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Universal Learning Design (ULD) and instructional strategies for inclusión

El Diseño Universal de Aprendizaje (DUA) y las estrategias didácticas para la inclusión

MUÑOZ-LÓPEZ, Temístocles†*, AYALA-GARCÍA, Jacqueline, SÁNCHEZ-RIVERA, Lilia and ESPERICUETA-MEDINA, Marta Nieves

Universidad Autónoma de Coahuila, Facultad de Ciencia, Educación y Humanidades

ID 1st Author: *Temístocles, Muñoz-López* / **ORC ID**: 0000-0003-4940-5730, **Researcher ID Thomson**: X-7834-2018. CVU 202437.

ID 1st Co-author: *Jacqueline, Ayala-García* / **ORC ID**: 0000-0002-2729-7401, **CVU CONACYT ID:** 541092

ID 2nd Co-author: *Lilia, Sánchez-Rivera* / **ORC ID**: 0000-0001-9468-2599, **CVU CONACYT ID:** 613195

ID 3rd Co-author: *Marta Nieves, Espericueta-Medina* / **ORC ID**: 0000-0002-4924-4332, **Researcher ID Thomson**: T-1500-2018, **arXiv Author ID:** Espericueta2018, **CVU CONACYT ID:** 372705

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Abstract

A study on Universal Design for Learning (UDL) was carried out with a sample of 373 teachers of the Elementary School of the Southeast region of Coahuila de Zaragoza in the 2021 – 2022 cycle, in three Axes that are Universal Design for learning, Educational Inclusion and Didactic Strategies from which 146 variables were obtained that were applied in an online digital instrument and processed with a spreadsheet and a statistical program, using descriptive statistics, correlation and factor analysis with the method of Principal Axis and Varimax rotation. 11 factors were obtained that explained 47.42% of the total variability of the phenomenon and was selected in Factor 1 since it concentrated the greatest variability with 27.22% with 38 variables selected. It was shown that teachers in their practice use 7 variables that correspond to the DUA, which allows to show a model with a central structure that was graphed. It also emphasizes the need to strengthen teacher training in variables that were not significant in their pedagogical practice.

Universal Design for Learning. Educational Inclusion. Didactic Strategies

Resumen

Se realizó un estudio sobre el Diseño Universal para el Aprendizaje (DUA) con una muestra de 373 docentes del Nivel Primaria de la región Sureste de Coahuila de Zaragoza en el ciclo 2021 – 2022, en tres Ejes que son Diseño Universal para el aprendizaje, Inclusión Educativa y Estrategias didácticas de los que se obtuvieron 146 variables que se aplicaron en un instrumento digital en línea y se procesaron con una hoja de cálculo y un programa estadístico, utilizando la estadística descriptiva, correlación y análisis factorial con el método de Eje Principal y rotación Varimax. Se obtuvieron 11 factores que explicaron el 47.42% de la variabilidad total del fenómeno y se seleccionó en Factor 1 dado que concentró la mayor variabilidad con el 27.22% con 38 variables seleccionadas. Se mostró que los docentes en su práctica utilizan 7 variables que corresponden al DUA, lo que permite mostrar un modelo con una estructura central que fue graficada. Se enfatiza también la necesidad de fortalecer la formación de los docentes en las variables que no resultaron significativas en su práctica pedagógica.

Diseño Universal para el Aprendizaje. Inclusión Educativa. Estrategias didácticas

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† Researcher contributing as first author.

Introduction

Universal Design for Learning is a concept that refers to the design of didactic materials and activities that allow learning objectives to be achieved by individuals with wide differences in their abilities" (SEP, 2018). In this empirical research it is considered necessary to assess teaching practices in order to establish the degree of implementation of Universal Design for Learning in Primary Level Institutions in the Southeast region of Coahuila de Zaragoza in the 2021 - 2022 cycle in order to have an overview that allows us to identify inclusive pedagogical practices that incorporate diversity as a source of enrichment of the teaching-learning process. The aim is to obtain results that allow us to assess and verify the degree of implementation of the SAD by teachers and, based on this, to determine whether or not it is an alternative to improve inclusion.

The SEP indicates that when we refer to Universal Design, we are talking about the design of products, environments and services to be used by all people, to the maximum extent possible, without adaptations or the need for specialised design according to the National Council for the Development and Inclusion of Persons with Disabilities since 17 June 2016, so talking about Universal Design for learning, automatically refers us to think about inclusion (Secretaría de Educación Pública, 2016).

We constantly talk about accessibility to refer to the right of persons with disabilities to enter, move around, go out, orient themselves and communicate with safe, autonomous and comfortable use of built spaces, furniture and equipment, transport, information and communications. Sometimes modifications and adaptations have to be made, for example, in the organisation of a work environment or an educational establishment in order to remove barriers that prevent a person with a disability from participating in an activity or receiving services on an equal basis with others.

However, when we refer to Universal Design, we are talking about the design of products, environments and services to be used by all people, to the maximum extent possible, without adaptations or the need for specialised design, i.e. the same design for everyone without distinction of people with or without disabilities. Universal Design for Learning (UDL)

In one of the classic texts on Universal Design for Learning (UDL), it is an approach that addresses the primary barrier to making expert learners of all students: it is the existence of inflexible curricula, which are intended to fit all students and therefore only increase the barriers to learning. They see learners with disabilities or in other disadvantaged situations as more vulnerable to such barriers, but many non-disabled learners also find that the curriculum is poorly designed to meet their learning needs. They insist that diversity is the norm, not the exception, wherever individuals are gathered, including schools.

These authors believe that when curricula are designed to meet the needs of the general average (to the exclusion of those with different abilities, learning styles, backgrounds, and even preferences), they fail to provide all individuals with fair and equal learning opportunities. The SAD helps meet the challenge of diversity by suggesting flexible instructional materials, techniques and strategies that empower educators to address and recognise these multiple needs. A universally designed curriculum is designed from the outset to try to meet the educational needs of the greatest number of users, making the costly process of introducing changes once the general curriculum is designed "for some" unnecessary (Rose & Wasson, 2008).

Iolanda Nieves and Ana Alberola say that these reflections present us with many challenges, one of which is the need to look for other frames of reference such as the UDL (Universal Design for Learning) universe, which offers us a new vision of the teaching-learning process for the 21st century. It proposes an education based on evidence (neuroeducation), respectful of human diversity (cognitive psychology), and offering a multiplicity of options for learning (active pedagogy, etc.). In conclusion, they state that, in addition, the ULD is based on a humanistic vision of education and on the evidence that we are all different and unique, combining our strengths and weaknesses. The norm is that beautiful and powerful variability (Nieves & Alberola, 2021).
As we commented earlier, Universal Design for Learning is a concept that refers to the design of teaching materials and activities that enable learning objectives to be achieved by individuals with wide differences in their abilities" (SEP, 2018).

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Universal design for learning constitutes a perspective through which it is possible for learners to experience greater well-being, confidence and personal fulfilment during their learning process.

Therefore, various examples of universal design for learning can be promoted in educational institutions to ensure that there are no major differences in the educational resources and learning strategies used with students.

Universal Design has seven principles:

1. Principle One: Equitable Use: Design is useful and marketable to people with diverse abilities.
2. Principle Two: Flexible Use: The design accommodates a wide range of individual preferences and abilities.
3. Principle Three: Simple and Intuitive Use: The use of the design is easy to understand, regardless of the user's experience, knowledge, language skills or level of concentration.
4. Principle Four: Perceptible Information: The design conveys the necessary information effectively to the user, regardless of environmental conditions or the user's sensory capabilities.
5. Principle Five: Error Tolerance: The design minimises risks and adverse consequences of unintended or accidental actions.
6. Principle Six: Minimal Physical Effort: The design can be used comfortably and efficiently while minimising fatigue.
7. Principle Seven: Adequate: Size of Approach and Use: Provides adequate size and space for approach, reach, manipulation and use, regardless of the user's body size, posture or mobility.

Undoubtedly, talking about Universal Design automatically leads us to think about inclusion (Secretaría de Educación Pública, 2016).

Educational Inclusion

It has been insisted in the official sector that in order to achieve growth within our country there is a series of basic elements, education, since through it we acquire knowledge, enrich our culture and develop our capacities, regardless of our condition.

Thus, inclusive education means that all children and young people, with and without disabilities or difficulties, learn together in the various regular educational institutions (pre-school, college/school, post-secondary and universities) with an appropriate area of support.

The word inclusion means "action and effect of putting something in" and is lexically composed of the prefix in meaning inwards, claudere meaning to enclose and the suffix -sion of action and effect.

In turn, the word educational composed of Latin roots means "relating to the action of directing to develop a child's faculties". It is composed of the lexicons ex meaning outward, ducere (to guide) and the suffix -tive meaning having an active or passive relationship.

The Diccionario de la Real Academia de la Lengua Española (2001) defines diversity as: "Variety, dissimilarity, difference". Similarly Abbagnano (Abbagnano, 1992), defines diversity as: "All otherness, difference or dissimilarity. The term is more generic than these three and can indicate one, any of them or all of them together. Diversity, in this sense, is everything that being real is not identical.”.

Within the pedagogical reflection on studying the sense and meaning of an education that is clearly evolving from a pedagogical perspective of integration towards one of social and educational inclusion. As a result of the analysis, it is highlighted that this conceptual evolution is extremely positive in the university environment and that it is necessary to articulate new discourses and teaching practices that project and illuminate the idea that inclusive education is a process of permanent change (Fernández Herrería & López López, 2007).

The precursor of inclusion in the area of education is St. Joseph Calasanz (1557-1648), a European religious and pedagogue who founded the first free public school in Rome in 1597, known as the Pious School, giving extraordinary importance to education as the main means of improving moral aspects, social promotion and the reform of customs.

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This revolutionary innovation radically broke with all those class privileges that kept large masses of the population at a disadvantage, marginalised and poor, which is why he is attributed as the pedagogue of social, racial or religious non-discrimination, giving the opportunity in these popular, public and free schools for the generalisation of education and its universalisation. (Domènech i Mira, 1993).

Rather than treating these individual differences as discrepant, irrelevant (or even annoying) sources of error, the SAD treats them as the main facts; they are fundamental to understanding and designing effective teaching. Consequently, to achieve high levels of performance the SAD maintains the criterion of flexible design with options adaptable to individual needs. CAST therefore ensures that such options must be strong and varied enough to optimise teaching for diverse learners, which are, by the way, found in all classrooms (Rose & Wasson, 2008).

Teaching strategies involved in SAD

Many authors have insisted on teacher training in SAD in order to promote inclusion. Through the creation of discussion groups, strategies such as cooperative learning, learning workshops, working in corners and centres of interest based on SAD principles have been tested. The conclusions reveal the need to orient the training of Early Childhood Education teachers towards the use of active and participatory methodologies (Navarro-Montaño *et al*., 2022).

These authors found that, in cooperative learning, effort and persistence, followed by self-regulation are the most important variables, with multiple options and interest being less valued. In the Learning Workshops, the most highly rated variables were comprehension and multiple choices, while the least rated were interest and executive functions. In the Corner Work, the most valued pattern is perception and the least valued are interacting with information, comprehension, effort and persistence, and self-regulation. With regard to the centres of interest, interest is the variable that stands out, and expression and communication are poorly valued. Diaz states that teaching strategies are "procedures and resources used by the teacher to promote meaningful learning, intentionally facilitating a deeper and more conscious processing of new content" (Díaz Barriga Arceo and Gerardo Hernández Rojas, 2002).

Another definition of teaching strategy is provided by (Tebar Belmonte, 2003) when he mentions that it consists of procedures that the teacher uses in a reflexive and flexible way, promoting the achievement of significant learning in students. Under this conceptualisation, teachers in charge of the teaching process must be competent in the design, planning, implementation and evaluation of classes.

There are two types of teaching strategies: teaching strategies used by the group teacher to promote and facilitate meaningful learning of the students and learning strategies used by the learner to recognise, learn and apply what has been learned. Therefore, strategies are directed towards the fulfilment of educational purposes in certain contexts where both strategies are put into practice.

It is necessary to allude to the fact that didactic strategies contribute positively to the development of competences in students; it is up to the teacher to decide on the didactic strategies to be used in animation situations, in each of their moments (beginning, development and closure).

Diaz continues (op. cit.) mentioning that two types of strategies are identified considering the teaching, didactic or animation sequence, classifying them in pre-instructional strategies as those that are developed at the beginning of the teaching process, which allow to promote previous knowledge, achieving the contextualisation of the students' learning; constructional strategies are those that are carried out during the teaching-learning process supporting the curricular contents, promoting the improvement in attention, codification and conceptualisation of the expected learning (Diaz Barriga & Hernández Rojas, 2002).

Post-instructional strategies are presented at the end of the process, allowing students to have a synthetic and integrative vision and sometimes a critical one, which promotes the valuation of their own learning.

Attention to diversity has been, is and will continue to be a concern of teaching, traditionally this process diversity is seen as a problem and not as a source of learning, given its own characteristics.

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It is evident that the teacher has at his disposal a wide range of strategies, resources and materials that allow him to attend to the learner, facilitating the teaching-learning process. It is also true that the concept of strategies to cater for diversity varies in meaning between authors and the educational community. Among other authors who contextualise the subject, Joaquín Gairín (1998) presents didactic and organisational strategies that educational institutions can carry out in order to educate in diversity, recognising the existing differences among school students. In the first part, he presents a conceptual analysis of diversity. He then reflects on the functionality of school organisations, analysing the different stages of these institutions, and gives an overview of possible ways of dealing with diversity within schools. The author provides organisational measures to manage student diversity, which affect institutional approaches, structures and the relational system of schools. In conclusion, it is suggested that there is no single organisational model for dealing with diversity, but that different modifications must be introduced in the organisational dynamics of schools in order to respond to this educational diversity (Gairín Sallán, 1998).

Similarly, he mentions the organisational strategies that occupy a greater structure in relation to decision-making, physical spaces in order to provide better accessibility to materials, such as corners, flexible groupings, workshops, support classrooms, dual plans, etc. In order to build inclusive schools and classrooms that integrate learners regardless of their particular condition, Article 24 of the Convention on the Rights of Persons with Disabilities recognises their right to education without discrimination, with equal opportunities to promote their academic and social development. This leads to the application of specific and diversified strategies that, in addition to responding to the needs of each individual, ensure their access, permanence and graduation from Basic Education.

Specific strategies are methodological and didactic resources that favour the learning and participation of people with disabilities, as they respond to the basic learning needs in various aspects: use of language, mathematical problem solving, use of Information and Communication Technologies (ICT), creative expression of ideas, aesthetic awareness and establishment of social ties.

Diversified strategies encourage the development of actions that respond to diversity in the classroom, through which it is possible for teachers to use didactic-creative and innovative resources, adapt spaces and collaborative work, manage materials and time, and use methodological proposals that represent a challenge for students (Secretaría de Educación Pública, 2012).

From the above, it is necessary to analyse the Universal Design for Learning Model in the context of its practice in the classroom, with the purpose of enriching it from the teaching practice in its concordances and differences, as well as in conjunction with other strategies that are preferred by teachers.

In the approach of the present research, reference was made to three axes that are didactic strategies, inclusion and the learning process that integrate the teaching practice in reality, focusing clearly on each of its characteristics to distil variables of importance for the study seeking the enrichment of the DUA Model. Likewise, orienting them to the educational attention of the population that faces barriers to learning and participation, due to presenting a condition of disability, outstanding abilities and aptitudes or difficulties in the development of the competences of the training fields of the Curriculum.

The problem

The problem has two aspects to be analysed, the first one lies in knowing in what way and to what extent teachers are implementing strategies in accordance with the UDL, and on the other hand, which of the strategies that teachers use in their daily practice could enrich it. From the Guide for Universal Design for Learning Version 1.0, it is mentioned that this model is based on Principles and each of them contains guidelines for its application, and this has been maintained in many schools. This classification contains the following, according to (Rose & Wasson, 2008):

Principle I. Provide multiple means of representation

Guideline 1. Providing options for perception

Guideline 2. Provide options for language and the use of symbols

Guideline 3. Providing options for comprehension

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Principle II. Provide Multiple Means for Action and Expression Guideline 4.

Guideline 4. Providing options for physical action

Guideline 5. Provide options for expressive skills and fluency Guideline 6.

Guideline 6. Provide Options for Executive Functions

Principle II. Provide Multiple Means for Motivation and Engagement in Learning

Guideline 7. Provide options for arousal of interest

Guideline 8. Providing options for sustaining effort and persistence

Guideline 9. Provide options for self-regulation

Methodology

An exhaustive review of the literature was made to obtain the relevant research variables, to be applied in Primary Level schools located in the Southeast Region of the State of Coahuila, as a quantitative, randomised, prospective, cross-sectional, comparative, observational research with relational and explanatory scope.

The variables were distilled from the selected axes and operationalised in a digital questionnaire composed of five sections made up of 146 questions, mostly closed and organised as follows:

Section I General Data. Basic information about the respondent

Section II Characterisation: Professional contextualisation information.

Section III Universal Design for Learning Axis and its principles.

Section IV Educational Inclusion Axis, with information about the basic conditions of inclusion (access, permanence and learning achievement).

Section V Didactic Strategies Axis with information related to specific strategies, diversified strategies and curricular adjustments.

The 146 variables obtained were coded with keys to allow their inclusion in the statistical programme.

The instrument was applied digitally online to teachers selected from a population of approximately 12,557 teachers (with annual movements), so that the sample was set at 373 teachers according to the formula of Stephen Isaac and William B. Michael. The inclusion criterion is that they work as regular group teachers or as pedagogy teachers at the Primary Level in educational institutions in the Southeast Region of Coahuila. The exclusion criterion is for those classroom teachers who do not include in their classes students who face some kind of barriers to learning and participation or Outstanding Students.

Data were entered into Excel spreadsheets and Statistica, where Cronbach's alpha: .969036; Mean inter-item corr.: 0.00001; Mean=1101.53; Dv. Std.=75.8462.

Descriptive statistics were obtained and an exploratory factor analysis was performed. Factor analysis is an exploratory technique designed 1) to reduce the number of variables and 2) to detect the structure of the relationships between variables, i.e. to classify the variables. Therefore, factor analysis is applied as a method of data reduction or structure detection. The relationship of inclusive teaching strategies related to SAD was sought orthogonally, so the Principal Axis technique with Varimax rotation was selected.This rotation of the factor loadings is useful because it is aimed at maximising the variances of the squared raw factor loadings between the variables for each factor; this is equivalent to maximising the variances in the columns of the matrix of the squared raw factor loadings. This is necessary to concentrate in Factor 1 most of the variance, a phenomenon used since Spearman in 1904, in his classic work on intelligence, where he distinguishes a general factor (factor G) and a number of specific factors (Spearman, 1904). Finally, the results were plotted and read and conclusions were drawn.

Results

The extraction of 11 factors with the Principal Axis method and varimax rotation concentrated 27.22% of the variability in the first factor as shown in Table 2.

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From the selection of the 38 variables of factor 1, we proceeded to read their intrafactorial relationships and to construct a graph Figure 1, with their factor loadings shown in Table 3.

Graphing the result of Factor 1 data and its variables, we find that the most important variables of the inclusive teaching practice model shows that the core structure is supported by 7 variables, namely: Providing alternatives for visual information, Clarifying syntax and structure, Illustrating through multiple media, Activating or providing prior knowledge, Guiding information processing and visualisation, Maximising transfer and generalisation of learning to new contexts, Guiding students to appropriate goal setting.

In addition, it is noted that there is a small group of variables consisting of: Follow-up regarding activities, Acceptance, Integration, Inclusion, and Student interests. Linked to the core structure by the variables: Guiding information processing and visualisation, Maximising transfer and generalisation of learning to new contexts, and Guiding learners in setting appropriate goals.

Two variables are isolated but associated with Optimising autonomy (learner independence) with individual choice of learning expected by learners, and the variable Optimising relevance, value and authenticity of activities and as an appendix to Promoting expectations and beliefs that optimise motivation, Fostering collaboration and community (learning groups, peer tutors), Incorporating reminders of goals and objectives and Varying demands and resources to optimise challenge.

Isolated from the Model without being associated are: Minimising threats and distractions in the learning environment, Promoting cross-language understanding, Cross-cutting learning, The extent to which students in your classroom are purposeful and motivated, The extent to which students in your classroom are resourceful and knowledgeable, and The extent to which students in your classroom are strategic and goal-directed. This can be seen in Figure 1.

Annexes

Variables integrated into the instrument	Code
Optimising autonomy (learner independence) and individual choice of learning expected by learners	OptAutonomía
Optimising relevance, value and authenticity of activities	OptRelevancia
Minimising threats and distractions in the learning environment	MinAmenazas
Incorporating reminders of goals and objectives	IncorpMetas
Promoting expectations and beliefs that optimise motivation	OptMotivación
Varying demands and resources to optimise challenge	OptDesafío
Encourage collaboration and community (learning groups, peer tutors)	FomentarColaboración
Increasing mastery-oriented feedback	IncremRetroalim
Facilitating personal coping skills and strategies	FacilHabyEst
Develop self-assessment and reflection	DesarrollAutoev
Offering ways to personalise the display of information	VisualizacionInf
Offering alternatives for auditory information	Infaudi
Offer alternatives for visual information	Infvisual
Clarify vocabulary and symbols	Vocabulario
Clarify syntax and structure	Sintaxis
Support decoding of text, mathematical notation and symbols	Decodificación
Promote cross-language comprehension	CompIdiomas
Illustrate through multiple media	Ilustrar
Activate or provide background knowledge	ConocPrevios
Highlight patterns, critical features, big ideas and relationships (key ideas, learned skills, schemas)	Patrones
Guide processing and visualisation of information	ProcesamientoInf
Maximising transfer and generalisation of learning to new contexts	GeneralizApdje
Vary response and navigation methods (hand-held, voice, switch, adapted keyboard)	Metodos
Optimising access to assistive tools and technologies (alternative keyboards, touch screens, software)	HerramYTec
Use multiple media to communicate	MMComunicacion
Use multiple tools for construction and composition	MMconstruccion
Develop fluency with graduated levels of practice and performance support	Independencia
Guide learners in setting appropriate goals	EstabMetas
Support planning and development of strategies to achieve the goal	PlanifYEstrategia
Facilitate information and resource management	GestiónInf
Enhancing capacity to monitor progress	MonitorearProgreso
Applying standards that promote attention to diversity	NormasDiv
Distribution of classroom space conducive to attention to diversity	EspacioAula
Adapting furniture to meet the needs of all learners	AdecuarMob
Change work routines to encourage peer interaction.	CambRutinas
Making abrupt changes in activities	CambiosAct
Create a high level of classroom discipline.	DisciplinaAula
Lighting	Iluminación
Sound	Sonido
Cleanliness	Limpieza
Pace of learning for all students	RitmoApdje
The Learning Style of all students	EstiloApdje
Adjusting the Teaching Style	AjustarEnseñanza
Adjust the Methodology of work	AjustarMetodología
Follow up on activities	SeguimAct
Conduct Observations in congruency with the Plan and Programmes	ObservaPyP
Make curricular adjustments	AjustesCurr
Diversify learning	DiversificarApdje
Transversality of Learning	Transversalidad
Types of intelligence	TiposInteligencia
Make use of alternative communication systems (e.g. gestures, body language, sign language, communication board. Braille)	SistemasAlternativos
Acceptance	Aceptación
Integration	Integración
Inclusion	Inclusión
Overprotection	Sobreprotección
Attention	Atención
Student needs	Necesidades
Student Interests	Intereses
Being Welcome	SerBienvenidos
Students support each other	ApoyoMutuo
Students are valued equally	ValoradosIgual
Reject all forms of discrimination	RechazanDisc
Admit all students from the community	Admision
Use alternative means and language of communication	LenguajeAltern
Attend school daily	Asistencia
Select the percentage of achievement in fundamental learning at the classroom level. Level Requires Support	NivelRA. Nivel Requiere Apoyo
Select the percentage of achievement in the key learning outcomes at the classroom level. Level Developing	NivelED. Nivel en Desarrollo
Select the percentage of achievement in fundamental learning at the classroom level. Expected Level	NivelE. Nivel Esperado
Observation Guide	GuíaObserv
Anecdotal Record	RegAnecdotico
Classroom diary	DiarioClase
Attitude scale	EscActitudes
Questions about the procedure	PreguntasProc
Students' notebooks	Cuadernos
Graphic organiser	OrgGráfico
Portfolio	Portafolio
Rubric	Rúbrica

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Checklist	ListaCotejo
Discussion	Debate
Essay	Ensayo
Written tests	PruebaEscrita
Evaluation Record	RegistroEv
SisAT Results System (Early Warning System)	SisAT
Examination Results	ResultEx
Fact Sheet	FichaDesc
Report card	Boleta
Student production	ProdAlumn
To what extent does your group achieve the key learning outcomes of the SiSAT Strategy at the Expected Reading Level?	NELect
To what extent does your group achieve the key learning outcomes of the SiSAT Strategy in the Expected Level of Text Production?	NEProdTex
To what extent does your group achieve the key learning outcomes considering the results of the SiSAT Strategy in the Expected Level of Mental Calculation?	1 NECalcMen
Learning activities are planned with all learners in mind.	ActvsApdje
The learning activities encourage the participation of all students.	ActApdzjePartic
Students' critical thinking is promoted	PensamCritico
Students are actively involved in their own learning	PropAdzje
Students learn from each other	TrabajoColab
Lessons develop an understanding of similarities and differences between people	ComprSimilYDif
Assessments encourage the achievements of all students	Ev FomeLogros
Discipline is based on mutual respect	Respeto
The educational team plans, teaches and reviews collaboratively.	EqEducativo
The educational team develops shared resources to support learning.	EqEdRec
Support teachers assist the learning and participation of all students.	ProfApApdje
Homework assignments are designed to contribute to each student's learning.	Tareas
After-school activities are available to all students.	ActExtracurr
Local resources are known and used.	RecursLocales
Mexican Sign Language	LSM
Braille system	Braille
Kramer Abacus	Kramer
Communication board	Tablero
Place student in front of the blackboard	FrenePizarr
Speak in front of the student with deafness	Gesticulacion
Articulate words using expressive resource	RecExpresivos
Macrotext	Macrotextos
Cognitive scaffolds	AndamCogn
Concrete material	MatConcreto
Information Technology and Application	TIC´S
Videos	Videos
Simple concrete explanations	Explicaciones
Alternative Communication Systems	SistAltern
Adapt the purposes for the class	AdapPropositos
Adapt learning activities	AjuActApdzje
Adapt the assessment of learning	AdapValApdzje
Adapting the curriculum	AjCurrículo
Adapt teaching materials	AdapMatDid
To what extent are the students in your classroom purposeful and motivated?	DecididosMotivados
To what extent are the students in your classroom resourceful and knowledgeable?	Ingeniosos
To what extent are the students in your classroom strategic and goal-directed?	Estrategicos

Table 1 Variables of the instrument and their codes
Source: Own Elaboration

Thematic axes	Conceptual definition	Operational definition	Categories of analysis
Universal Design for Learning	The design of teaching materials and activities that enable learning objectives to be achieved by individuals with wide differences in abilities" (SEP, 2018).	Methodological tool used to cater for diversity, multiplying the resources available.	Principles
Educational Inclusion	Educational inclusion is defined as "a process based on the principle that assumes diversity as an inherent characteristic of social groups, which must be used to the benefit of each of its members, so that the educational system and programmes must be designed and implemented in accordance with this diversity, in order to identify and respond to the needs, characteristics and capacities of all students". Operational rules of the Programme for Inclusion and Equity (2016)	Integration of all pupils in classes according to their needs, interests and abilities..	Types of Barriers: Attitudinal Organisational Methodological Indicators of educational inclusion: Accessibility Permanence Learning achievement
Didactic strategy	Useful tools that help teachers communicate content and make it easier for students to understand. (Flores Flores, *et al.*, 2017)	Procedures and resources used by teachers to facilitate learners' learning.	Diversified strategies Specific strategies Curricular adjustments

Table 1 Conceptualisation of variables
Source: Own Elaboration

Factors	eigenvalue	% Overall Variance	Cumulative Eigenvalue	% Cumulative
1	34.30	**27.22**	34.30	27.22
2	5.09	4.04	39.39	31.26
3	5.01	3.97	44.40	35.24
4	4.07	3.23	48.46	38.46
5	2.39	1.90	50.85	40.36
6	1.93	1.54	52.79	41.89
7	1.80	1.43	54.58	43.32
8	1.49	1.18	56.07	44.50
9	1.37	1.08	57.44	45.58
10	1.17	0.93	58.61	46.51
11	1.14	0.91	59.75	47.42

Table 3 Extracted factors, with their eigenvalues and percentage of variance explained.
Source: Own Elaboration

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Axis	Variable selected	Code	factor loading	No. Correlations
Learning Axis: Universal Design for Learning	Optimising autonomy (learner independence) and individual choice of learning expected by learners	OptAutonomía	0.41	1
	Optimising relevance, value and authenticity of activities	OptRelevancia	0.46	1
	Minimising threats and distractions in the learning environment	MinAmenazas	0.39	0
	Incorporating reminders of goals and objectives	IncorpMetas	0.49	1
	Promoting expectations and beliefs that optimise motivation	OptMotivación	0.53	8
	Varying demands and resources to optimise challenge	OptDesafío	0.50	1
	Encourage collaboration and community (learning groups, peer tutors)	FomentarColaboración	0.51	1
	Increasing mastery-oriented feedback	IncremRetroalim	0.61	4
	Facilitating personal coping skills and strategies	FacilHabyEst	0.55	5
	Develop self-assessment and reflection	DesarrollAutoev	0.55	7
	Offering ways to personalise the display of information	VisualizacionInf	0.56	9
	Offering alternatives for auditory information	Ofrecer alternativas para la información auditiva	0.58	9
	Offer alternatives for visual information	**Infvisual**	**0.58**	**10**
	Clarify vocabulary and symbols	Vocabulario	0.58	7
	Clarify syntax and structure	**Sintaxis**	**0.64**	**11**
	Support decoding of text, mathematical notation and symbols	Decodificación	0.62	7
	Promote cross-language comprehension	CompIdiomas	0.40	0
	Illustrate through multiple media	**Ilustrar**	**0.56**	**10**
	Activate or provide background knowledge	**ConocPrevios**	**0.60**	**12**
	Highlight patterns, critical features, big ideas and relationships (key ideas, learned skills, schemas)	Patrones	0.55	5
	Guiding information processing and visualisation	**ProcesamientoInf**	**0.56**	**13**
	Maximise transfer and generalisation of learning to new contexts	**GeneralizApdje**	**0.57**	**17**
	Develop fluency with graduated levels of support for practice and performance	Independencia	0.30	2
	Guide learners in setting appropriate goals	**EstabMetas**	**0.49**	**10**
	Support planning and development of strategies to achieve the goal	PlanifYEstrategia	0.40	3
	Facilitate information and resource management	GestiónInf	0.45	5
	Improve capacity to monitor progress	MonitorearProgreso	0.46	9
Educational Inclusion	Pace of learning for all learners	RitmoApdje	0.31	1
	Follow-up on activities	SeguimAct	0.32	7
	Mainstreaming of learning	Transversalidad	0.33	0
	Acceptance	Aceptación	0.30	5
	Integration	Integración	0.38	3
	Inclusion	Inclusión	0.38	5
	Student interests	Intereses	0.36	3
	Student production	ProdAlumn	0.38	2
Axis Teaching	Extent to which students in your classroom are purposeful and motivated.	DecididosMotivados	0.41	0
	Extent to which students in your classroom are resourceful and knowledgeable	Ingeniosos	0.36	0
	Extent to which students in your classroom are strategic and goal-directed.	Estrategicos	0.30	0

Table 4 Variables selected by factor analysis for Factor 1, with factor loadings ≥0.294 and the number of correlations between them, selected by sigmatic cut-off N+1=0.588, where the most important variables are in bold
Source: Own Elaboration

Conclusions

The 7 variables of the resulting model come from the Universal Design for Learning (UDL) Axis and are the basis for the pedagogical activity of teachers, namely Provide alternatives for visual information, Clarify syntax and structure, Illustrate through multiple media, Activate or provide prior knowledge, Guide processing and visualisation of information, Maximise transfer and generalisation of learning to new contexts, Guide learners to set appropriate goals, Maximising transfer and generalisation of learning to new contexts, Guiding learners in setting appropriate goals, while the group of variables of Following up on activities, Acceptance, Integration, Inclusion, and Learner interests correspond to the Educational Inclusion Axis which is integrated to the core structure by the variables: Guiding information processing and visualisation, Maximising transfer and generalisation of learning to new contexts and, Guiding learners to appropriate goal setting.

The above denotes an acceptable but not full adoption of the Universal Design for Learning Model, enriched by own initiatives, but without the specific strategies such as Mexican Sign Language, Braille System, Kramer Abacus, Communication Board, Placing student in front of the blackboard, Face-to-face talk to the deaf learner, Articulating words using expressive resource, Macrotexts, Cognitive scaffolds, Concrete material, Information Technology and Application, Videos, Simple concrete explanations, Alternative Communication Systems, Adapting the purposes for the class, Adapting the learning activities, Adapting the assessment of learning, Adjusting the curriculum, and Adapting the didactic materials, Elements that need to be incorporated in a significant way in the Model.

The variables that are considered in teaching practice and that should be strengthened in relation to others in the SAD model are Guiding information processing and visualisation, Maximising transfer and generalisation of learning to new contexts, and Developing fluency with graduated levels of support for practice and performance.

These findings provide options for improving the DUA Model, especially in teaching practice, to generate inclusive pedagogy.

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