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Reading lessons planning with students with intellectual and developmental disabilities in mind: needs-based assessment proposal

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Reading lessons planning with students with intellectual and developmental disabilities in mind: needs-based assessment proposal

This study addresses the need to reinforce the reading learning of students with intellectual and developmental disabilities (IDD) in general education classrooms. A standardized way of assessing support needs in reading (SNr) from the teachers' perspective is proposed. The objectives were (i) to develop an instrument and evaluate its properties and (ii) to preliminarily assess the support needs in reading of students with IDD. Participants were 86 Chilean elementary school teachers who responded about the support needs of their own students. The instrument assesses three dimensions (i.e., representation, engagement, and action and expression). Analyses showed excellent preliminary evidence of validity and reliability. Preliminarily identified support needs suggest that students need more support in representation. Practical and research implications are discussed.

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From an ecological-functional approach, reading is understood as a continuous learning activity essential for human development. Knowing how to read and understanding what is read allows a more autonomous participation in the world and a deeper understanding of it, essential aspects for achieving personal-desired outcomes. Thus, it is consistent with a quality-of-life (QoL) approach (Schalock & Verdugo, 2002). Reading is a skill that allows access to knowledge as well as facilitating an understanding of other curricular areas. But above all things, literacy is a civil right., because it provides access to culture and participation in society throughout life (Allor et al. 2010; Fonseca et al., 2019; Joseph et al., 2021). Reading competence and text comprehension are a prerequisite for learning and performance in almost any daily task. The mastery of written language is part of the democratization of society; it is a tool that allows people to function in everyday life, relate to others, communicate effectively in different ways, develop new knowledge, and access different activities (Alnahdi, 2015; Fonseca et al., 2019; Medina, 2006).

Consequently, efforts to promote reading learning in students with intellectual and developmental disabilities (IDD) is a crucial learning goal (Ratz & Lenhard, 2013) to enhance not only their access to and learning from the curricular content, but also to promote their participation and development to their fullest potential, key elements within a “paedocentric” and “whole-child approach” as defended by Schalock and Verdugo’s QoL model (2002) and the United Nation’s Convention on the Rights of Persons with Disabilities (UNCRPD; United Nations, 2006).

Even though students with IDD display an extremely wide variety of skills in the field of literacy (Ratz & Lenhard,2013), they often have difficulty reading and comprehending texts. Reading is a complex task and, therefore, learning to read or comprehend texts are difficult processes, which become even more difficult for learners who face additional challenges (Alnahdi, 2015). In this context, teachers face great challenges in teaching reading to students with IDD (Allor et al. 2009; Alnahdi, 2015; Joseph et al., 2021). Several studies have addressed learning to

read for students with ID, many of them focused on the effectiveness of different instructional strategies. In doing so, they have promoted evidence-based practices in schools. Two types of approaches stand out (Alnahdi, 2015). One focused on subsets of skills or one method approach (e.g., word recognition) (e.g., Ruwe et al., 2011). And the other, a comprehensive approach (e.g., comprehension, phonological awareness) (Allor et al. 2010). Findings indicate that students with IDD could demonstrate their understanding of a text if they received adequate instruction. Students with IDD can apply reading comprehension strategies (e.g., predicting, summarizing, identifying main ideas) especially if the strategies were modelled and practiced with support and feedback (Joseph et al., 2021).

All these studies have been of undoubted relevance in the field of reading and IDD. Notwithstanding the above, two gaps can be identified that are addressed in this paper:

1. Most studies have been conducted on small groups of students (Joseph et al., 2021). For example, in the studies reviewed by Joseph et al. (2021), only one study implemented instruction in a large group setting (Isikdogan & Kargin, 2010). It has also been criticized that many of the methods have been effective because of the level of support available (Alnahdi, 2015). Moreover, that they have often been implemented in segregated contexts. In this regard, the authors have highlighted that it would be beneficial for researchers to further examine teaching reading comprehension to students with IDD in groups with larger than 1:3 teacher to student ratios (Joseph et al., 2021).

2. Another gap identified is that this field has largely focused on the efficacy of interventions (evidence-based practice) but has not made room for the identification of needs (needs-based practice). This is even though it has been emphasized that the choice of strategies should be

aligned with the characteristics of students with IDD and should respond to the variability among students (Alnahdi, 2015).

Bearing the above in mind, to our knowledge, no linkage of evidence-based practices with an approach based on the detection of students' needs has been presented. This highlights the importance of focusing research on the needs of learners for planning and not only on the implementation of practices that have proven to be effective. This is because the characteristics that make strategies effective are closely related to their ability to respond to the needs of learners under person-centered approaches that take into consideration assets, goals, and needs of persons with IDD (Schalock et al., 2021a; Thompson et al., 2018; Walker et al., 2014). Moreover, in a general education context (non-segregated context), a needs-based perspective can enable prioritization of those elements that are crucial to making the common classroom a conducive environment for all students to learn to read (Thompson et al., 2020).

Learning to read in general education settings

According to the UNCRPD (United Nations, 2006), all countries must guarantee an inclusive education (IE) system that allows access, participation, learning and development of students with disabilities to their fullest potential in general education contexts, on equal terms with their typically developing peers. While some positions prioritize students' learning over participation alongside peers, both elements are now considered equally important (Norwich & Koutsouris, 2017). Indeed, maximizing participation has become a curricular goal itself. Amor et al. (2019) provide a definition of IE aligned with what is stated in the UNCRPD (United Nations, 2006). The authors state that an IE allows students with disabilities to be present, participate, learn, and develop to their fullest potential alongside their typically developing peers. This should take place

in a general education context in which students with disabilities receive the necessary support to access the general curriculum.

Reading is learned mainly through social interaction; that is, knowing how others use reading (Medina, 2006). Consequently, all students should be able to learn to read in their cultural context of reference and in relation to their peers. However, this learning must occur without neglecting the students' participation (i.e., in general education contexts). Alongside the importance of learning in mainstream contexts, the UNCRPD emphasizes the application of universal design; that is, the design of products, environments, and services that are useful for all students to the greatest extent possible, without excluding specific groups. Universal design for learning (UDL) has emerged as an essential framework for delivering learning for students with IDD in general education contexts (Smith & Lowrey, 2017). Some evidence has supported its application in these contexts (AlRawi & AlKahtani, 2021; Al Hazmi & Ahmad, 2018; Rao et al., 2014; Rao et al., 2017; Smith & Lowrey, 2017). In fact, UDL is currently seen as the most promising framework for changing mindsets and accepting learner diversity as a fact of life, something that can be achieved through proactive design of the learning experience (Fovet, 2022; Thompson et al., 2018).

However, limited research has been conducted to explore the effectiveness of UDL environments for supporting literacy outcomes for students with IDD (Coyne et al, 2017; Rao et al., 2017). Some experimental studies have supported the benefits of using UDL to design of literacy environments for elementary-aged students with IDD (Coyne et al. 2010; Coyne et al., 2017; Rao et al., 2017). For instance, Coyne et al. (2010) examined the effect of a UDL approach to literacy on the reading achievement of students with IDD. The results supported the value of this approach because the participating children showed significant improvements in reading comprehension.

Then, in Coyne et al. (2017) authors concluded that students with IDD can benefit from UDL for literacy if its application meets the needs of the individual student.

Need-based planning to support learning

The UNCRPD (United Nations, 2006) emphasizes adopting reasonable accommodations to ensure the IE. This can be achieved by addressing their personal needs to optimize participation, learning and progress through the implementation of adequate supports (Amor et al., 2019; López-Vélez et al., 2022). Hence, IE is understood as a process through which the educational system offers responses to different needs and identities, thereby guaranteeing the right to education and access to the curriculum for all students. The UNCRPD have arisen from a paradigm shift towards disability. From this paradigm, efforts are focused on modifying the educational context to improve the functioning of learners (Schalock, 2018). A central concept in this paradigm shift is "support needs" (SN). Thompson et al. (2009, p. 135) define this term as the "pattern and intensity of supports necessary for a person to participate in activities related to standard human functioning". The SN are central in the field of needs-centered assessment and must be accurately assessed to plan and provide supports (Schalock et al., 2021b).

The application of this paradigm has focused on SN assessment and planning personalized supports (see, e.g., Thompson *et al*., 2018). Although the primary focus of this approach has been students with IDD, there are authors that have highlighted the pertinence to implement the supports paradigm with all students (Hagiwara et al., 2019; Verdugo et al., 2019). Regarding the practical experiences of its implementation, evidence still goes in a slow pace with several works proposing frameworks for action (e.g., Amor et al., 2021; Thompson et al., 2018) and others showing evidence coming from case studies (e.g., Schalock et al., 2018; Walker et al., 2014). In this sense, there is an important mismatch between the available evidence regarding education and

social services, where different works have addressed the efficacy of the implementation of personalized supports through person-centered planning (Claes et al., 2010; Ratti et al., 2016) and where the implementation of the supports paradigm has led the transformation of disability organizations (see, e.g., Thompson et al., 2014; van Loon et al., 2010).

Learning opportunities should be planned purposefully, taking into account the needs and abilities of students to promote authentic responses that accurately reflect what they know and can do (Johnson et al., 2022). The study reported in *[details removed for peer review]* emphasizes the value of designing supports in a universal way with students' needs in mind. In this sense, the authors proposed a new application of the term SN, specifically in relation to universal supports. The paper conceptualized UDL as a system of supports, which implies a planned and integrated articulation of strategies and resources to enhance learning for all learners. In doing so, the proposal delineated the construct of SN, giving rise to the concept “learning support needs”. This construct is defined as "the pattern and intensity of supports for engagement, representation, action, and expression necessary for a student to learn in a regular classroom (along with all students)" (p. 150). Consistent with this concept, an assessment approach was proposed, as well as preliminary guidelines for the operationalization of these SN. However, that work emphasized that to carry out an effective assessment of learning SN, each indicator must be framed within a specific curricular setting and educational level *[details removed for peer review].*

The current study

Considering as a theoretical framework the proposal developed in *[details removed for peer review]*, this paper describes the development of a standardized measure of support needs in reading (SNr) for students with ID in general education classrooms from the teacher's perspective. The tool developed and the data derived from it are intended to serve as input for the planning of

reading classes from the UDL framework, promoting the effective inclusion of students' needs through the implementation of universal supports. This work placed emphasis solely on reading activities conducted in Spanish classes (language classes) within general education classrooms. The purpose of this study was to develop a test and assess the SNr of students with IDD from the teacher's perspective. Therefore, the research objectives were twofold: (i) to develop an instrument and evaluate its properties; and (ii) to preliminarily assess the SNr of students with IDD. This work is in line with the growing interest of researchers in increasing responsive opportunities for students with increased SN in general education settings (e.g., Johnson et al., 2022; Flanagan & Morgan, 2021). The contribution of this work is that it offers an explicitly needs-based approach to curriculum planning and proposes a systematic way of thinking about and assessing student needs.

The work presented addresses the challenge of assessing and identifying the SNr of children with IDD in general education classrooms. The development of an original instrument called the *Evaluation Scale of Support Needs for Learning to Read in the Classroom* (ENAULA) the analysis of its psychometric properties in a sample of teachers is reported. Subsequently, the SNr identified in the group studied were preliminarily characterized. This scale is intended to help teachers identify the supports needed by children with IDD to learn to read along with their peers.

In relation to the study's hypotheses on the psychometric quality of the instrument, it was hypothesized that the instrument developed would present adequate evidence of validity and that the model on which it was constructed would be reflected in the response of the participants (three-dimensional model). Given that the instrument can be applied to both classroom teachers and special education teachers, it was hypothesized that there would be invariance in test performance between both informants. Likewise, it was expected that the instrument would have adequate reliability indices. Regarding the needs preliminarily identified by means of the

instrument developed, it was hypothesized that: (i) the needs identified will differ among the subjects evaluated since under a common diagnosis there are diverse needs; and (ii) at a global level, certain patterns of needs will be observed that will allow discussing the most pertinent type of support to be incorporated in regular reading classes.

Methods

This study was instrumental and non-experimental because its purpose was to develop and administer a new tool and evaluate its psychometric properties (Montero & León, 2007). The scope of the study is associative since relationships between variables were analyzed (Ato et al. 2013).

Procedure

This work was conducted in two big phases that are shown in Table 1. The first phase involved the design of the instrument. The second phase involved the implementation phase. Each of these phases clustered different steps suggested by Muñiz and Fonseca-Pedrero (2019) for the development of psychometric instruments. A final stage focused on the assessment of students' SNr through the final version of the instrument.

[Insert Table 1]

Participants

Table 1 lists the experts who were consulted during the design phase of the instrument in its different stages. The qualification and expertise of each expert is detailed. Regarding the participants of the implementation phase, the instrument was administered to 86 primary school teachers in Chile. All teachers were female and taught Grades 4 to 6 and worked in mainstream schools. Of these, 42 taught Spanish while 44 were special education teachers. Each pair of Spanish and Special education teachers responded based on the same student or students. In this

way, the teachers assessed the needs of 44 students with IDD. In the case of two students, information was only available from the evaluation carried out by the special education teacher.

Regarding the characteristics of the students evaluated by the teachers, they corresponded to students between 9 and 15 years old (9=15%; 10=12.5%; 11=17.5%; 12=15%; 13=27.5%; 14=7.5%; 15=5%), from 4th grade (n=13; 29%), 5th grade (n=2; 4,55%) and 6th grade (n=29; 65,91%). As reported by the teachers, 31 (70.45%) of the students evaluated were male, while 11 were female (29.55%). To establish the basic reading level of students with IDD assessed, teachers responded to questions about the achievement of three initial reading objectives. For the first objective, "to recognize that written texts convey messages and that they are written by someone to fulfill a purpose", 60.5% of the teachers considered that their student had fully achieved this objective, 24.4% that they had partially achieved it, and 15.1% that they had not yet achieved it. As for the second objective, "to recognize that words are units of meaning separated by spaces in written text", 65.1% of the teachers considered that their student fully achieved this objective, while 26.7% responded that he/she partially achieved it (and the remaining 8.2% that he/she did not achieve the objective). As for the third objective, "identify the sounds that make up words (phonological awareness), recognize, separate and combine their phonemes and syllables", 59.3% of the teachers considered that their student fully achieved this objective, while 25.6% indicated that he/she partially achieved it.

Ethical considerations

The Research Ethics Board of the Faculty of Social Sciences of the University of Chile granted the approval for the study (*[details removed for peer review]*). Informed consent forms were signed by all the participants. Informed consent was only requested to the participating teachers since the type of evaluation performed was framed within a curricular planning task, and

no personal data were collected from the student. The participating teachers did not identify the students being evaluated, and only indicated an acronym. Therefore, the research group did not have access to the identity of the students or their personal characteristics beyond those indicated in this manuscript.

Data analysis

To analyze the structure of the instrument and to test the relationships between the measured variables, specifically, "the parameters specified by the relationships proposed at the theoretical level" (Ruiz et al., 2010, p. 34), confirmatory factor analysis (CFA) was used, and the model fit was estimated. The structure hypothesized and compared in this study was a second-order structure, consisting of (i) one global second-order factor (represented as 1F), referring to the SNr construct and (ii) three first-order factors (3F) referring to each domain ('representation', 'engagement' and 'action and expression'). The analyses were performed using Jamovi software version 2.3 (The Jamovi Project, 2022) and the SEM package. The interpretation of the fit indices considered the following criteria: (i) the ratio between the chi-square and its degrees of freedom, which was adequate if its value was less than 2 (χ^2 / g.l < 2), (ii) the root mean square error of approximation (RMSEA), with values below .08 and .06, respectively, indicating an acceptable and good fit and (iii) the Bentler-Bonnet Comparative Fit Index (CFI) and Tucker-Lewis Index, with a value above .9 being adequate and above .95 being optimal (Hu & Bentler, 1995). Factor weights were significant for values above .30 (Hair et al., 2010).

To test for invariance, a comparison was made between the structures of the two groups being evaluated. Each group or subsample corresponded to each type of teacher (Spanish teachers and special education teachers). The estimation of the structure of both groups followed the same criteria as in the previous step. Then, for comparison, the variances of CFI (ΔCFI) and RMSEA (ΔRMSEA) between these groups were determined. For this comparison, a ΔCFI

($CFI_{GROUP1} - CFI_{GROUP2}$) ≤ .01 and a ΔRMSEA ($RMSEA_{GROUP1} - RMSEA_{GROUP2}$) ≤ .015 were the reference values.

To analyze reliability, the ordinal alpha was calculated. This is an index of internal consistency suitable for variables of a discrete and ordinal nature (Domínguez-Lara, 2012). The calculation of the ordinal alpha of each factor used the factor loadings obtained from the CFA. According to Prieto & Delgado (2010), values above .70 are satisfactory indices. To characterize the SNr of each group studied, descriptive analyses were performed. Thus, the following statistics were calculated and plotted: mean, standard deviation (SD), median, minimum, maximum and standardized skewness coefficient.

Then, to compare SNr between dimensions, repeated measure analyses of variance were performed. The *F*-value and its *p*-value were reported for each case. For cases in which the assumption of sphericity was met (Mauchly's W with $p > .05$) the *F*-value associated with the assumed sphericity was reported. For cases in which this assumption could not be met (Mauchly's W with $p < .05$), the *F*-value yielded by the Huynh-Feldt test was reported.

Instrument

Variables

The instrument was developed to assess the SNr of students with IDD and was named "Evaluation Scale of Support Needs for Classroom Learning of Reading" (abbreviated as ENAULA in Spanish). The instrument is focused on the learning and practice of reading in Spanish classes (language classes). Based on the definition of learning support needs provided in *[details removed for peer review],* and the contribution of experts who participated in the design process (Table 1), in the current work, SNr are defined as follows: "pattern and intensity of supports for engagement, representation as well as action and expression necessary for a student to learn

reading in a general education classroom (together with all students)". This construct can be further broken down into three dimensions of needs, defined as follows: (i) representation, which refers to "pattern and intensity of support needed to perceive and comprehend the information presented during reading activities"; (ii) engagement, which refers to "pattern and intensity of support needed to engage in learning to read according to his/her preferences"; and (iii) action and expression, which refers to "pattern and intensity of support needed to carry out the reading tasks and express the knowledge in the domain". In turn, these dimensions are specified through sub-dimensions: (i) "perception", "language and symbols", and "comprehension" are the subdomains for the representation dimension; (ii) the engagement dimension is composed by "recruiting interest", "sustaining of effort and persistence", and "self-regulation" subdomains; and (iii) the subdomains "physical action", "expression and communication", and "executive functions" make up the action and expression dimension.

Indicators

For a construct to be measurable, it must be properly operationalized into observable indicators. Tables 2, 3 and 4 present the psychometric scaling process performed for each dimension, from UDL guidelines to SNr indicators. Following the established approach used in standardized measures of SN (e.g., Supports Intensity Scale-Children's version by Thompson et al., 2016), the frequency of autonomous achievement in each activity can be regarded as an indicator of SN. Therefore, the higher the frequency of achievement, the lower the SN in that activity.

[Insert Table 2]

[Insert Table 3]

[Insert Table 4]

Format

The responses to the items in the instrument followed a graduated format. Thus, each item consisted of a statement and four response options. The response options, written in Spanish, can be translated as follows: 4 = *Never*, 3 = *Rarely*, 2 = *Sometimes* and 1 = *Most of the time*. The instrument design and application of the instrument corresponded to a digital and automated format. The tables reported in the results section (see below), show a translation of the items developed. For both the interpretation of each item and the interpretation of the derived scores, a higher score indicates a higher level of SNr.

It is worth mentioning that the way in which SNr have been operationalized and assessed in this work differs from the way chosen in essential works in this field (i.e., SIS and SIS-C). These instruments assess SN according to the type, frequency and duration of support required for participating in an activity. Despite the relevance of these tools, their response format is complex and requires application by a trained interviewer. This response system has already been questioned in some papers (Seo et al. 2016; Verdugo et al., 2019). Given that in this work we aimed at a self-administered instrument, we have opted for a simpler and more understandable form of response for teachers, which does not require a trained interviewer.

Results

The aims of this study were twofold: (i) to develop an instrument and evaluate its properties; and (ii) to preliminary assess SNr of students with IDD in general education classrooms. Therefore, the results are presented in two sections, one of them referring to the results associated with the psychometric properties of the instrument; and the other focused on the preliminary characterization of needs in the group studied.

Psychometric properties observed

This section describes the results referring to the psychometric properties of the instrument developed. First, the evidence of validity referring to the internal structure of the instrument is described, and then its evidence of reliability.

Validity evidence based on internal structure

The hypothesis referring to the internal structure of the instrument was tested using four models (A, B, C and D). Table 2 shows the four models, the number of items considered in each of them, and the fit indicators obtained. The four models presented a common structure among factors (1F to 3F). This was aligned with the theoretical proposal described above but varied in the number of items considered in their conformation (67, 65, 55 and 52 items, respectively). Model A corresponds to the initial model that included all the initial items.

[Insert Table 5]

The variation in the number of items is caused by the elimination of items that performed poorly. Items were discarded based on three criteria. First, items that had significant factor loadings ($p < .000$) but were negative (less than 0) were removed. Under this criterion two items were removed, resulting in Model B. For the second criterion, and given that invariance between groups was being sought, items showing different loadings between the two subsamples were removed. An absolute value of the difference greater than .2 was the contrast value. According to this criterion, six items were removed, resulting in Model C. The last criterion was guided by the modification indexes, which made it possible to identify indexes that, if eliminated, would improve the adjustment. According to this criterion, seven items were removed, leaving 52 items. This resulted in Model D. Table 6 shows the items removed under each criterion.

Considering item elimination criteria and model fit indicators, Model D was retained. This model showed excellent fit indicators for all coefficients, although acceptable in the RMSEA. Figure 1 shows the factorial structure of Model D.

[Insert Table 6]

[Insert Figure 1. 52-item factorial solution (Model D)]

Between group adjustment comparison

Since it was hypothesized that the instrument would work in a similar way regardless of the type of informant (subject or special education teacher), an invariance analysis was performed. When analyzing the invariance in model fit between groups, Model D showed invariance at this level. Table 3 details the fit indicators of Model D for the total sample and for each group. It also shows the values obtained for the ΔRMSEA and ΔCFI. As can be seen in Table 7, both were very close to 0.

[Insert Table 7]

Reliability evidence

Using the factor loadings of the 52 items in Model D, the ordinal alpha index was calculated for each dimension. As shown in Table 4, the internal consistency indices were excellent for all three dimensions (> .90).

[Insert Table 4]

Preliminary identification of support needs in reading

To preliminary assess the SNr for students with IDD, the final version of the instrument

was used. This section describes how the participants responded to the instrument (to each item and globally) and the SNr identified from it. First, the proportion of responses to each response option per item is shown. Then, the analysis of the scores observed by dimension and subdimension is presented. Finally, the comparative conclusions referring to the identification of areas of greater or lesser need are described. Tables 9, 10 and 11 show the distribution of responses obtained for each item in the instrument. Table 12 presents the statistics analyzed for each dimension and sub-dimension.

[Insert Table 9]

[Insert Table 10]

[Insert Table 11]

[Insert Table 12]

The box-and-whisker plot presented in Figure 2 illustrates the scores obtained by students with IDD in each dimension and sub dimension. This graph shows the minimum and maximum values reached, the dispersion of the data (height of the central box) as well as the values of the median, at the center of the box, and the quartiles 1 and 3, which accumulate 25% and 75% of the cases, respectively. To illustrate the comparison between sub dimensions, Figure 3 illustrates only the means obtained in each of them.

[Insert Figure 2. Box-and-whisker plot for Dimensions and Sub dimensions]

[Insert Figure 3. Identified support needs for each sub-dimension]

Although the three dimensions have very similar SNr values (see dark boxes in Figure 2) (F = 2.112; p = .12), significant differences appear when compared between sub dimensions (see

Figure 2) ($F = 31.967$, $p < .001$). Thus, significant differences were observed between the representation's sub-dimensions ($F = 79.394$, $p < .001$), the engagement's sub-dimensions ($F = 26.406$, $p = .000$) and the action and expression's sub-dimensions ($F = 49.965$; $p < .001$).

The sub-dimension perception stands out as an area requiring a lower level of support (*M = 1.81; Mdn = 1.60).* Unlike all the others sub-dimensions, perception presented a positive asymmetry (standardized skewness coefficient > 1.96), characterized by a higher frequency of low scores (i.e., lower SNr). Conversely, comprehension was one of the sub-dimensions with the highest SNr, despite belonging to the same dimension as perception (representation dimension). High SNr were also observed in the sub-dimensions, executive functions (action and expression dimension) and sustaining effort and persistence (engagement dimension) (see Figure 3).

This analysis suggests that sub-dimensions should be categorized according to the level of SNr identified, as follows: The sub-dimensions that showed the highest level of support were (from highest to lowest) executive functions, sustaining effort and persistence, comprehension, and self-regulation. In contrast, the sub-dimensions that showed the lowest level of support were (from lowest to highest) perception, recruiting interest and physical action. Last, the sub-dimensions, language and symbols and expression and communication showed a medium level of SNr.

Discussion

This work focused on the assessment of SNr identified in Spanish lessons (Language lessons) and mainstream primary school classrooms. The curricular area addressed in this study, reading, is considered as the cornerstone of the right to IE. Fostering a mastery of written language in students enables them to learn and actively participate in life (United Nations, 2006). As in the results section, this section develops the discussions of the study following the order of the research objectives

addressed. First, the discussions related to the instrument developed are presented. Secondly, the needs preliminarily identified are discussed. Finally, the strengths, limitations and projections of the work are highlighted.

This paper described the development of a standardized measure for SNr of students with IDD within general education classrooms from the teacher's perspective. There is currently no other scale that assesses a similar construct. The final version of the scale consisted of 52 items that assess three dimensions and nine sub-dimensions of SNr. Each item contains a statement about a specific action. For each statement, teachers estimate how often their students can carry out a specific action without support.

This new assessment could help answer questions about the SN of students and inform planning in mainstream classroom contexts. Therefore, the scale has both practical and theoretical implications. Despite the evidence on the contribution of UDL to IE, knowledge on how to implement it is still lacking. To date, there has been scant research on the development of evaluation instruments based on UDL (Abell et al., 2011; Sánchez et al., 2016). The present study makes a specific contribution to the latter.

Part of the rigor of this study lies in the fact that it followed the guidelines in the most recent literature on psychometrics (i.e., Muñiz & Fonseca-Pedrero, 2019). Thus, the instrument developed in this study has shown good preliminary evidence on validity and reliability. At the content level, the balance between the different indicators and theoretical dimensions was emphasized. This balance was sought through two procedures: (i) the detailed development of specification tables evaluated by experts and (ii) the balanced elimination of items, which maintained at least one item per indicator. Future studies should deepen the items considered in the motivation dimension, since the preliminary elimination of items would imply an imbalance in

the indicator-item relationship in this area. However, it is possible that a larger sample size would allow a better performance of these items.

Regarding psychometric properties, the structure of the final instrument showed excellent values for the fit indices, except for RMSEA, which presented an acceptable fit. However, RMSEA is sensitive to sample size and this study was conducted on a small sample (n = 86). The question that remains is what does an adequate structural fit imply? It implies that the way in which the instrument was answered reflected the conceptual bases that guided its construction. In turn, this structure showed an adequate fit when compared with two types of teachers (i.e., adequate evidence of between group invariance). In terms of reliability, the instrument presented excellent values for all dimensions. Other strengths of the instrument include its ease of application given that the response options were the same for all the items and its online implementation format.

The most evident and relevant constraint of the study is its sample size. Future studies will evaluate the performance of the instrument with a larger number of cases. A larger sample is desirable to carry out analyses that are still considered necessary. This is necessary to (i) construct scales or norms of interpretation for the scores of each dimension and sub-dimension and (ii) conduct a more detailed structural analysis to consider the sub-dimensions in the contrasted model. This will provide evidence that allows the use and interpretation of the scores. Therefore, any conclusions on the identified SNr of students with IDD should be treated with caution.

Regarding the preliminary characterization of SNr, the areas in which the greatest need is observed are consistent with the difficulties that students with IDD tend to present, e.g., comprehension, executive function. This aspect is relevant because it reinforces the argument that a needs-centered perspective can be better linked to curriculum planning that is responsive to all learners. It is important to note that the perception sub-dimension showed lower levels of need.

This is of concern, given that UDL applications have focused almost solely on the presentation of information. In contrast, comprehension sub-dimension showed higher levels of needs. This is a point to note if we remember that most reading interventions for students with IDD have focused on foundational skills rather than text comprehension (Joseph et al., 2021). In this sense, a needs-based assessment would allow the diversification to focus on priority aspects.

It is not the purpose of this paper to delimit a limited list of pedagogical strategies that respond to the different dimensions of SNr. However, a review of existing options and supports useful for responding to student needs could be helpful to enrich and facilitate teaching practice. A recent work by Johnson et al. (2021) reviews the main supports that have been shown to be effective in improving the learning of all students (including students with IDD). Although his work does not link to a needs assessment, it does provide us with options for thinking about how these needs can be addressed. The supports and strategies outlined in their paper are intended to equip general and special education teachers with ideas to use when planning to consider how all students can more easily participate in general education lessons.

In this sense, one of the future lines of research aims at describing recommendations of supports that can respond to the SNr assessed. Although the UDL framework (Meyer et al., 2014) presents some examples of supports, these are few and part of them are not applicable to learning to read. Thus, it is necessary to offer more possibilities of supports that teachers can incorporate in their classes. Consequently, this future line of research consists of advancing towards a more varied proposal of supports that are applicable to this curricular content. To this end, the following sources could be considered: (i) supports already suggested directly in the UDL framework (in its latest version) that are pertinent; and (ii) literature (framed or not from UDL) that addresses or identifies useful supports for learning to read in the classroom (e.g., Johnson et

al., 2021). These recommendations are essentials as a continuation of this work, and if followed through, it could enrich curricular planning carried out in schools.

This study could contribute to the IE of students with IDD and their typically developing peers. This is because the provision of universal supports benefits students with disabilities as well as the rest of the class (Dell'Anna et al., 2021; Szumski et al., 2017; Thompson et al., 2018; Verdugo et al., 2019). IE is an internationally recognized right (United Nations, 2006) and a key aspect in the quest for social justice (Sánchez-Gómez et al., 2020; Simón et al., 2019).

This study seeks to contribute to the implementation of the supports paradigm in schools by means of developing a standardized measure of SNr. Some authors have claimed the need to develop new instruments and frameworks for action that make the educational systems permeable to approaches such as the supports paradigm (see, e.g., Amor et al., 2021; Verdugo et al., 2019), an approach aligned with the UNCRPD and, therefore, necessary to enhance inclusive education outcomes for students with IDD (Verdugo et al., 2021). The development of tools such as the one presented in this study could become a practical resource to facilitate the adoption of the supports paradigm by teachers and support staff working on the inclusion of students with IDD within mainstream settings.

The supports paradigm is one example of the IDD field's contribution to IE for all students. This study, although focused on IDD, also promotes IE for all students. Therefore, it can be used to inform further research. One argument that supports this idea is the continuum of SN between students with IDD and those without IDD (Verdugo et al., 2019). Addressing the SN of students with IDD can improve the diversification of education for all. This is particularly the case in areas where greater needs are identified (i.e., executive functions, sustaining effort and persistence, comprehension, and self-regulation). As Rose et al. (2005) argue, students who are "on the

margins" (i.e., those for whom the curriculum is least effective) allow us to target real reform. Such students help us to identify curricular weaknesses and barriers to learning that any student could face. Thus, interventions designed to address the needs of those students with the greatest needs should be beneficial for all students (Florian, 2014).

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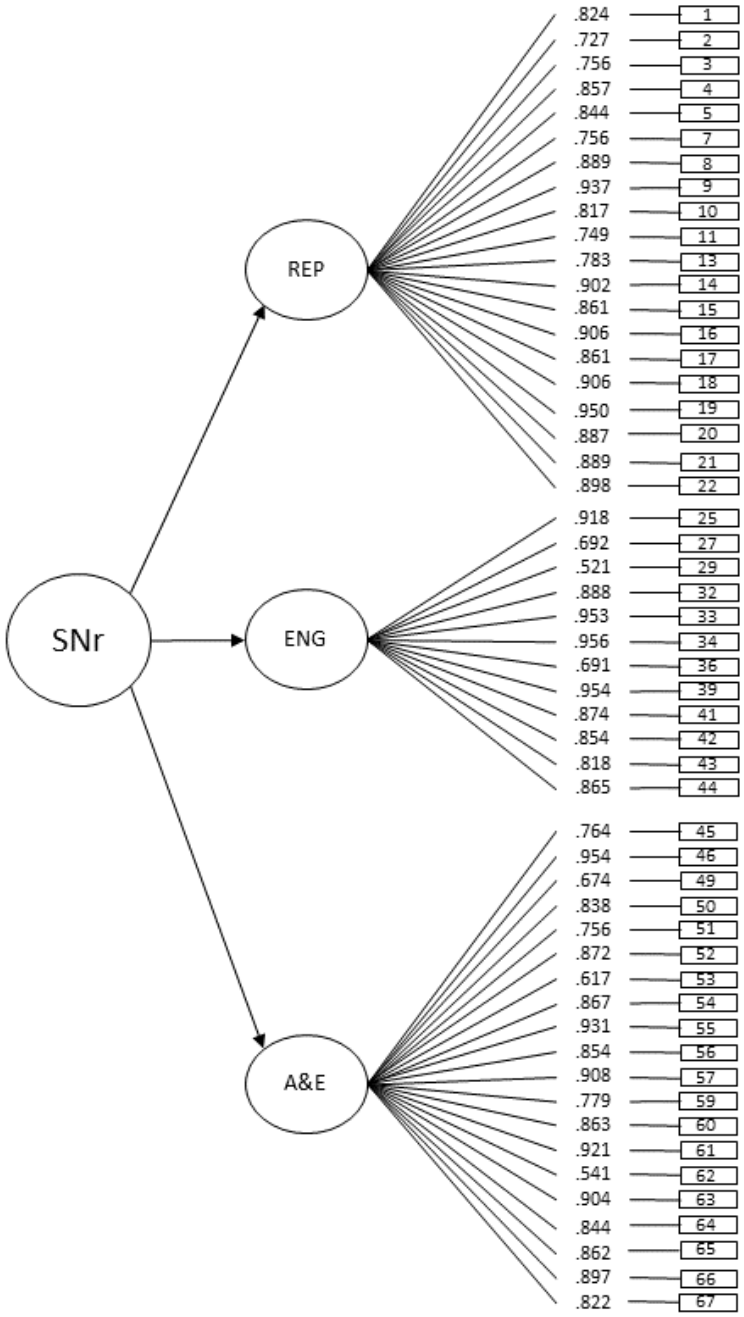
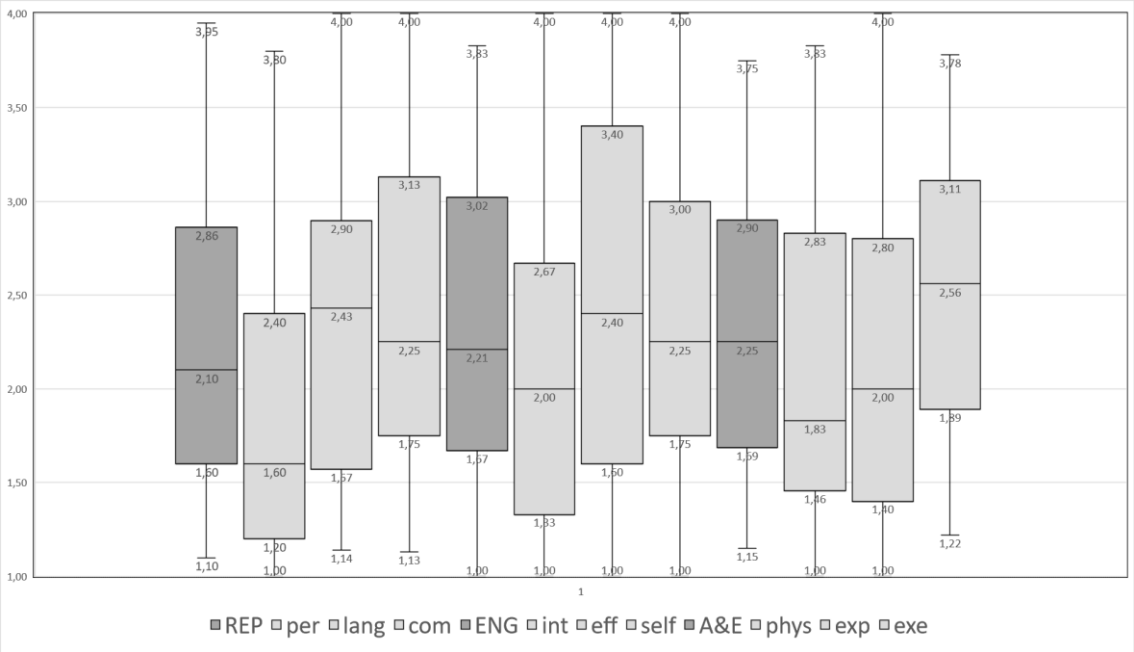
Figure 1. 52-item factorial solution (Model D)



Note: LSN= Support needs in reading; REP= Representation; ENG= Engagement; A&E= Action and Expression.

Figure 2. Box plot for Dimensions and Sub dimensions



Note: REP=Representation; per=perception; lang=language and symbols; com=comprehension; ENG=Engagement; int= recruiting interest; eff=sustaining of effort and persistence; self= self-regulation; A&E=action and expression; phys= physical action; exp=expression and communication; exe= executive functions.

Figure 3. Identified support needs in reading for each sub-dimension.

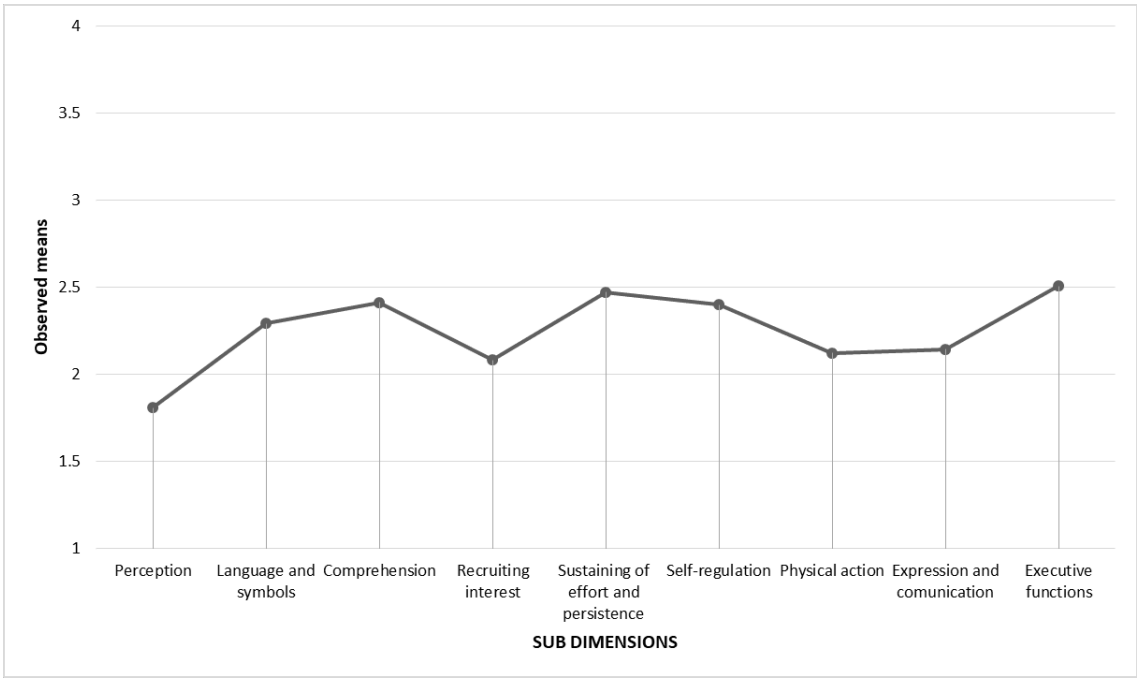


Table 1. Test development procedure.

Phases	Steps	Participants and techniques
1. Design of the instrument	1. Delimitation of the general framework of the instrument	These steps involved the participation of two kind of experts: (i) Two university lecturers with academic experience in language and ID; and (ii) Three schoolteachers with experience in teaching language to students with IDD. The main topics addressed in these interviews were: the curricular delimitation of the test, the relevance and usefulness of the tool and its format.
	2. Definition (conceptual and operational) of the variable to measure	
	3. Specification of the characteristics of the instrument	The operational definition of the construct was based on the guidelines of universal design for learning applied specifically to reading.
	4. Construction of the items	The items were constructed by the authors.
	5. Expert judges' evaluation	The evaluation by the judges is central since it is par excellence the tool for providing evidence of the content validity of the instruments. The judges evaluated: the relevance of the items constructed in relation to the conceptual and operational definitions proposed; as well as the clarity and wording of the instrument. The expert judges were three experts in the field of educational assessment: (i) A male Psychologist and university lecturer with expertise in psychometrics and educational assessment; (ii) A female Language Teacher professional from the Ministry of Education with expertise in UDL and IDD; (iii) A female Psychologist and researcher with expertise in IDD, UDL and support needs.

	6. Editing and assembly of the pilot test	Editing took into account the judges' reviews and was performed by the main author.
2. Implementation	7. Application of the test	The test was administered to 86 primary school teachers. All teachers taught Grades 4 to 6 and worked in mainstream schools. Of these: (i) 42 respondents taught Spanish; and (ii) 44 respondents were special education teachers
	8. Evaluation the psychometric properties	Performed by the main author
	9. Proposal of the final version	Performed by the authors

** The steps were delimited according to the recommendations of Muñiz & Fonseca-Pedrero (2019).*

Table 2. Psychometric scaling of 'Representation' dimension: Sub-dimensions, supports and activities associated with each indicator.

Sub-dimension	Support involved	Activities linked to indicator
Perception	Ways of customizing the display of information	▪ Perceiving without difficulty the information provided in the reading exercises in the same modality presented to their peers.
	Alternatives for auditory information	▪ Perceiving auditory information during reading exercises. ▪ Maintaining attention to auditory information during reading exercises.
	Alternatives for visual information	▪ Clearly perceiving visual information during reading exercises. ▪ Maintaining attention to visual information used during reading exercises.
Language and symbols	Clarifying vocabulary and symbols	▪ Knowing the meaning of most of the words in the texts used in class. ▪ Approaching the meaning of unfamiliar words through a variety of strategies.
	Clarifying syntax and structure	▪ Understanding in a general way the relationship between the elements of sentences in the texts he/she reads or hears. ▪ Distinguishing the elements that structure sentences in the texts he/she reads or hears.
	Support decoding	▪ Identifying the sounds represented by letters and their combinations. ▪ Decoding familiar words. ▪ Decoding unfamiliar words or new words.
	Illustrating through multiple media	▪ Identifying the most relevant words in a written text. ▪ Understanding the central ideas of a text when these are conveyed in written text.

Comprehension	Activating or supplying background knowledge	▪ Recalling contents previously seen or exercised. ▪ Applying previously known information that will be useful when facing a new learning experience.
	Highlighting patterns, critical features, big ideas, and relationships	▪ Identifying valuable or central information in texts. ▪ Identifying the links between the central ideas of the text.
	Guiding information processing and visualization	▪ Following-up his/her reading process. ▪ Use reading comprehension strategies to construct the meaning of a text.
	Maximizing transfer and generalization	▪ Recalling information from a recently read or heard text. ▪ Transferring/applying information from a read/heard text to new contexts.

Table 3. Psychometric scaling of 'Engagement' dimension: Sub-dimensions, supports and activities associated with each indicator.

Sub-dimension	Support involved	Activities linked to indicator
Recruiting interest	Individual choice and autonomy	• Have opportunities to make decisions about decisions about the activities in which reading is exercised.
		• To have opportunities to decide about the activities in which reading is assessed
	Relevance, value, and authenticity	• Enjoy reading activities
		• Have reading choices that match their interests
		• Begin reading activities with an interesting purpose
	Climate free of insecurity and distractions	• Having a climate with few distractions
		• Having a supportive and accepting environment
		• Having a familiar classroom routine in which to anticipate changes and transitions between activities
Sustaining effort and persistence	Relevance of goals and objectives	• Be clear about the goal associated with each reading activity.
		• Staying focused during activities associated with reading.
		• Strive and persevere on learning or reading assessment tasks to completion.
	Levels of challenge and support	• Persevere with reading tasks that are challenging to perform.
		• Can vary or choose the level of difficulty associated with reading assignments.
	Collaboration and the community	• Perform reading activities better when collaborating with peers.

		• Work in dynamic and flexible groupings with peers to achieve reading activities.
	Oriented feedback	• Identify their mistakes during reading activities and try to correct them during their execution.
		• Persevere on reading assignments even when not receiving feedback on this/her performance.
Self-regulation	Expectations and beliefs that optimize motivation	• Trust that their reading ability will improve day by day.
		• Identify when his/ her own reading ability has improved in some way.
	Graded levels of support	• Identifies their emotions during reading activities
	Self-evaluation and reflection	• Adaptive regulation of emerging emotions in reading activities.
		• Regulating their frustration when difficulties arise in reading activities.

Table 4. Psychometric scaling of 'Action and Expression" dimension: Sub-dimensions, supports and activities associated with each indicator.

Sub-dimension	Support involved	Activities linked to indicator
Multiple physical means of action	Various response methods	• Express reading comprehension by the same means requested of their peers.
		• Demonstrate reading proficiency in the same modality requested of their peers.
		• Be allowed to answer questions of different types
		• Be allowed to answer questions in different modalities
	Possibilities to interact with materials	• Develop strategic tasks to approach a text
		• Perform specific tasks through the materials available for reading.
	Access to assistive tools and technologies	• Access information as effectively as their peers, when using technologies to exercise reading
		• Access information as effectively as their peers when the teacher uses assistive technology to teach content relevant to reading.
Expression and communication	Multiple forms or means of communication	• Express him/herself and communicate with his/her peers or the teacher through oral communication.
	Multiple tools for construction and construction and composition	• Perform composition or construction tasks associated with reading through the same means provided to their peers.
	Graded levels of support in	• Read texts of the same level of difficulty as their peers.

	the learning process	• Carry out the same reading activities proposed to the whole group.
		• Perceive as achievable the activities proposed to the whole group.
		• Have available reading activities that are appropriate to their level of difficulty.
Executive functions	Appropriate goals	• Identify when a proposed reading task is challenging and achievable.
		• Identify when a reading task is challenging.
	Strategy planning and development	• Plan and develop strategies for completing reading activities.
		• Have activities with tasks varied in type and level of difficulty.
	Information and resource management	• Organize internally the information needed to accomplish a reading comprehension task
		• Leverage external resources to organize the information needed to complete a task.
	Progress monitoring capability	• Identify the level of achievement in the reading activity.
		• Be conscious of their progress in reading
		• Regulate the effort he/she puts into each task according to the difficulty of the task.

Table 5. Fit indexes for each model contrasted by CFA.

Model		Items	χ^2 / g. l	RMSEA (90% CI)	CFI	TLI
A	**1^F-3_F**	67 items	1.534	.079 (.074 .085)	.982	.981
B	**1^F-3_F**	65 items	1.492	.076 (.070 .082)	.985	.985
C	**1^F-3_F**	59 items	1.485	.075 (.069 .081)	.989	.989
D	**1^F-3_F**	52 items	1.457	.073 (.066 .080)	.991	.991

Table 6. Removed items and elimination criteria.

Item	Dimension	Elimination criteria
E2. The student has opportunities to decide on the activities in which the reading is evaluated (e.g., choosing the text to read).	Engagement	Negative factor loading
E13. The student has the opportunity to vary or choose the level of difficulty associated with the reading tasks.	Engagement	Negative factor loading
E4. The student has reading options according to his/her interests.	Engagement	Differential performance of the item according to type of teacher
E6. The student has a classroom climate with few distractions (e.g., walls free of unnecessary elements)	Engagement	Differential performance of the item according to type of teacher
E8. The student has a familiar classroom routine in which he/she can anticipate changes and transitions between activities.	Engagement	Differential performance of the item according to type of teacher
AE3. The student is allowed to answer questions of different types (literal, inferential, personal, and creative) about a text read or heard."	Action & Expression	Differential performance of the item according to type of teacher
AE4. The student is allowed to answer questions in different modalities (written, oral, graphic) about a text read or heard.	Action & Expression	Differential performance of the item according to type of teacher
AE14. The student has reading activities that are appropriate to his/her level of difficulty.	Action & Expression	Differential performance of the item according to type of teacher

E1. The student has opportunities to make decisions about the activities in which reading is exercised (e.g., choosing the story he/she prefers to read).	Engagement	Modification index
E9. The student is clear about the goal associated with each reading activity.	Engagement	Modification index
E15. Students are encouraged to work in dynamic and flexible groupings with their peers to achieve the reading activities.	Engagement	Modification index
E16. The student identifies his/her errors during the reading activities and tries to correct them during their execution.	Engagement	Modification index
E18. The student is confident that his/her reading ability will improve day by day.	Engagement	Modification index
R6. The student knows the meaning of most of the words in the texts used in class.	Representation	Modification index
R12. The student is able to decode unfamiliar or new words (identify how they sound and how they are read).	Representation	Modification index

***Note: A direct translation of the item is provided for informational purposes. The item has been designed and applied in Spanish and has not been adapted to English.*

Table 7. Model D fit indexes for each group.

Groups	**n**	**χ^2 / g. l**	**RMSEA (90% CI)**	**CFI**	**TLI**
Total	86	1.457	.073 (.066 .080)	.991	.991
Group 1	42	1.219	.073 (.060 .085)	.993	.993
Group 2	44	1.191	.067 (.053 .079)	.995	.995
Differential (Δ)			ΔRMSEA=.006	ΔCFI= .002	

Group 1: Spanish teachers. Group 2: Special education teachers.

Table 8. Internal consistency indexes for each dimension

Dimension	**Items**	**Ordinal alpha**	**Omega**
Representation	20	.978	.974
Engagement	12	.957	.957
Action and Expression	20	.970	.969

Table 9. Distribution of responses by item in 'Representation' dimension.

Translation of the statement*	Never	Rarely	Sometimes	Most of the time
1. The student is able to perceive without difficulty the information provided in the reading exercises in the same modality presented to his/her classmates (e.g., textbook with normal font size, medium volume of the teacher's voice, slides presented in front of the whole class).	11.6%	20.9%	17.4%	50.0%
2. The student is able to perceive auditory information during reading exercises (e.g., the teacher or a student reads a text).	3.49%	10.47%	23.2%	62.79%
3. The student is able to maintain attention to auditory information during reading exercises (e.g., teacher or student reading a text).	5.81%	27.91%	34.88%	31.40%
4. The student is able to clearly perceive visual information during reading exercises (e.g., slide presentation, text in ink).	1.16%	17.44%	20.93%	60.47%
5. The student is able to maintain attention to visual information used during reading exercises (e.g., normal-sized print in a text or on a slide).	3.49%	22.09%	32.56%	41.86%
6. The student is able to approach the meaning of the words he/she does not know through different strategies (e.g., inferring from the context).	19.77%	43.02%	31.40%	5.81%
7. The student understands in a general way the relationship between the elements of sentences in the texts he/she reads or hears.	19.77%	26.74%	18.60%	34.88%
8. The student distinguishes the elements that make up sentences in the texts he/she reads or hears (e.g., identifying subject or verb).	38.37%	18.60%	15.12%	68.60%
9. The student identifies the sounds represented by the letters and their combinations.	4.65%	12.79%	22.09%	60.47%
10. The student is able to decode familiar words (identify how they sound and how they are read).	4.65%	11.63%	15.12%	68.60%

11. The student is able to identify the most relevant words in a written text.	17.44%	33.72%	37.21%	11.63%
12. The student understands central ideas of a text when they are conveyed through written text	22.09%	22.09%	46.51%	9.30%
13. The student is able to recall previously seen or exercised contents.	12.79%	26.74%	40.70%	19.77%
14. The student is able to apply previously known information that is useful when facing new learning.	13.95%	36.05%	41.86%	8.14%
15. The student identifies valuable or central information in texts (e.g., identifies the protagonist of a story, identifies milestones in a story, etc.).	8.14%	22.09%	39.53%	30.23%
16. The student identifies relationships between central ideas in a text (e.g., relating milestones in a story).	17.44%	25.58%	38.37%	18.60%
17. The student is able to monitor his/her reading process (e.g., identifies difficulties, corrects errors).	25.58%	17.44%	25.58%	31.40%
18. The student uses reading comprehension strategies to construct meaning from a text (e.g., predict, visualize, make connections, follow textual clues to infer information, etc.).	30.23%	38.37%	24.42%	6.98%
19. Student recalls information from a recently read or heard text (e.g., answers questions about what was read).	6.98%	23.26%	30.23%	39.53%
20. Student is able to transfer/apply information from a text read or heard to new contexts.	18.60%	30.23%	46.51%	4.65%

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Table 10. Distribution of responses by item in the 'Engagement' dimension.

Translation of the statement	Never	Rarely	Sometimes	Most of the time
21. The student enjoys the reading activities.	23.26%	16.28%	26.74%	33.72%
22. Student initiates reading activities with a purpose that is interesting to him/her (e.g., reading a recipe to perform it, reading a poem to recite it in an act).	13.95%	19.77%	54.65%	11.63%
23. The student has a climate of support and acceptance from his/her peers.	3.49%	11.63%	25.58%	59.30%
24. The student manages to stay focused during activities associated with reading.	19.77%	29.07%	33.72%	17.44%
25. Student strives and perseveres on learning or reading assessment tasks to completion.	22.09%	25.58%	22.09%	30.23%
26. Student perseveres on reading assignments that are challenging for him/her to complete.	25.58%	23.26%	26.74%	24.42%
27. The student is better able to perform reading activities when he/she collaborates with his/her peers.	26.74%	15.12%	33.72%	24.42%
28. The student perseveres with reading assignments even if he/she does not receive feedback on his/her performance.	27.91%	23.26%	20.93%	27.91%
29. The student identifies when his/her reading ability has improved in some aspect.	20.93%	30.23%	36.05%	12.79%
30. The student identifies his/her emotions during reading activities.	17.44%	25.58%	31.40%	25.58%
31. The student adaptively regulates emerging emotions in reading activities.	13.95%	31.40%	27.91%	26.74%
32. The student is able to regulate his/her frustration when difficulties arise in reading activities.	18.60%	23.26%	30.23%	27.91%

**Note: A direct translation of the item is provided for informational purposes. The item has been designed and applied in Spanish and has not been adapted to English.*

Table 11. Distribution of responses by item in 'Action and Expression' dimension.

Translation of the statement	Never	Rarely	Sometimes	Most of the time
33. The student is able to express his/her reading comprehension by the same means requested of his/her peers (e.g., pencil and paper test).	9.30%	15.12%	32.56%	43.02%
34. Student is able to demonstrate reading proficiency in the same modality requested of his/her peers (e.g., reading quietly and then answering a question, reading aloud, etc.).	19.77%	18.60%	22.09%	39.53%
35. The student develops strategic tasks to approach a text (e.g., search, select, paint, highlight, cut out, etc.).	13.95%	36.05%	26.74%	23.26%
36. The student is able to perform specific tasks through the reading materials available (e.g., find a particular paragraph, find a word in a text).	19.77%	33.72%	30.23%	16.28%
37. When technologies are used to exercise reading (e.g., use of screens, tablets, software), the student is able to access information as effectively as his/her peers.	5.81%	25.58%	25.58%	43.02%
38. When the teacher uses assistive technologies for teaching content relevant to reading (e.g., slide presentations, use of videos or screens, etc.), the student can access the information as effectively as his/her peers.	3.49%	16.28%	27.91%	52.33%
39. During the class, the student is able to express him/herself and communicate with his/her peers or the teacher orally.	3.49%	17.44%	26.74%	52.33%
40. The student is able to perform composition or construction tasks associated with reading by the same means provided to his/her peers (e.g., forming a sentence by joining words with a pencil, arranging a story in pictures, etc.).	6.98%	22.09%	34.88	36.05%
41. The student reads texts of the same level of difficulty as his/her peers.	25.58%	16.28%	18.60%	39.53%
42. The student manages to develop the same reading activities proposed to the whole group.	19.77%	19.77%	38.37%	22.09%

43. The student perceives the activities proposed to the whole group as achievable.	19.77%	19.77%	34.88%	25.58%
44. The student identifies when a proposed reading task is a doable challenge and when it is not.	16.28%	38.37%	26.74%	18.60%
45. The student identifies when a reading task is challenging.	17.44%	33.72%	22.09%	26.74%
46. The student is able to plan and develop strategies for the completion of reading activities.	30.23%	34.88%	29.07%	5.81%
47. The student has activities with tasks that vary in type and level of difficulty.	2.33%	12.79%	27.91%	56.98%
48. The student is able to internally organize the information necessary to complete a reading comprehension task.	26.74%	39.53%	30.23%	3.49%
49. The student takes advantage of external resources to organize the information needed to complete a reading comprehension task.	19.77%	37.21%	33.72%	9.30%
50. The student identifies the level of achievement reached in the reading activity (e.g., identifies whether he/she has read adequately, whether he/she had difficulty decoding, whether there were comprehension difficulties, etc.).	19.77%	22.09%	26.74%	31.40%
51. Student is aware of his/her progress in reading (e.g., identifies that he/she can read new words.).	18.60%	22.09%	46.51%	12.79%
52. The student is able to regulate the effort he/she puts into each task according to its difficulty (e.g., spends more time on an activity that he/she identifies as more challenging)	19.77%	48.84%	20.93%	10.47%

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Table 12. Descriptive statistics for each dimension and sub-dimensions.

Dimension and sub-dimensions	M	SD	Mdn	Min.	Max.	Skewness
Representation (20 items)	**2.22**	**0.74**	**2.10**	**1.10**	**3.95**	**1.45**
Perception (5 items)	1.81	0.73	1.60	1.00	3.80	2.68
Language and symbols (7 items)	2.29	0.78	2.43	1.14	4.00	.90
Comprehension (8 items)	2.43	0.82	2.22	1.11	4.00	1.32
Engagement (12 items)	**2.35**	**0.83**	**2.21**	**1.00**	**3.83**	**1.30**
Recruiting interest (3 items)	2.08	0.76	2.00	1.00	4.00	1.58
Sustaining of effort and persistence (5 items)	2.47	0.96	2.40	1.00	4.00	0.92
Self-regulation (4 items)	2.40	0.88	2.25	1.00	4.00	1.15
Action and expression (20 items)	**2.30**	**0.74**	**2.25**	**1.15**	**3.75**	**1.04**
Physical action (6 items)	2.12	0.81	1.83	1.00	3.83	1.87
Expression and communication (5 items)	2.14	0.87	2.00	1.00	4.00	1.65
Executive functions (9 items)	2.51	0.74	2.56	1.22	3.78	0.34

**Each dimension has a theoretical minimum score of 1 and a theoretical maximum of 4.*

** Standardized Skewness Coefficient is reported*