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Mapping Study for the Integration of Accommodations for Students with Special Education Needs (SEN) in PISA

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This working paper has been authorised by Andreas Schleicher, Director of the Directorate for Education and Skills, OECD.

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Abstract

Due to various technical and methodological challenges, PISA has to date offered only limited accommodations for students with special education needs (SEN). As a result, some students are currently excluded from the PISA target population at the sampling stage, and in some countries, exclusion rates are growing as more and more students are recognised as having disabilities that require testing accommodations. This practice in PISA contrasts with testing standards in many countries which call for the inclusion of students with SEN in order to give every student the right to demonstrate their skills and to generate information that represents all students. In order to take stock of the situation in terms of exclusions from PISA and accommodations already offered in national evaluations, we conducted a survey of PISA-participating countries and economies. This paper presents results from this survey and reviews the literature on effective accommodations in order to identify the priority needs to address in PISA, as well as promising accommodations that PISA could integrate to support these needs.

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Mapping Study for the Integration of Accommodations for Students with Special Education Needs (SEN) in PISA

1. Introduction

1. The Program for International Student Assessment (PISA) is an international large-scale assessment carried by the Organisation for Economic Co-operation and Development (OECD) since 2000. It cyclically assesses the learning outcomes of 15-year-old students' and provides cross-national comparisons of educational systems around the world in order to inform education policymakers and stakeholders. PISA collects information on learning outcomes through cognitive tests assessing students' capacity to use their knowledge and skills to solve real-life problems in the domains of mathematics, reading, science and an innovative domain that changes every cycle. PISA also collects background information through questionnaires on students' school environment, attitudes, and well-being.

2. In order to ensure the validity and comparability of the results of the assessment, PISA has maintained strict guidelines on the participation of students with special education needs (hereafter, SEN) providing limited possibilities to accommodate them. Specifically, PISA administration guidelines mention that students with "moderate to severe permanent physical disability" or with "cognitive, behavioural or emotional disability", such that they cannot participate in the PISA testing situation (including "students who are cognitively, behaviourally, or emotionally unable to follow even the general instructions of the assessment"), may be excluded (PISA 2022 School Coordinator Manual). However, national centres need to keep the overall exclusions rate below 5%, and within-school exclusions below 2.5% of the PISA desired target population (PISA 2022 Technical Standards). This is becoming more and more challenging as an increasing number of students are recognised as having needs or disabilities that require testing accommodations.

3. Yet, PISA only allows a reduced range of accommodations which would enable countries/economies to limit exclusions (see Table 1). In addition, for students with an official SEN classification and who would be excluded from taking the regular assessment with or without allowable PISA accommodations, an adapted version of the PISA test has been developed, called the Une Heure (UH) form. The UH option consists in the administration of a shorter computer-based test (two 30-minutes sections) and questionnaire (15 minutes), offered as a separate session for the national centre. Students taking the UH option can benefit from extended time (maximum of 100 minutes in total for the cognitive test, and 25 minutes in total for the questionnaire). This is designed to reduce exclusions. However, national teams have expressed the concern that neither the UH nor the restricted range of allowed accommodations adequately cater to the needs of many students with SEN (also reported by Gamazo et al. (2019[1])). Looking at PISA 2012 data, LeRoy had also shown that very few SEN students actually used the UH booklet (7%), and noted that the UH booklet does not have a "rigorous development" and may not be "a scientifically valid instrument, but rather was developed in response to issues related to the inclusion of test participants from separate schools and those deemed to have limited skills (LeRoy, 2015[2]).

Table 1. Accommodations allowed in PISA 2022

Accommodations explicitly allowed in PISA 2022	• Small group • One-on-one • Special equipment: lighting devices; straight-edge (but not a ruler), overlay, or template; special writing tool or pencil grip; preferential seating; study carrel; large screen calculator • Directions read aloud in sign language • Auditory amplification
Accommodations explicitly not allowed in PISA 2022	• Read-aloud of the assessment items including the item directions • Extended time • Scribe • Braille • Large print assessment materials • Magnification devices • Cueing to stay on task

Source: Westat, "Reducing exclusion rates in PISA"

4. At the same time, PISA countries/economies are bound by their own legal frameworks to include students with SEN in education settings, including testing situations. For instance, in the United Kingdom, schools are subject to the "duty to make reasonable adjustments" for disabled pupils (Equality Act, par. 4.13). Similarly, international frameworks such as the Convention on the Rights of Persons with Disabilities (CRPD) specifically demand that State Parties "shall ensure an inclusive education system", where "reasonable accommodation of the individual's requirements is provided" (Article 24).

5. Enhancing the accessibility of PISA would enable the OECD to improve its representativeness and to provide important information on the learning outcomes and well-being of students with SEN across countries and economies, which is crucial to inform policy-making (Kim, Richardson and Mizunoya, 2020[3]). Moreover, making progress in this area will send an important policy message about the need to provide students with SEN with the same learning opportunities as other students, in line with the Sustainable Development Goal (SDG) 4 of "ensur[ing] inclusive and equitable quality education […] for all".

6. Improving accessibility in PISA entails (1) enabling the administration of the assessment with reasonable accommodations for students who need them; (2) in the longer-term, making the instruments as inclusive as possible by revising items and developing new ones according to the principles of Universal Design; and (3) improving the coding system for students with SEN for reporting and research[1]. This paper provides background information and feasibility assessment for the first goal, which is incorporating accommodations in PISA administration. Based on available data and data collected through a survey to PISA participating countries and economies, the study identifies and proposes a mapping of the different types of needs that can be addressed through specific accommodations. This mapping aims to identify the (human and technological) accommodations that respond to the most widespread needs in the PISA target population, are within reach, and are most cost-efficient to implement.

7. Section 2 of the paper provides definitions of accommodations and students with SEN. Section 3 looks at the available data and data collected from a country/economy

[1] Students with disabilities – whether they are included or excluded from the study – are categorised in PISA as either having "Functional (physical or sensory) disability" (Code 1) or "Cognitive, behavioural, or emotional disability" (Code 2).

survey to gain a better understanding of the students with SEN in the PISA target population and identify priority needs to address in PISA. Section 4 uses data from the country/economy survey to understand what accommodations are currently used in PISA participating countries and economies and synthesises research on the effectiveness of the commonly used accommodations for the identified priority needs. Based on these results, the paper finally concludes with promising accommodations to implement in PISA.

2. Accommodating SEN in assessments: key definitions

2.1. What is an (effective) assessment accommodation?

8. Proposing an accommodation to a student consists in modifying the administration procedure of the assessment without altering its content (Lovett and Lewandowski, 2015[4]), in order to lift unfair barriers to assessments associated with the students' disabilities and to make valid interpretations of their scores – in other words, accommodations should ensure that assessment scores or responses reflect the target constructs, rather than their disability. Accommodations should provide students with an equal opportunity to demonstrate their skills and knowledge without being hindered by their needs or disabilities (Fuchs and Fuchs, 1999[5]). For instance, in a mathematics task involving a lot of reading, the score of a student with dyslexia may not reflect their actual mathematics skills but their reading difficulties. It is important to stress that an accommodation, in contrast to a *modification*, should not change the instructional level, content or performance criteria of the assessment – in other words, there should be no change in what students are expected to know and do. Accommodations can take the form of affordances embedded in the platform, external assistive technologies, or non-technological accommodations, such as human assistants.

9. To do so, assessment programmes can play on three different levers: task presentation, response format and timing/scheduling:

- *Presentation accommodations* refer to modifications to the way the task is presented to the student. Examples of presentation accommodations include enlarging the font size of the text, increasing the contrast of images, changing the font, reading text aloud, or providing text descriptions of images or videos.
- *Response format accommodations* refer to modifications to the way the student can provide their answers to the assessment. Examples of response format accommodations include using a special pen or keyboard, dictating answers instead of typing/writing, using spell-checking software.
- *Timing/scheduling accommodations* refer to modification to the administration situation. Examples of timing/scheduling accommodations include extended time, allowing multiple breaks, morning instead of afternoon, small group or one-to-one setting.

10. It is worth noting that depending on the administrators' choice, these elements can either be provided to all students as Universal Design[2] (UD) elements (e.g. embedding text-to-speech or zooming tools in the platform and giving the choice to all students to make use of them or not; or introducing multiple breaks for all students), or as actual

[2] Universal test design is "an approach to assessment development that attempts to maximise accessibility of a test for all of its intended test takers" (AERA, APA and NCME, 2014, p. 225[41]). It aims at removing the cognitive, physical or emotional barriers that are irrelevant to the assessment of the target construct, in order to fairly assess all groups of students.

accommodations, allowed only for students with SEN. For instance, the United States' National Assessment of Educational Progress (NAEP) has integrated accessibility tools in its assessment instruments both as Universal Design (UD) elements and as accommodations. This means that in NAEP, all students irrespective of their SEN status can access a range of accessibility tools (included as UD elements), and, in addition to these tools, students with SEN can benefit from certain accommodations according to their specific needs. Examples of UD elements in NAEP include, among others, zooming, text-to-speech, and scratch paper, while accommodations include extended time, magnification, or high contrast.

11. What is a fair and valid accommodation, and how do we gauge its effectiveness? A valid accommodation should "speak to the nature of the disability itself", allowing to obtain valid information – but not necessarily optimal scores (Fuchs, Fuchs and Capizzi, 2005[6]). One way to quantitatively assess the validity of accommodations is to determine whether it produces a differential boost (Phillips, 1994). The differential boost designates greater score improvements for students with SEN compared to their peers. This differential boost represents "the interaction hypothesis" which posits that a fair accommodation will result in an interaction between accommodation and disability (Sireci, Scarpati and Li, 2005[7]).

2.2. Who should benefit from an assessment accommodation?

12. Not all students with SEN may need to be accommodated for the purpose of assessments. Here, it is useful to come back to the conceptualisation and understanding of SEN, as it influences policy practices regarding the education of students with SEN, including the provision or not of accommodations.

13. Three main paradigms of disability and functioning have historically been dominant: the medical, social and biopsychosocial models (see Table 2). The medical model understands disability as the impairment/the problem of the person. The resulting policy approach is thus to educate persons with disabilities around their impairment. Against the medical model which puts the persons as the issue, the social model considers that disabilities exist due to society's failure to meet individual's needs. The resulting approach is thus to modify the environment to allow everyone to participate. Finally, the biopsychosocial model reconciles the two previous models and provides a comprehensive approach to understanding disability and impairment. It acknowledges that disability and functioning are a function of environmental, biological and psychosocial factors (Brussino, 2020[8]). This is the approach that was adopted by the WHO as the model to define disabilities in the 2001 International Classification of Functioning, Disability and Health (ICF) and 2007 International Classification of Functioning, Disability and Health for Children and Youth (ICF-CY).

Table 2. The three main paradigms of disability and functioning

Model of disability and functioning	Definition	Policy target	Policy means	Political intervention
Medical	Disability directly caused by trauma or health conditions	Individual changes	Medical care	Reforming health care policy
Social	Incomplete integration of individuals in society/environment	Social environment generating a complex collection of conditions	Social action	Considering the question of human rights
Biopsychosocial	Disability as a mismatch between an individual and their capabilities with respect to the requirements of the environment they are in	Analyse the environment and accommodate it so it becomes more suitable to a person's disability.	Multidimensional	Multidimensional and functional responses to reduce the gap between the person's capabilities and the environment

Source: *Brussino* (2020[8]).

14. In line with the biopsychosocial model of disability and functioning, accommodation decisions should depend on the interaction between the student's specific needs, and the assessment content and environment, including the domain assessed, the design of the assessment, or administration conditions. For instance, a student with dyscalculia (specific difficulties with mathematics) will not need accommodations for a reading comprehension test but may need to be accommodated for a science or mathematics test. Likewise, a student with lower body mobility impairment will not need specific assessment accommodations as long as the room where the assessment is administered is accessible.

15. Therefore, at the centre of the decision to accommodate a student is the precise identification of their needs. For the purpose of an international large-scale assessment like PISA, an important first step here is thus to understand how SEN are identified, recognised and categorised across countries/economies. National definitions of SEN are varied. Some countries/economies, such as Norway, only provide a general definition of SEN: "pupils who do not have or who cannot get satisfactory benefit from the ordinary education offer, have the right to special education" (Education Act, § 5-1[3]). Others propose a detailed categorisation. For instance, under the Individuals with Disabilities Education Act (IDEA), the United States provides thirteen different groups of students with SEN eligible for special education: Specific learning disability, Other health impairment, Autism spectrum disorder, Emotional disturbance, Speech or language impairment, Visual impairment (including blindness), Deafness, Hearing impairment, Deaf-blindness, Orthopedic impairment, Intellectual disability, Traumatic brain injury, and Multiple disabilities. Finally, some countries/economies such as Portugal have more recently moved away from any categorisation of students, thereby abandoning condition-specific labels for students with SEN (Brussino, 2020[8]). In spite of these differences, students are in general recognised as SEN if they "are not able to benefit from the school education made generally available for children of the same age without additional support or adaptations in the content of studies" (OECD, 2012[9]). Beyond this broad definition of SEN, national categorisations of SEN usually include conditions related to physical impairments, learning disabilities and mental disorders, with differences in the terminology employed to label similar conditions (Brussino, 2020[8]).

16. In order to go beyond these national definitions and gather cross-nationally comparable data, the WHO's Washington Group on Disability Statistics and UNICEF have developed the Module of Child Functioning and Disability, which is a set of questions

[3] https://lovdata.no/NLE/lov/1998-07-17-61/§5-1

intended for use in national household surveys and censuses. The module is based on the WHO's ICF-CY framework and aims to identify "the subpopulation of children who are at greater risk than other children of the same age or who are experiencing limited participation in an unaccommodating environment." (UNICEF, 2022[10]). The interesting aspect of this module is that it focuses on children's difficulties in functioning. The Module thus distinguishes thirteen categories of difficulties: Seeing, Hearing, Walking, Self-care, Communication, Learning, Remembering, Concentrating, Accepting Change, Controlling behaviour, Making friends, Anxiety, Depression.

17. For the purpose of this paper, we propose to adopt a needs-based categorisation of SEN based on specific difficulties that students have and which could constitute barriers to taking the PISA assessment. For PISA, such a needs-based approach is useful compared to a categorisation based on diagnostics, because (i) different disabilities can share the same needs (e.g. students with dyspraxia and students with mobility impairments both encounter specific difficulties with fine motor skills which hamper typing on a keyboard, using a mouse or writing with a pen); (ii) countries/economies vary in the way they identify and categorise students with SEN; and (iii) it allows a more direct mapping to the kind of accommodations that would work to address these needs. The proposed framework builds on and expands the Module of Child Functioning and Disability. For the purpose of accommodating students in PISA, a more fine-grained categorisation is needed regarding the difficulties – and associated needs for accommodations – that students have in an assessment context. For instance, the categories in the Module of Child Functioning and Disability do not allow to identify different types of learning disabilities which would warrant different accommodations (e.g. differentiating a student with specific difficulties reading vs. one with difficulties understanding speech, which can both create difficulties learning but would need different accommodations). Table 3 presents the proposed list of difficulties that will be used in the remaining of this paper to categorise students with SEN in the PISA target population.

Table 3. Categories of difficulties that may constitute barriers in an assessment context

Difficulties	*Examples of corresponding conditions or diagnoses*
Difficulties moving	Mobility impairments
Moderate difficulties seeing	Low vision, partial sight
Severe difficulties seeing	Blindness
Difficulties hearing	Hearing loss, deafness
Specific difficulties reading	Dyslexia
Specific difficulties with mathematics	Dyscalculia
Specific difficulties spelling, expressing oneself in writing	Dysgraphia
Specific difficulties producing and understanding speech	Dysphasia
Specific difficulties with fine motor skills: typing on a keyboard, using a mouse, writing with a pen/stylus	Dyspraxia, Mobility impairments
Difficulties controlling behaviour	Attention Deficit Hyperactivity Disorder, Impulse Control Disorders, Tourette syndrome, Oppositional Defiant Disorder
Difficulties focusing	Attention Deficit Hyperactivity Disorder, Autism Spectrum Disorder
Difficulties changing routines	Autism Spectrum Disorder
Excessive tiredness	Chronic fatigue syndrome, diseases
Anxiety	Anxiety disorders, school phobia
Depression	Depression, school phobia
Assessment content too difficult	Intellectual disability

3. Students with SEN in the PISA population

18. In 2023, the OECD Secretariat conducted an online survey to collect comparative information on students with SEN in countries and economies participating in PISA and the accommodations they can already benefit from in national assessments. The first part of the survey focused on the need for accommodations in PISA, looking at the identification and exclusion of students with SEN in PISA across countries/economies. The second part focused on inclusivity and the accommodations that students with SEN can benefit from in national or subnational assessments. The respondents for the first part (about PISA) were members of the national PISA team. Respondents not part of a PISA National Centre were directly routed to the second part, skipping questions about the PISA administration. The OECD received responses from a total of 27 countries/economies. This includes responses by 24 PISA National Centres, 23 national assessment programmes, and 15 subnational/other assessment programs (see Annex A).

19. This section presents an overview of students with SEN in PISA participating countries and economies based on data collected from the survey, focusing on the prevalence of different SEN groups, which SEN groups are recognised and benefit from accommodations in national assessments, the process for identifying, and deciding on the exclusion from PISA of students with SEN across countries/economies, and exclusions from PISA by SEN group.

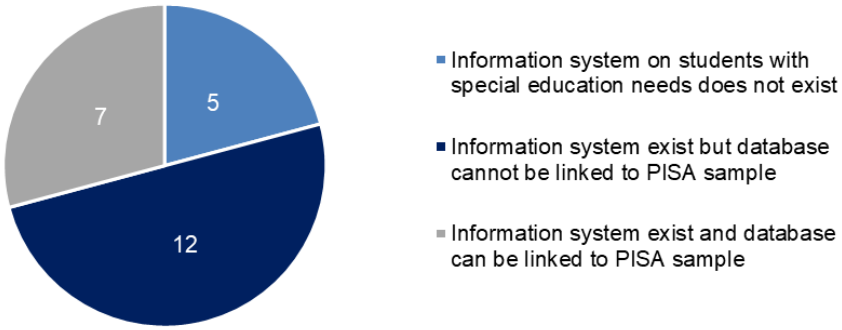
3.1. Prevalence, recognition and accommodation of SEN students in PISA participating countries/economies

3.1.1. Availability of fine-grained data on students with SEN

20. Respondents were asked if an information system which collects fine-grained data on students with SEN exists in their respective country/economy. Overall, 19 reported that they have an information system which collects fine-grained data on students with SEN.

Out of these, only 12 said that the database from this system can be linked to the PISA sample (Figure 1).

Figure 1. Information system on students with SEN



Source*: PISA system-level survey on accommodations for SEN students (2023)*

21. Data available across countries/economies indicate that learning disabilities, intellectual disabilities, speech and language impairments and other developmental disorders are the most prominent among students and children. For instance, in Hungary, the majority of students with SEN had learning disabilities in 2021-2022: 47% had severe learning problems. This is followed by 17% of students with mild intellectual disability, 9% with Autism Spectrum Disorder (ASD), 6% with severe attention deficit and 5% with speech disorders (Hungarian Central Statistical Office[4]). In France 36% of students with SEN schooled in regular schools had intellectual or cognitive disorders, followed by 21% with speech or language impairment, 17% had emotional and behavioural problems, 9% had motor issues, and 7% had several disorders combined (Ministère de l'Education nationale and Ministère de l'enseignement supérieur, 2018[11]). In the United States, 33% of students under the IDEA in 2020-21 had a specific learning disability, 19% had a speech or language impairment, 15% had other health impairment (a category covering a range of chronic or acute health problems such as ADHD, asthma, heart conditions, Tourette syndrome), 12% had autism, and 7% developmental delays (National Center for Education Statistics, 2023[12]).

22. It is worth noting that these numbers contrast with the available picture of disabilities world wide. Using data from the Global Burden of Disease (GBD) study, Olusanya and colleagues (2022[13]) estimated the prevalence of various disabilities across regions in the world (Table 4). Their findings indicate that, globally, hearing loss is the most prevalent, with 4.6% of the full population of children aged 5-19. However, this number varies across region – from 1.8% in North America to 5.3% in Sub-Saharan Africa. Conversely, 4.9% of children in North America have ADHD symptoms, compared to 1.4% in Sub-Saharan Africa. Developmental intellectual disability ranges from 1.6% in North America, to 5.5% in South Asia. Between 1 to 2% of children have vision loss across regions. Autism spectrum disorders appear to be the less common globally, with 0.4% of 5-19 years old. However, the authors note that GBD data do not cover the full spectrum of known disabilities in children; hence these numbers must be considered minimum estimates. Yet, they provide insights on how prevalence might vary across countries and regions, which needs to be considered for an international large-scale

[4] https://www.ksh.hu/stadat_files/okt/en/okt0006.html

assessment such as PISA, especially as more and more countries/economies are participating.

Table 4. Global and regional prevalence of disabilities among children aged 5 to 19 years old

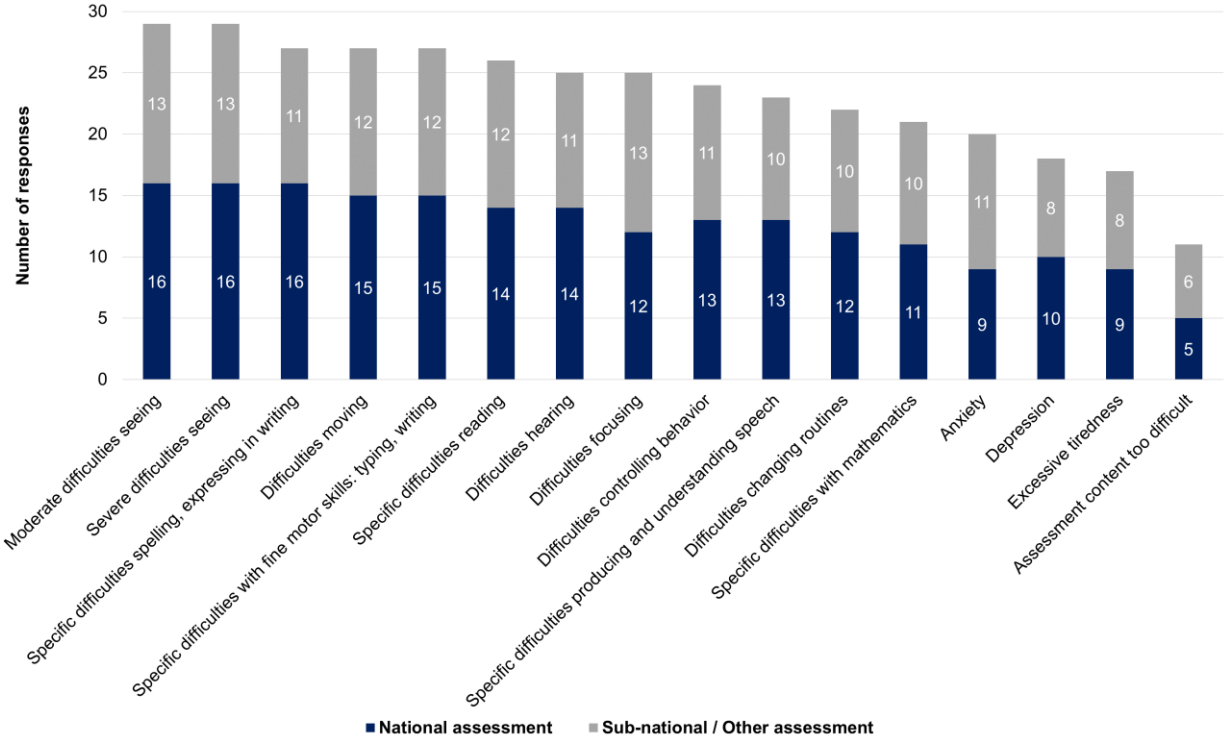
Region	Hearing loss	Vision loss	Epilepsy	Developmental intellectual disability	Autism spectrum disorders	ADHD	Total
North America	1.8	1.2	0.7	1.6	0.7	4.9	10.9
Europe and Central Asia	2.8	1.4	0.7	1.7	0.5	2.8	10.0
East Asia and the Pacific	5.2	1.4	0.6	1.7	0.4	3.7	13.0
Latin America and the Caribbean	4.2	1.8	0.9	1.6	0.4	3.8	12.7
South Asia	5.1	1.5	0.8	5.5	0.3	1.4	14.7
Middle East and North Africa	2.3	2.0	0.8	3.2	0.4	2.5	11.1
Sub-Saharan Africa	5.3	1.0	0.8	2.3	0.4	1.4	11.2
Global	4.6	1.4	0.7	3.0	0.4	2.4	12.6

Source*: Olusanya et al.* (2022[13])

3.1.2. Needs that are recognised and benefit from accommodations in national or subnational assessments

23. Respondents were asked to indicate the list of needs (from the needs-based classification presented in Table 3) that are recognised and benefit from accommodations in national or subnational assessments of students in secondary education. Overall, as presented in Figure 2, moderate and severe difficulties seeing (with 29 responses each) were the most listed needs that are recognised and benefit from accommodations, followed by specific difficulties spelling/writing, difficulties moving, and specific difficulties with fine motor skills (27 responses each). Specific difficulties reading, difficulties hearing, and difficulties focusing received 25 or more responses.

Figure 2. Needs that are recognised and benefit from accommodations in national or subnational assessments

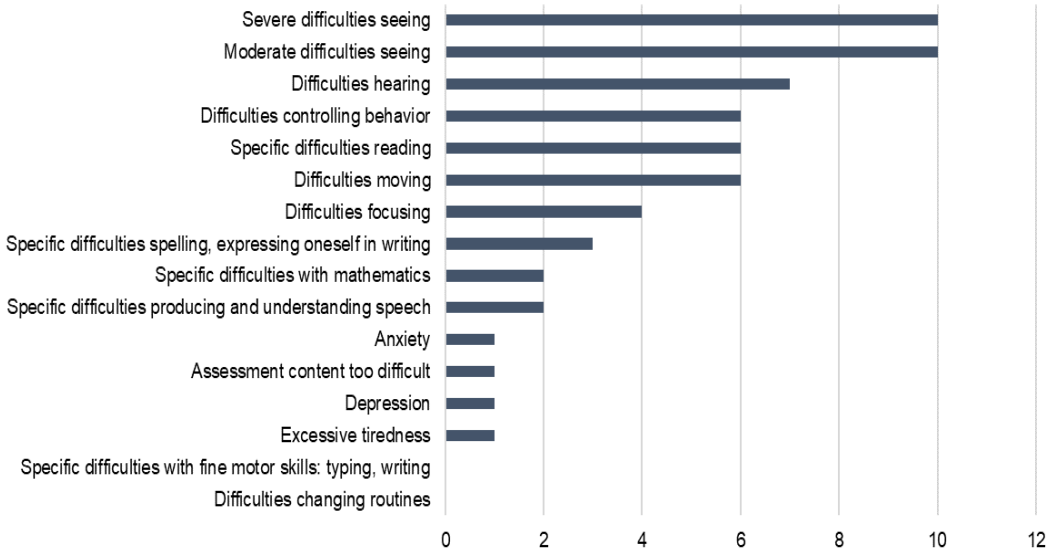


Source*: PISA system-level survey on accommodations for SEN students (2023)*

3.1.3. Most frequent reasons for accommodating students in national assessments

24. Respondents were asked to indicate the 3 to 5 most recurring specific causes for accommodating students in (sub)national assessments. From this question, students with severe difficulties seeing, moderate difficulties seeing, difficulties hearing, difficulties controlling behaviour, specific difficulties reading, difficulties moving, and difficulties focusing were identified as the most frequently accommodated groups (see Figure 3).

Figure 3. Most frequently accommodated needs in national assessments across countries/economies



Source*: PISA system-level survey on accommodations for SEN students (2023)*

3.2. Exclusion of students with SEN from PISA

3.2.1. Process for identifying students with SEN in PISA

25. For the purpose of PISA, participating countries and economies need to record students with disabilities – whether they are included or excluded from the study – as either having "Functional (physical or sensory) disability" (Code 1), "Cognitive, behavioural, or emotional disability" (Code 2). Respondents to the survey were asked to describe the process for identifying these students in their countries/economies. The procedures for identifying students in categories 1 (functional disability) and 2 (cognitive, behavioural, or emotional disability) across the 24 countries/economies surveyed reveal a blend of commonalities and distinctions. Many countries/economies, such as Australia, Hungary, Spain, and the United States, emphasise the importance of official diagnoses, often conducted by medical professionals or psychologists. Meanwhile, school personnel, including teachers and principals, play a vital role in assessing students' abilities and needs based on their educational interactions, as observed in Brazil, Ireland, and Japan. However, differences arise regarding the degree of reliance on medical versus educational approaches, with some nations, like New Zealand, considering a broader array of sources such as parents. Some countries/economies maintain special schools for students with severe disabilities, allowing them to participate in assessments; this is the case in the Czech Republic and New Zealand. National variations also result from federal structures, influencing who can allocate a SEN status. Certain countries/economies, including Ecuador, employ psychological and psychosocial assessments carried by the Ministry of Public Health to assess emotional and behavioural aspects. These diverse approaches highlight the intricate balance between medical diagnoses, educational assessments, ultimately aimed at ensuring that students with disabilities are accommodated fairly in the assessment process.

3.2.2. Process for deciding whether to exclude students with SEN from participating in PISA

26. Similarly, respondents were asked to detail the process and criteria for deciding whether students identified as SEN in categories 1 (functional disability) or 2 (cognitive, behavioural or emotional disability) should be excluded from PISA. This displays a blend of commonalities and distinctions among the 24 countries/economies. A recurring theme is the overarching commitment to inclusivity in education. Typically, the decision-making process involves school coordinators, teachers, and, in some cases, specialised teams like special education teachers (Palestinian Authority) or health teams (Sweden). These professionals collaborate to evaluate students' abilities and needs, with an emphasis on ensuring that students can understand and follow test instructions. The importance of professional judgment is evident, where educators rely on their expertise to make these determinations (Australia, Brazil, Czech Republic, Germany, Hungary, Israel[5], Italy, Latvia, Lebanon, New Zealand, Panama, Spain, Switzerland, United States).

However, several distinctions emerge. For instance, in Brunei Darussalam, students are categorised into different priority levels based on the severity of their needs, influencing their eligibility for PISA participation (Priority Levels 1-5). In some countries/economies such as Italy, students using compensatory tools not allowed in PISA are excluded from the test. Germany's approach varies between federal states, leading to diverse guidelines for assessing special needs. Ecuador emphasises collaboration with the Ministry of Education to accommodate students' unique needs rather than outright exclusion. Similarly, in Norway, there is an emphasis on maintaining inclusivity, by (i) excluding students only when a functional disability impedes test participation, or when cognitive, behavioural, or emotional disabilities prevent students from understanding or following test instruction; and (ii) considering the UH test as an alternative to reduce exclusions while ensuring fair participation.

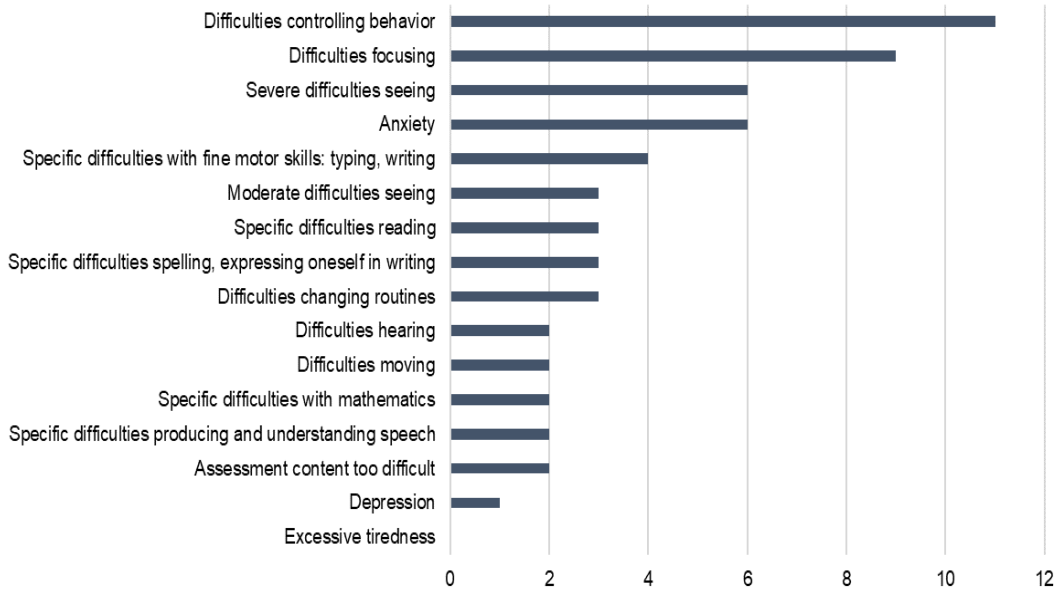
27. Furthermore, some countries/economies involve medical documents to confirm diagnoses (Brunei Darussalam, Italy), while others stress the importance of official diagnoses accredited by the Ministry of Education (Israel, Spain). Peru relies on the information recorded in their educational management information system (SIAGIE, Sistema de Información de Apoyo a la Gestión de la Institución Educativa) but confirms exclusions during school visits.

3.2.3. Most frequent reasons for excluding students with SEN in PISA

28. The respondents were asked to indicate the 3 to 5 most recurring specific causes for excluding students with SEN from PISA. Students with difficulties controlling behaviour and difficulties focusing were the most frequently excluded across countries/economies, followed by those with severe difficulties seeing, anxiety, and specific difficulties with fine motor skills (see Figure 4).

[5] The statistical data for Israel are supplied by and under the responsibility of the relevant Israeli authorities. The use of such data by the OECD is without prejudice to the status of the Golan Heights, East Jerusalem and Israeli settlements in the West Bank under the terms of international law.

Figure 4. Most frequent reason for excluding students with SEN from PISA across countries/economies

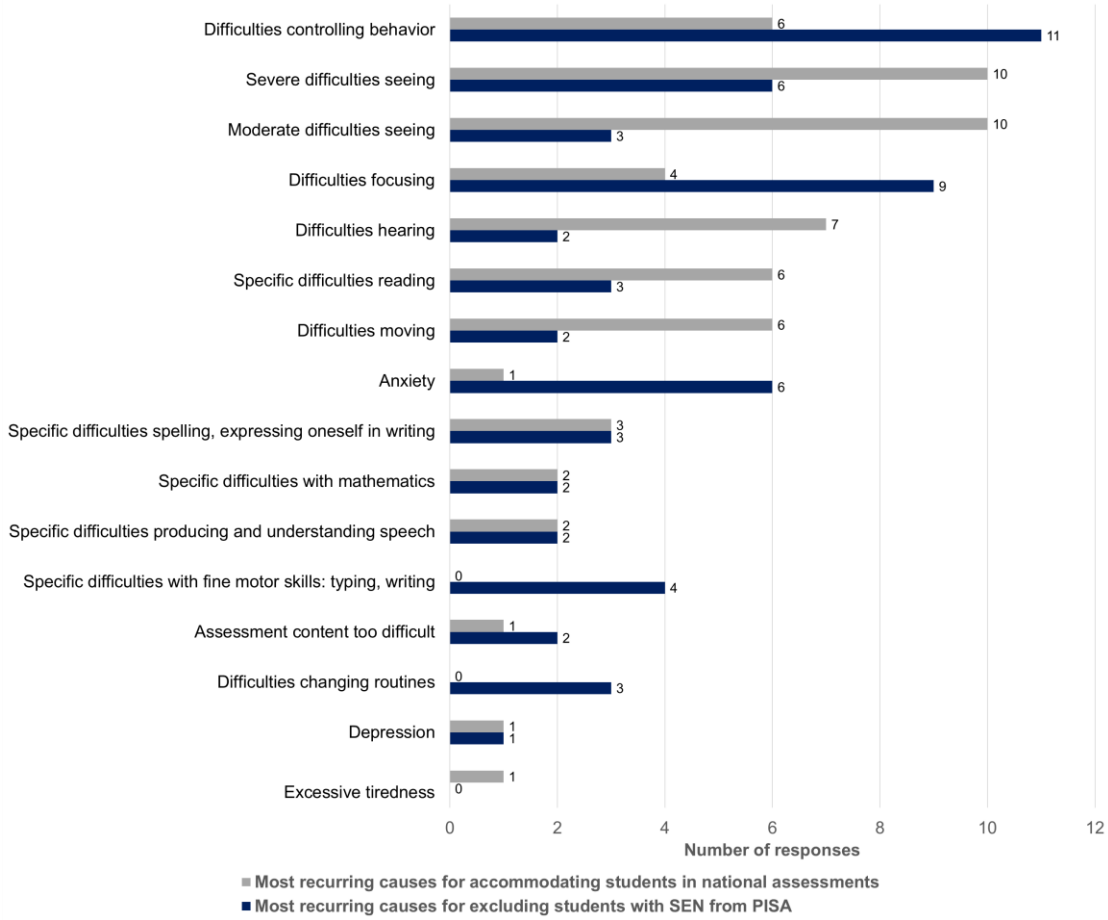


Source*: PISA system-level survey on accommodations for SEN students (2023)*

3.3. Identifying priority needs to address in PISA

29. In order to reduce the exclusion of SEN students, PISA needs to provide accommodations in priority to students that countries/economies indicated as the most frequently excluded. In order to ensure feasibility, it is however important to consider at the same time information on whether these students benefit from accommodations in their national assessments. Crossing results on the most frequently excluded groups from PISA and on the most frequently accommodated groups in national assessments, we are therefore able to identify needs that should constitute a priority to address in PISA through accommodations. Figure 5 combines responses from these two questions. Five groups stand out as being often excluded from PISA while usually accommodated in national assessments and should thus be considered in priority for the provision of accommodations in PISA: difficulties controlling behaviour, difficulties focusing, severe difficulties seeing, moderate difficulties seeing, and specific difficulties reading.

Figure 5. Causes for exclusion in PISA and reasons for accommodations in (sub-)national assessments



Source*: PISA system-level survey on accommodations for SEN students (2023)*

4. A mapping of accommodations used in PISA participating countries/economies

30. Whenever possible given practical constraints, accommodations for international large-scale assessments such as PISA should be consistent with what the students are already using in their classroom and national or subnational assessments. Based on countries'/economies' responses to the survey, this section reviews what accommodations are already proposed in national and subnational assessments, in order to determine the most impactful and cost-effective accommodations that could be put in place in PISA.

4.1. Accommodations used across countries/economies

31. Respondents were asked to select the accommodations that students with SEN can currently use in subnational or national assessments. Table 5 shows how frequently different accommodations were listed by respondent as currently offered for each SEN group in subnational or national assessments, by accommodation type (presentation, response, and setting/timing/scheduling). A darker shade of blue indicates a higher number of responses, showing which accommodations are popular for each specific need. The first five columns under needs are the ones identified from Figure 5 above as a priority to address in PISA.

32. Across needs, extended time and small group or isolated administration are the most commonly used accommodations, followed by use of human readers and offering multiple/frequent breaks.

33. Turning to the five priority needs identified in the previous section, we can see that large print, magnification devices, Braille test, and human readers are the most used to accommodate severe and moderate difficulties in seeing; while extended time and text to speech screen reader are the most popular to address specific difficulties reading. Finally, extended time and small group/isolated administration are most frequently used for students with difficulties focusing or controlling behaviour.

Table 5. Mapping of accommodations used in PISA participating countries/economies by need

		Difficulties controlling behaviour	Severe difficulties seeing	Moderate difficulties seeing	Difficulties focusing	Specific difficulties reading	Difficulties moving	Difficulties hearing	Specific difficulties with mathematics	Specific difficulties spelling, expressing oneself in writing	Specific difficulties producing and understanding speech	Specific difficulties with fine motor skills: typing , writing	Difficulties changing routines	Excessive tiredness	Anxiety	Depression	Assessment content too difficult	TOTAL
Presentation	Large print	1	5	12	1	4	0	0	2	2	0	1	0	0	0	0	1	**29**
	Magnification devices	1	5	8	2	2	2	2	2	2	1	1	1	1	1	1	1	**33**
	Sign language interpreters or videos	0	0	0	0	0	0	8	0	0	2	0	0	0	0	0	1	**11**
	Braille test	0	12	7	0	1	0	0	0	0	0	0	0	0	0	0	1	**21**
	Braille screen readers	0	6	3	0	0	0	0	0	0	0	0	0	0	0	0	1	**10**
	Human reader	3	10	9	2	4	3	2	2	2	3	4	1	2	2	2	2	**53**
	Text-to-speech screen reader	1	5	5	2	6	2	1	4	3	2	3	1	1	1	1	1	**39**
	Recorded instructions	0	1	1	0	2	0	0	1	1	0	0	0	0	0	0	0	**6**
	Audio amplification devices	1	1	1	1	2	0	5	0	0	2	0	1	1	1	1	2	**19**
	Visual cues	2	3	4	3	3	2	3	2	1	2	1	2	1	0	0	2	**31**
	Simplified supports	2	1	3	1	1	1	2	1	2	2	2	1	1	1	1	2	**24**
	Adapted texts	1	2	4	0	2	1	2	2	2	2	1	0	0	0	0	2	**21**
	Adapted documents	0	3	6	0	1	1	2	1	2	1	1	1	0	0	0	0	**19**
	Flexible interface (e.g. contrast, fonts)	1	2	4	1	3	1	0	2	2	2	1	1	1	0	0	0	**21**
	Specific software	2	5	4	1	3	3	3	2	4	3	3	1	1	1	0	1	**37**
Response	Human writer (scribe)	2	6	5	3	2	4	0	0	5	1	5	2	3	2	2	0	**42**
	Word processor	1	5	5	1	3	5	3	1	5	2	2	1	1	0	0	1	**36**
	Speech-to-text	0	2	2	0	2	2	1	1	2	0	0	0	0	0	0	0	**12**
	Brailler (Braille keyboard)	0	7	6	0	0	1	0	0	0	0	0	0	0	0	0	0	**14**
	Calculators	0	2	2	1	2	2	0	5	2	0	1	1	1	1	0	0	**20**
	Spelling and grammar check	0	1	1	0	2	0	2	1	2	1	0	0	0	0	0	1	**11**
	Highlighters	1	2	1	2	3	0	0	3	4	1	1	1	1	1	0	2	**23**
	Eye-control or breath-control technology	0	0	0	0	0	3	0	0	0	0	2	0	1	0	0	0	**6**
	Specific keyboard/mouse	1	2	3	1	2	5	1	0	2	1	4	1	1	1	0	1	**26**
	Other specific material for writing	1	3	4	1	3	5	2	2	4	2	5	1	1	1	0	2	**37**
Setting, timing and scheduling	Noise buffers	3	2	2	3	4	3	3	3	4	4	2	3	3	2	2	1	**44**
	Small group or isolated	8	7	6	7	5	3	6	4	5	5	4	5	5	6	5	1	**82**
	Shorter test	2	2	1	0	2	1	2	2	4	3	1	1	0	0	0	1	**22**
	Extended time	7	7	7	8	8	8	6	7	10	7	7	6	6	5	4	1	**104**
	Multiple/frequent breaks	3	3	3	4	4	3	2	4	4	4	3	4	4	3	3	1	**52**
	Environmental accommodations	5	4	3	2	2	6	3	2	2	2	3	3	3	4	4	1	**49**

4.2. Effectiveness of the most common accommodations for identified priority needs

34. After identifying the most pressing needs to address in PISA, as well as the most commonly used accommodations for these needs across countries/economies, we review in this section the scientific literature on the impact of these accommodations for the identified priority needs. We therefore cover the research carried on extended time, small group/isolated administration, multiple/frequent breaks, read-aloud (human reader and text-to-speech), and large prints and magnifying tools, in populations of students with difficulties controlling behaviour, difficulties focusing, severe or moderate difficulties seeing, or specific difficulties reading. We do not cover the use of a Braille test or Braille keyboard for students with severe difficulties seeing/blindness, as its usefulness for this group of students is evident.

4.2.1. Extended time

35. As the most used accommodation across countries/economies and types of need, extended time has been researched quite extensively compared to other types of accommodations, especially for students with difficulties controlling behaviour and focusing (mostly looking at students with Attention Deficit Hyperactivity Disorder – ADHD) and specific difficulties reading (reading disabilities/dyslexia).

36. Several studies have explored the impact of extended time accommodations on students with and without ADHD, with mixed results. In their systematic review of the literature, Lovett and Nelson (2021[14]) identified nine studies that have examined the effects of extended testing time on middle school and high school students with ADHD. Results indicate that on time-pressured tests, extended time does lead to higher test scores for students with ADHD, but it also has this effect for typically developing controls. These results converge with findings from another study among college students which looked at reading comprehension performance in 76 college students with and without ADHD under three conditions: standard time, time and one half, and double time (Miller, Lewandowski and Antshel, 2015[15]). Their findings shows that groups did not differ in the number of items attempted or correctly answered whatever the condition. These results suggest that extended time accommodations are not specific and may not be necessary for students with an ADHD diagnosis. Furthermore, some studies have even shown a negative effect of extended time for students with ADHD: Lovett and Leja (2015[16]) assessed the processing speed, reading fluency and reading comprehension among college students, under two different time limits. Their findings show that students reporting more symptoms of ADHD and executive functioning deficits actually benefited less from extended time. In addition, students' perceptions of their timing needs did not predict benefit from extended time. In the same line, Pariseau and colleagues (2010[17]) found that the rate of correct worksheet completion among middle school students with ADHD declined with extended time. These findings are consistent with the notion of sustained attention deficit in individuals with ADHD (Tucha et al., 2017[18]). Collectively, these findings question the overall appropriateness of extended time for students with difficulties focusing and controlling their behaviour as the evidence for its effectiveness appears to be weak at best, and detrimental at worst.

37. Existing evidence regarding the effectiveness of extended time for students with specific difficulties reading is similarly unconvincing. Lewandowski, Lovett and Rogers (2008[19]) assessed reading comprehension performance among 64 students, half of whom had learning disabilities in the area of reading, under various time conditions. Their results indicate that typically developing students benefited more from the extended time than their peers with reading disability. At the same time, extended time did allow students with

reading disability to attempt as many questions as the control group did under standard time conditions. Similarly, Lewandowski, Cohen and Lovett (2013[20]) found that typical students benefited more than those with learning disabilities when given extra time. In addition, students with learning disabilities working with extended time outperformed nondisabled students when they worked under standard conditions. Taken together, these results indicate that extended time is not a test accommodation that is specific to those with learning disabilities, and might in certain cases lead to an overestimation of students with learning disabilities' skills. In contrast, analysing data from the Swedish Scholastic Aptitude Test (SweSAT), Hjärne (2021[21]) found that while the extra time improved test results for test-takers with dyslexia, there was no conclusive evidence of differential speededness – and thus, of an unfair advantage – due to the extra time. In conclusion, the results from these studies present a mixed picture, underscoring the need for careful consideration and further investigation to better understand their impact on test performance for students with learning disabilities.

38. On the other hand, extended time might be more appropriate for students with visual impairments, since the targeted accommodations typically used to overcome these students' specific barriers to the test (e.g. Braille supports, magnifiers) necessitate more time for students. Thus, in a small pilot study with Korean students with visual impairments (3 with low vision and 7 with blindness), Kim (2012[22]) reported that students' Braille reading speed was slower than the time that was required to complete the tests, and it was difficult for them to read long passages with Braille or magnifiers for low vision.

4.2.2. Small group or isolated administration

39. In spite of its widespread use, little research has examined the effectiveness of small group or isolated test administration for students with SEN. Lovett, Lewandowski and Carter (2018[23]) tested the reading comprehension of college students with and without ADHD diagnoses under two conditions: one in a classroom with other students, and one in a private, proctored setting. Their results revealed no significant effect of test setting on performance, and no interaction between ADHD-status and setting. Similarly, Lewandowski and colleagues (2020[24]) conducted a small case study to examine the effects of three different settings (private room, typical classroom, and high-distraction room) on math test performance of six college students with ADHD. They found that a regular classroom setting did not produce a high level of distraction and did not influence performance at math tests compared to a private room setting. Finally, Weis and Beauchemin (2019[25]) assessed how the Spanish language performance of college students with and without disability (learning disability, ADHD, and test anxiety) differs when the test is administered in group or in separate room setting. Surprisingly, while all students performed equally well in the group setting, students with disabilities performed significantly lower than their peers when tested in a separate room. In summary, the existing research on the effectiveness of small group or isolated test administration for students with SEN yields mixed results, with findings suggesting that such setting do not mitigate the effects of disabilities on performance and might in some cases actually lower test scores.

4.2.3. Multiple/frequent breaks

40. Despite its common use, there remains a limited body of research exploring the efficacy of multiple/frequent breaks as test accommodations for students with SEN. Regarding students with ADHD, some authors, have postulated that more frequent breaks may benefit individuals with ADHD by alleviating the challenges associated with sustained attention deficits (Tucha et al., 2017[18]). However, the few studies existing on the topic do

not allow to infer causal evidence on the effectiveness of breaks for this population. For instance, in an observational study associating students' test scores with reported use of accommodations at school, Esposito Pritchard and colleagues (2016[26]) found that none of the five accommodations investigated, including frequent breaks (the five accommodations were: extended time, frequent breaks, reduced distraction, oral presentation, and calculator), were associated with better test scores for students with ADHD compared to matched students who did not benefit from accommodations. When looking at students with learning disabilities, studies are scarce, and with mixed results. Thus, Abedi and colleagues (2010[27]) investigated the impact of breaking reading comprehension passages into shorter segments, assigning randomly students with and without learning disabilities to the accommodated or standard testing condition. Their results show that neither groups of students showed performance differences. However, it should be noted that this choice of design (breaking reading passages into smaller chunks) might have different effects on students than taking breaks in a test. In another study, Mandinach and colleagues (2005[28]) explored the impact of providing standard time, time and a half (1.5 time) with and without specified section breaks, and double time without specified section breaks, on the verbal and mathematics sections of the SAT of students with disabilities (learning disabilities or ADHD) and of students without disabilities. Their results suggest that, for both students with and without disabilities of medium ability, 1.5 time with section breaks leads to higher performance than standard time, 1.5 times without breaks, and than double time, with a seemingly greater (although non-significant) effect in the disability group. The authors conclude that the provision of section breaks might be beneficial not only for students with disabilities but also for nondisabled students. These mixed findings underscore the complexity of employing breaks as accommodations, calling for more comprehensive investigation.

4.2.4. Read-aloud (human reader and text-to-speech)

41. The effect of read-aloud accommodation has been more amply investigated, in particular for students with reading difficulties. Thus, Wood and colleagues (2018[29]) conducted a meta-analysis on the effects of text-to-speech technology and related read-aloud tools on reading comprehension for students with reading difficulties. Their results point towards a significantly positive, medium effect size (d =.35). It is worth noting that their findings show no significant moderating effect of the modality (human reader, recorded voice). In a later study, Košak-Babuder and colleagues (2018[30]) investigated the effect of read-aloud assistance on young English learners' language comprehension scores with and without dyslexia. While typically developing students performed similarly with and without the read-aloud assistance, those with dyslexia earned higher scores with the read-aloud when reading difficult texts. This allowed them to perform at the level of their non-dyslexic peers. Similarly, Silvestri, Holmes and Rahemtulla (2021[31]) assessed reading comprehension performance among 94 grade 8 students with reading difficulties with and without text-to-speech accommodation. Their results show that only those participants with a dyslexic profile (listening comprehension greater than decoding skills) demonstrated significant gains in reading comprehension with the text-to-speech. Taken together, these results provide clear evidence that read-aloud is an appropriate accommodation for students with specific difficulties reading.

42. Interestingly, read-aloud accommodation also seems to be beneficial and appropriate for students with ADHD. In a first experiment, Spiel and colleagues (2016[32]) randomised students with or at risk for ADHD and without ADHD into one of two conditions (i.e., read-aloud and silent) that alternated across 5 days. Their findings show that reading tests aloud in small groups significantly improved the testing

performance of youth with or at risk for ADHD and provided a differential boost relative to youth without ADHD. In a second experiment, Spiel, Evans and Harrison (2019[33]) randomly assigned 45 grade 5 and 6 children (58% with ADHD) to take a standardised test in silence or with a recording of the test questions and answer choices read-aloud. Results similarly showed the read-aloud accommodation improved performance for ADHD students beyond any benefit seen in typically developing children.

43. Turning to students with vision impairments, Kim (2012[22]) conducted a small pilot study with 10 visually impaired middle school students and 10 controls in South Korea. Read-aloud (human reader) was investigated in combination with commonly used accommodations for students with visual impairments (Braille, large print, and extended time). Results show that students with visual impairments performed better when given read-aloud accommodations than without them. On the contrary, students with no disabilities had higher scores without read-aloud. Interestingly, students with vision impairments declared that they preferred having the read-aloud because they read more slowly in Braille and reading long passages in Braille or with magnifiers was more difficult.

44. Finally, it is worth noting that available evidence suggests that computerised text-to-speech is a good substitute for a human reader. Thus, Calhoon, Fuchs and Hamlett (2000[34]) assessed mathematics performance of 81 secondary students with learning disabilities under different conditions: no accommodation, teacher-read, computer-read, and with video. Their results indicate that there was no difference between the different read-aloud conditions, all leading to significantly higher scores for students than the no accommodation condition.

4.2.6 Large print, magnification devices and visual adjustments

45. In a review of the literature on the efficiency of various accommodations and features on reading digitally for individuals with low vision, Legge (2016[35]) highlights the major importance of print size and display size, as well as magnification. In addition, high contrast is often deemed essential. Other beneficial adjustments, to a lower extent, are bright displays and contrast reversal, as well as inter-line and inter-word spacing and font types.

46. Interestingly, some of these factors may also be beneficial for students with specific difficulties reading. For instance, some fonts – sans serif, monospaced and roman fonts styles – have been shown to improve reading performance in dyslexic readers (Rello and Baeza-Yates, 2013[36]). In addition, inter-letter spacing can also increase reading performance in this population (Zorzi et al., 2012[37]; Duranovic, Senka and Babic-Gavric, 2018[38]) (but see Łuniewska, Wójcik and Jednoróg (2022[39]) for contrasting results). This effect also depends on inter-word spacing (Slattery, Yates and Angele, 2016[40]).

47. Table 6 summarises these findings.

Table 6. Research evidence on the effectiveness of the most commonly used accommodations for the identified priority needs in PISA

Needs \ Accommodations	Extended time	Small group or isolated	Multiple/frequent breaks	Braille test and keyboard	Read-aloud (human reader and text-to-speech)	Large print, magnification devices and visual adjustments
Difficulties controlling behaviour and focusing* *Existing research mostly focuses on students with ADHD and does not cover the various profiles of students with these difficulties (e.g. Autism Spectrum Disorder)	**Not recommended** • Effect not specific to the disability • Might have detrimental effects	**Unclear** • Limited evidence • No effect (or might have detrimental effects)	**Unclear** • Limited evidence • Effect not specific to the disability	Not applicable	**Recommended** • Positive effect • Effect specific to the disability	**Unclear** • Limited evidence
Severe difficulties seeing	**Unclear** • Limited evidence Compensates effort of using tools for blindness	**Unclear** • Limited evidence	**Unclear** • Limited evidence	**Recommended** • Essential to address the need	**Recommended** • Positive effect in combination with other tools for blindness	Not applicable
Moderate difficulties seeing	**Unclear** • Limited evidence • Compensates effort of using tools for low vision	**Unclear** • Limited evidence	**Unclear** • Limited evidence	Not applicable	**Recommended** • Positive effect in combination with other tools for low vision	**Recommended** • Essential to address the need
Specific difficulties reading	**Unclear** • Effect might not be specific to the disability (mixed evidence)	**Unclear** • Limited evidence • Might have detrimental effects	**Unclear** • Limited evidence • Effect not specific to the disability	Not applicable	**Recommended** • Positive effect • Effect specific to the disability	**Recommended** • Evidence of positive effect of certain fonts and spacing between words and letters

5. Conclusion

48. This paper aimed to provide background information for incorporating accommodations in PISA administration and identify the accommodations that respond to the most widespread needs in the PISA target population, that are within reach and effective. Based on data collected through a survey of PISA participating countries and economies, the paper identifies and proposes a mapping of the different types of needs that can be addressed through specific accommodations. Crossing data on exclusions from PISA and existing accommodations in national assessments, we identified five needs which are the most often excluded from PISA while benefitting the most often from accommodations in national assessments: difficulties focusing and controlling behaviour, severe and moderate difficulties seeing, and specific difficulties reading. These five needs thus constitute a priority to address through accommodations in PISA.

49. Analysing data from the survey on existing accommodations that PISA participating countries/economies already use in their national assessments, we presented a mapping of existing accommodations to the specific barriers that students with SEN face. The mapping identified, for each specific type of need, which accommodations are used, and reviewed the effectiveness of the most common accommodations for the five priority needs identified. These accommodations are: extended time, small group/isolated administration, multiple/frequent breaks, read-aloud (human reader and text-to-speech), and large prints and magnifying tools, and Braille support. The review brings out the fact that several accommodations address more than a single need (for instance, read-aloud seems to be helpful for students with difficulties seeing, students with specific difficulties reading, and students with difficulties focusing and controlling behaviour). Among the reviewed presentation accommodations, read-aloud and large print/magnification as well as other visual adjustments that could be implemented alongside (such as adjusting contrast, fonts, and spacing between words and letters) seem to be the most promising to introduce in PISA as they have a stronger research base supporting their use and seem effective to address most of the priority needs. Among setting, timing and scheduling accommodations, extended time was the most researched, with mixed results emerging from the literature. While some studies show that extended time does not provide an unfair advantage to students, others point to the contrary. In addition, some studies even suggest its effect might be negative, especially for students with difficulties focusing. For PISA, an alternative to extended test that has been implemented so far is the use of a shorter test (the UH booklet). The use of a similar short form might be a good alternative to keep for students with SEN in PISA, providing them with the suggested benefits of extended time (levelling the playing field by enabling SEN students to cover the same proportion of items as their peers) while avoiding the potential pitfalls of declined attention that may be associated with extended time administration for certain groups of students. Finally, the research on small group administration and breaks was found to be scarce and somewhat inconclusive, but the rationale behind these accommodations would warrant to assess their effectiveness in PISA.

50. With these results in mind, a feasible way forward for PISA could consist in modifying the current UH form to incorporate effective accommodations, starting with the priority needs identified. In order to clarify the feasibility and effectiveness of prospective accommodations, it is recommended to conduct research and pilots to validate the new SEN form.

51. Given the policy relevance of PISA on the global education scene and its influence on national assessments, it is important that the programme makes concrete steps towards

demonstrating the feasibility of providing needs-based accommodations and, ultimately, moves towards a greater inclusivity.

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Annex A. Sample description

Table A.1. Sample description

#	Country/economy	Response on behalf of a PISA national centre 1 = Yes 0 = No	Information on accommodation from (sub)national assessments 1 = National jurisdiction 2 = Subnational jurisdiction 3 = Other	Names of subnational jurisdictions included
1	Australia	1	1	
2	Belgium - Flemish Community	0	2	Flemish Community of Belgium
3	Brazil	1	1	
4	Brunei Darussalam	1	1	
5	Canada	1	1 and 2	British Columbia, Manitoba, New Brunswick - Anglophone, Newfoundland and Labrador, Nova Scotia, Prince Edward Island, Province of Alberta, Province of Ontario, Quebec, Saskatchewan, Yukon
6	Czech Republic	1	1	
7	Ecuador	1	1	
8	Germany	1	2	
9	Hungary	1	1	
10	Ireland	1	1	
11	Israel	1	3	
12	Italy	1	1	
13	Japan	1	1	
14	Latvia	1	1	
15	Lebanon	1	1	
16	Nederland	0	1	
17	New Zealand	1	1	
18	Norway	1	1	
19	Palestinian Authority	1	1	
20	Panama	1	1	
21	Peru	1	1	
22	QUK (England, Wales & Northern Ireland)	1	3	
23	Kosovo	0	1	
24	Spain	1	1	
25	Sweden	1	1	
26	Switzerland	1	1	
27	United States	1	1	