Report on field-testing of adapted ICAN in Pakistan for learners with sensory impairment

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Sightsavers

Contents

1. Introduction

This is a summary report of the findings from the field-testing of an adapted International Common Assessment of Numeracy (ICAN) among children aged 4 to 16 with sensory impairment in Pakistan. The report begins by presenting key findings from the field testing. It then describes the methodology adopted to adapt and test ICAN, before discussing the children's performance and the factors shaping their performance.

ICAN is an open-source tool to measure numeracy skills of children which:

- Is currently available in 11 languages.
- Consists of tasks aligned to Grade 3-level or lower of the UNESCO Global Proficiency Framework.
- Is feasible for use in household-based assessments as well as in school settings.
- Is suitable for a broad age group of learners, in order to identify gaps in numeracy.
- Involves oral and one-on-one administration to be inclusive for children who are not yet fluent readers.
- Has an average administration time of 15 minutes per child.
- Is progressively administered as only children who can do easier number operation tasks are given more advanced tasks.
- Can be implemented on large scale in low resource settings.

In this report, the term children with sensory impairment refers to deaf children with mild, moderate, severe, and profound hearing loss. It also refers to children with visual impairment – i.e., both children who are blind or severely visually impaired and children with low vision.

It should be stressed that the content of the ICAN was not changed. The ICAN was only 'adapted' in the sense that supplementary guidelines and (for some children) supplementary materials were produced.

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2. Key findings

2.1 Practicality of the adapted ICAN

- As mentioned in the introduction, there was no need to change the content of the ICAN. It was only necessary to provide supplementary guidance and (for some children) supplementary materials. This greatly contributed to the practicality of the adapted ICAN.
- The field-testing (i.e., the pre-testing and piloting) in Pakistan showed that ICAN can be used to assess the numeracy of early grade learners with sensory impairment if certain adaptations are carried out.
- When the adapted ICAN is rolled out more widely for children with sensory impairment (across district, provinces, and even nationally), it will be necessary for the process to be centrally focused and appropriately resourced by Private-Public Stakeholders.
- When the adapted ICAN is rolled out, it will also be necessary to expand the guidelines to include ways of identifying out-of-school children with sensory impairment between 5 to 16 years of age.

2.2 Value of the adapted ICAN

- ICAN data can be used to compare the attainments of children with sensory impairment with those of other children in the general population. This knowledge is essential in planning and resourcing regional and national provision for children with sensory impairment both in Pakistan and across the Global South.
- It was found that out-of-school children with hearing impairment were unable to participate meaningfully in the ICAN unless they had previously been enrolled in education. On the one hand, it can be argued that there is no point administering ICAN to these children as the experience is likely to be demoralising and frustrating for them. On the other hand, it can be argued that it is valuable for ICAN to be administered to these children as it highlights the need for these children to receive the necessary support and stimulation from early childhood onwards. To lessen the frustration of these children, assessors should be able to terminate the ICAN at an early stage when it is clear children lack the skills and knowledge to participate in the assessment.

2.3 Delivering the adapted ICAN

- The field-testing showed that it is very helpful for assessors to record the specific reasons why children are unable to answer certain questions, as teachers can use this information to provide need-based support for these children which addresses their weaknesses while building on their strengths.
- The adjustments required to make ICAN accessible for children with hearing impairment differ greatly from those required for children with visual impairment. The access needs of the two groups of children are different, and this should be reflected

in the guidelines for assessors and the materials developed to administer ICAN for the children.

- Using the guidelines and adapted materials developed for this project, teachers with expertise in the education of children with sensory impairment are capable of successfully administering ICAN to children with severe sensory loss – i.e., blind or severely visually impaired children who are braille users and severely or profoundly deaf children who communicate through sign language.
- It is anticipated that teachers without specialist sensory impairment expertise will be able to deliver ICAN successfully to children with mild to moderate sensory impairment – i.e., children with low vision who can read large print and children with mild and moderate degrees of hearing loss who communicate through speech.
- When the adapted ICAN is rolled out more widely, strategies will need to be developed for ensuring data collection, storage, and analysis are manageable as possible, without compromising quality.

2.4 Insights from the ICAN field-test

- Children with hearing impairment enrolled in education who participated in the ICAN piloting tended to achieve lower scores than their visually impaired peers. This indicates that their schools are struggling to meet the specific needs of these children – not only in terms of teaching numeracy but in terms of teaching literacy and communication skills.
- Children with hearing impairment who were not in school demonstrated minimal or non-existent levels of numeracy (unless they had previously been enrolled in education). This indicates the need for these children to receive much greater levels of support for learning and their inclusion in formal education systems.
- The field-testing shows that specialist training needs to be provided for assessors if they are to use the guidelines effectively.

2.5 Next steps

- It is recommended that a study be carried out to identify barriers to numeracy both for children with hearing impairment enrolled in education and out-of-school children with hearing impairment in Pakistan, along with strategies for overcoming those barriers.
- A national dissemination event should be held to create an opportunity for key government representatives at federal and provincial level, as well as key stakeholders from the international donor community (including UN agencies) and civil society organisations (including OPDs), to discuss the report's findings, as this will ensure these findings will inform future education assessment strategies and approaches in support of the Government of Pakistan's commitment to inclusion.
- There should be a national policy dialogue built around SDG 4.1: "(increased) proficiency in reading and mathematics" which addresses disability issues. This will ensure political commitment at the policy level to adopt inclusion as a cross-cutting theme. The project learnings can also inform the National Equitable Education Program (NEEP) 2020-2025 on accessible assessment methods.

- Beyond Pakistan, Sightsavers and ITA should engage with the PAL network and other national and international stakeholders to disseminate the report's findings and promote accessible assessment throughout the Global South.

3. Adapting ICAN for children with sensory impairment

3.1 Overview

This section describes how ICAN was adapted for children with sensory impairment.

At the start, guidelines were developed in English and Urdu for the administration of ICAN to children with sensory impairment, along with adapted assessment materials that addressed the specific needs of these children. This process involved extensive consultations between key stakeholders in Pakistan and experienced sector specialists in the United Kingdom.

As far as possible, the assessments followed the standard ICAN rubric. Adaptations were only made when a task needed to be clarified or presented in a different way – for instance, raised tactile materials were used to enable children who were blind to use touch rather than sight to access print drawings. Care was taken not to make the adapted ICAN any easier for children with sensory impairment and to ensure that the mathematical concepts being assessed were the same as in the original ICAN.

The theoretical design for the adapted ICAN drew on the existing literature on effective assessment approaches for children with hearing impairment (e.g., Gregory, 2005; Marschark, 2007; Marschark & Hauser, 2012) and children with visual impairment (e.g., (Mason and McCall, 1997; Le Fanu *et al*, 2018; McLinden *et al*, 2020). It was also aligned with the principles of Universal Design for Assessment which identify ways in which assessments can accommodate the requirements of diverse learners (e.g., Rose, 2000; Thompson, Johnstone & Thurlow, 2002; Ketterlin-Geller, 2005).

3.2 Adapting ICAN for children with visual impairment

It was recognised that the degree of adaptation required for children with visual impairment depends largely on the extent of their visual loss. Children with mild visual impairment may require no changes to the standard ICAN materials, while children with moderate vision loss may require minor adaptations, such as enlarged drawings or enlarged print. Children who rely on touch to access visually presented information will require simple, handmade tactile materials (including braille materials) to answer some ICAN questions.

For the pre-test, instructions were provided in the guidance for assessors about developing their own version of the adapted ICAN materials for children with moderate and severe vision loss. For the pilot, centrally produced materials were provided to ensure standardisation in administration. There was evidence that the children participating in both the pre-test and pilot found the tactile materials produced for the assessment both helpful and enjoyable. It seems that there was also a degree of novelty for the children in having tactile representations available.

3.3 Adapting ICAN for children with hearing impairment

We recognised some questions needed to be adapted so they were more accessible for children with hearing loss. The delivery in sign language had to be considered. For example, for the question ‘show me the triangle’, the word ‘triangle’ could not be signed without revealing the shape. For children who could read, explanatory written labels were provided for some questions to accompany delivery in sign language.

Following feedback from the pre-test, a section was added to the guidance for administering ICAN to children with hearing impairment whose speaking and signing skills were limited. If children were unable to read the written labels, the assessor was allowed to sign vocabulary, but any adaptation had to be recorded to indicate the extent of the child's understanding of the mathematical concept in the question. The guidance outlined four methods for delivering the ICAN assessment to children with various degrees of hearing impairment (see Table 1).

Table 1: Methods for delivering ICAN to children with hearing impairment

	Method of adaptation
Method 1	The child was given the ICAN assessment. The child then completed the assessment questions on their own without any help.
Method 2	The child was given the ICAN assessment. The assessment was read to the child. Where necessary, the language of the assessment was adapted so it was clearer for the child.
Method 3	The child was given the ICAN assessment. The assessment was signed to the child. The signing instructions were included in the guidance for assessors. Written labels were provided to avoid signing the answer required. For example, for Question 12, if the assessor uses the sign for a triangle, the child will be easily available to identify which of the four shapes on the question sheet is a triangle. The child will therefore not be effectively assessed on their understanding of the concept.
Method 4	The child was given the printed ICAN assessment. The assessment was delivered using a total communication approach. A combination of Methods 2 and 3 was used.

4. Field testing the adapted ICAN

This section describes the methodology used to field-test the adapted ICAN.

4.1 Pre-testing the adapted ICAN

For the pre-test, training of trainers (TOT) was conducted virtually by the sector experts from UK who developed the guidelines. This training was provided for 18 teachers with specialist expertise in either the education of children with visual impairment or the education of children with hearing impairment. A second training was held virtually before pre-testing to further orient the teachers to the ICAN tool.

In total, 20 pupils from 4 schools participated in the pre-test – 11 boys and 9 girls. Of these children, 11 had hearing impairment and 9 had visual impairment. These children were between 5 to 14 years, enrolled in Grades 2 and 3 and had varying degrees of sensory impairment (see Table 2). After the pre-testing, necessary changes were made to the guidelines and adapted materials.

Table 2: Schools participating in the pre-test

Name of school	Location	Type of disability of enrolled pupils
DEWA Trust	Karachi & Islamabad/Sindh & ICT	Hearing impairment
National Institute for Deaf (NID)	Gujranwala/Punjab	Hearing impairment
Baseerat High School for Blind	Wah/Punjab	Visual impairment
Idarieu School & College for Blind and Deaf	Karachi/Sindh	Visual impairment

4.2 Lessons from the pre-test

When the adapted ICAN was pre-tested in selected schools, topline quantitative data were collected by the assessors on the characteristics of the pupils participating in the assessment (i.e., age, grade, sex, and type and severity of impairment), along with topline quantitative data on their performance in the ICAN. In addition, the assessors were asked to describe their experiences administering the ICAN and to comment on its accessibility for their pupils. This involved them providing written answers to open-ended questions.

The pre-test generated useful lessons that were used to refine and develop the draft guidelines and materials for the main piloting.

During the pre-test, it was found:

1. Some teachers were so focused on delivering ICAN that a) they did not follow the guidelines and/or b) did not evaluate the guidelines after delivering ICAN.

2. Some teachers were so anxious for their pupils to do well that they intervened inappropriately – e.g., through moving the child's hand (in the case of a child who was blind) or prompting the child.
3. There was some confusion about when to stop the assessment. Sometimes teachers made arbitrary decisions to stop assessing, not allowing children to show their full potential, while others persisted beyond the child's level of understanding and concentration causing undue fatigue.

The guidelines were adjusted in response to the above.

4.3 Piloting the adapted ICAN

For the piloting, training in the adapted ICAN was organised with 41 participants which took into account learning from the pre-test. The guidelines and materials were then piloted in five schools from Islamabad Capital Territory and two provinces (Punjab and Sindh), along with communities in the vicinity of these schools. In total, 68 children participated in the pilot – of whom 36 were hearing impaired and 32 were visually impaired. Thirty-two children were enrolled in school and 36 were out of school. Equal numbers of boys and girls participated in the assessment. See Table 3 below.

Table 3: Pre-testing of ICAN in Pakistan – participants and locations

Location	Name of special school	Sample size in special schools		Sample size in communities[1]		Sample size (Total)
		Male	Female	Male	Female	
ICT/Chak Shehzad	DEWA Trust Isb (HI)	2 (HI)	2 (HI)	2 (HI)	2 (HI)	8 (HI)
Sindh/Karachi	DEWA Trust Khi (HI)	2 (HI)	2 (HI)	2 (HI)	2 (HI)	8 (HI)
	Idarieu School & College for Blind and Deaf (VI)	4 (VI)	4 (VI)	8 (VI)	9 (VI)	25 (VI)
Punjab/Gujranwala	National Institute of Deaf (NID) (HI)	4 (HI)	4 (HI)	4 (HI)	4 (HI)	16 (HI)
Punjab/Wah	Baseerat High School for Blind (VI)	2 (VI)	2 (VI)	-	-	4 (VI)
ICT/Islamabad	Bahria College for Special Education	1(VI) 1(HI)	1(VI) 1(HI)	1 (VI) 1 (HI)	1(HI)	3 (VI) 4(HI)

Total sample		**16**	**16**	**18**	**18**	**68** **36 (HI)** **32 (VI)**

[1] The communities were in the vicinity of the schools who participated in the pre-test.

For the pilot, an additional column was added to the original ICAN scoresheet so that the assessors could record additional observations about the way children tackled each question. This information was potentially invaluable as it could be used by the children's teachers to provide targeted interventions for these children: it has therefore been retained in the final version of the scoresheet. In most cases, feedback from the assessors was supplemented by photographs and videos of the ICAN being administered. This information again helped up to better understand the practicalities of the administration process.

4.4 Rationale for selecting students in Grades 2 and 3

For both the pre-test and the pilot, we selected students with sensory impairment in Grade 2 and Grade 3. In fact, ICAN has been designed so it can be administered to children aged 5-16 regardless of the grades in which they are studying, as per the ICAN/ASER guidelines. We decided to focus on Grades 2 and 3 students as ICAN is aligned with UNESCO's Global Proficiency Framework under Grade 2 and 3 and therefore testing the adapted test with Grade 2 and Grade 3 learners would enable us to advocate more effectively for the transnational universality of the guidelines. However, based on the results of the field-test, we can confidently argue that these guidelines can be used across a wide age range of children with sensory impairment enrolled in diverse grades to assess levels of foundational numeracy.

4.5 Lessons from the pilot

When the adapted ICAN was piloted in selected schools and communities, quantitative data were again collected about the children's performance in the adapted ICAN. In addition, qualitative feedback was collected from the field team who conducted the assessments and from the parents of the children.

It was found that identifying out-of-school children with sensory impairment was challenging, as there was no accurate database that could be used to identify them. The data received from national and provincial special education institutions were out of date and most children who were identified by these bodies were already over sixteen years of age. Where children of an appropriate age were identified, parents were sometimes unwilling to provide their consent, even when the purpose and process of the project was fully explained to them. When parents were willing to provide their consent, the children sometimes resided in remote areas that were inaccessible.

However, based on the data collected from the pre-test and the pilot, we were able to obtain a detailed understanding of the performance of the children in the adapted ICAN and the factors shaping their performance. This is discussed in the next two sections – the first of which discusses children with hearing impairment and the second children with visual impairment.

5. Performance of children with hearing impairment

In total 36 children with hearing impairment were assessed, of whom 18 were in school and 18 out of school.

5.1 Results for children with hearing impairment enrolled in school

The age range of these children was from 6 to 14 years. There were 11 children in Grade 3 and 7 in Grade 2.

The recorded time taken to administer the assessment was between 15 minutes and 65 minutes. All the assessors used Method 4 in schools. The mean score for girls was 12.7 and for boys 14.1. Relevant data are provided in Table 4 below.

Table 4: Results for children with hearing impairment enrolled in school

Age	**4-5**	**6-8**	**9-11**	**12-14**	**15-16**	**Total**
Number of children	0	1	12	5	0	**18 (9B, 9G)**
Grade	**2**	**3**				
Number of children	7	11				**18**
Hearing loss	**Mild**	**Moderate**	**Severe**	**Profound**		
Number of children	0	2	2	14		**18**
Admin time (mins)	**<20**	**20-30**	**31-40**	**41-50**	**51-65**	
Number of children	6	6	3	1	2	**18**
ICAN score	**0-7**	**8-12**	**13-17**	**18-22**	**23-26**	
Number of children	3	4	5	6	0	**18**

[1] NR= No record

5.2 Results for out of school children with hearing impairment

The age range of these children was from 4 to 16 years. All the assessors used Method 4 except one who used Method 2. Two children performed much better in the assessment

than the majority which raised the mean scores. The mean score for girls was 5.4 and for boys 5.0. See Table 5 below.

Table 5: Results for out of school children with hearing impairment

Age	**4-5**	**6-8**	**9-11**	**12-14**	**15-16**	**NR[1]**	**Total**
Number of children	1	5	3	4	3	2	**18 (8B, 10G)**
Hearing loss	**Mild**	**Moderate to severe**	**Severe**	**Profound**			
Number of children	2	2	8	6			**18**
Admin time (mins)	**<20**	**20-30**	**31-40**	**41-50**	**NR**		
Number of children	6	6	3	1	2		**18**
ICAN score	**0-7**	**8-12**	**13-17**	**18-22**	**23-26**		
Number of children	12	4	1	1	0		**18**

[1] No record

5.3 Analysis of performance of children with hearing impairment

5.3.1 Children with hearing impairment enrolled in school

These children found it difficult to answer the questions and consequently most achieved low scores. The language-based questions and the questions which asked children to make comparisons were particularly challenging. Many pupils found Questions 1 to 4 difficult to answer because of their lack of familiarity with the vocabulary used and their underlying concepts. For instance, the assessors made comments such as, “Farthest is not in his vocabulary” and “She knows big and small but not shortest.” Similarly, assessors reported that Question 6 proved difficult for many of children, as they could add up the number of bananas and oranges but could not say how many more bananas than oranges there were.

Most children did not understand the clock, time, or calendars, so could not answer questions 7-10. Many of the returns stated that children had no knowledge of division and therefore could not answer questions 19 and 24. Only two pupils answered questions 21 to 25 correctly. In line with the guidance, most assessors did not ask the questions in the last section because children were unable to solve the simpler sums.

Some children were unable to read the labels (on which various words had been written). These labels were used to supplement delivery when signing was not appropriate as it would have provided the child with the answer. When the children could not read the labels, the assessors used a range of alternative methods to make the questions accessible. These included extensive use of sign language without giving the answer, acting out situations, and asking supplementary questions. These additional methods are acceptable, but it is important that assessors record that they used these methods and the reason they used them (i.e., because the children could not read the labels), as their teachers can then provide these children with the necessary remediation. Only one assessor reported using the alternative labels which presented the questions in alternative ways – e.g., farthest from the tree/far from the tree. Good sign language skills in both the assessor and the pupil were essential for effective delivery to children with severe and profound hearing loss.

The guidance was well received. For example, one assessor commented,

> ***"The clear instructions, helpful guidelines, and well-designed layout (of the guidance) made it easier to navigate and utilise the tool effectively."***

Suggestions by assessors of ways to improve the guidance often involved adapting the assessment in ways which were impractical or would invalidate the assessment (for example by providing additional information on concepts before asking the questions).

The timing of the assessment was seen as important and it was suggested that the assessment should be delivered to pupils in Grade 2 and 3 at least six months into the academic year, as this will ensure the pupils are as ready for the assessment as possible. Some of the assessors observed that children with hearing impairment would only be able to participate in ICAN if they were systematically taught the concepts in the assessment over an extended period of time.

Several assessors presented the assessment to their pupils as a game. Given the importance of ICAN, it should not be described as so.

5.3.2 Out of school children with hearing impairment

These children found it even more difficult than the in-school children to participate in ICAN, as most had no speech or sign language skills and no numeracy skills. The communication barrier was huge as the children did not understand the questions. As a result, only one pupil (who had attended school until two years ago), along with another child, could answer more than a few questions. Eight children scored less than 2. Some of these children had a mild to moderate hearing loss which should not, with support and amplification, be a barrier to learning. However, only one of these children was aided with amplification. Deafness is not a learning disability, and these children require access to training and tuition, hearing aids and if necessary, sign language skills. The assessment highlighted the lack of communication, literacy, and numeracy skills of these children, along with the absence of necessary support.

Video footage illustrated the difficulties. The children did not have the sign language skills to understand the questions. Rather than answering the questions, most merely nodded, smiled, and copied the assessors' signing. Commenting on the performance of a child, one assessor noted,

“Sign language barriers posed significant challenges in communicating instructions and understanding his response effectively”.

6. Performance of children with visual impairment

A total of 32 children were assessed. 14 were in school and 18 were out of school.

6.1 Results for children with visual impairment enrolled in school

The age range of children in school varied from 8-15 with most children in the 11-13 age range. Five of the children were categorised as blind and nine as having low vision. All the children completed at least eight questions successfully. Scores ranged from 8/26 to 24/26 with 6 children scoring 20/26 or more. The mean score for the children was 18/26. The children described as blind averaged 19/26. Administration time exceeded the recommended time for most children, with two children being assessed for over an hour. The feedback from the assessors on the materials was uniformly positive and most children were reported as enjoying the challenge. See Table 6 below.

Table 6: Results for children with visual impairment enrolled in school

Age	**8-10**	**11-13**	**14+**			**Total**
Number of children	3	9	2			**14 (6B, 8G)**
Grade	**2**	**3**				
Number of children	7	7				**14**
Level of vision	**Blind**	**LV**				
Number of children	5	9				**14**
Admin time (mins)	**<20**	**20-40**	**40-60**	**60-80**		
Number of children	1	3	8	2		**14**
ICAN score	**0-7**	**8-12**	**13-17**	**18-22**	**23-26**	
Number of children	0	2	4	5	3	**14**

6.2 Results for out of school children with visual impairment

The information provided about the performance of children who were out of school was detailed and useful. The age range of the out of school children varied from 5-16. Most of the children in the sample were in the 13-16 age range and there were equal numbers of children described as being blind and having low vision. Interestingly, six of the children had attended schools for the blind at a younger age but had dropped out. Five of the children who were blind retained their braille skills. Despite a lack of formal education, almost all the children were able to complete at least seven of the questions successfully. Scores ranged from 7/26 to 24/26, apart from a 16-year-old male with low vision who recorded a full score. Only one child was not able to engage with the assessment – a six-year-old reportedly with

attention deficit hyperactivity disorder (ADHD). Children were often reported as 'delighted' to have the opportunity to participate in the testing.

The responses received from the assessors provided a detailed and informative picture of the children's performance in the assessment for children out of school. Assessors reported that the assessment had taken 30-40 minutes to administer, much shorter than that for the children in school. This was possibly because certain questions were omitted because these children were unable to answer them. See Table 7 below.

Table 7: Performance of out of school children with visual impairment

Age	**5-7**	**8-10**	**11-13**	**14+**		**Total**
Number of children	3	4	3	8		**18 (9B, 9G)**
Level of vision	**Blind**	**LV**				
Number of children	9	9				**18**
Admin time (mins)	**<20**	**20-40**	**40-60**	**60-80**		
Number of children	0	18	0	0		**18**
ICAN score	**0-7**	**8-12**	**13-17**	**18-22**	**23-26**	
Number of children	5	3	3	5	2	**18**

6.3 Analysis of the performance of children with visual impairment

Encouragingly, only a marginal difference was found between the scores of boys and girls in school. The mean score for girls in school was 18/26 and the mean score for boys in school was 17/26. When comparing the scores of children in school who were blind with those of children in school with low vision, the results were more surprising. Children who were blind averaged scores of 20/26 while children with low vision averaged 17/26. Given the additional complexity entailed in accessing the test materials through touch, one would expect children with low vision to outscore children who are blind in mathematics. This surprising result may simply be a result of the small sample sizes or inaccurate classifications of vision, but it would be interesting to see if this finding is replicated in a larger scale study. Another possible explanation is that the advantages of working through vision are lost by the widespread practice in schools for the blind of teaching children with low vision through tactile methods. The result could also be taken as evidence that the materials and methods developed for giving children who are blind access to ICAN are effective.

The mean score for girls who were out of school (14/26) was also broadly comparable to that of the boys who were out of school (13/26). As expected, the mean score of out of school children who were blind (11/26) was lower than that for out of school children with low vision

(15/26). However, these results should be treated with caution since some children described as ‘blind’ were reported as using vision for some tasks.

The questions that caused the greatest difficulty for almost all the children, whether in or out of school, were questions that required them to interpret a graph, a calendar, and a tactile clockface. The assessors sometimes did not even ask the children to answer the clockface question, as they believed the children would not be able to answer it. In many cases children had concepts of time but were unfamiliar with clocks – some because they had never been shown a clock, others because they used devices with speech technology to tell the time and therefore never needed to engage with clock faces. As expected, the more complex calculations involving multiplication and division were correctly answered by older children who had been taught these skills.

The in-school children used a range of assistive materials to help calculate sums including slates and styluses, but others successfully relied on mental calculations. Mental calculation was the preferred method for the out of school children. Both the in-school children and the out of school children found the same questions difficult, but a higher proportion of the latter were unable to make the more advanced calculations.

7. Conclusion

The field-testing of the adapted ICAN in Pakistan has shown ICAN can be made accessible for children with sensory impairment. It is recommended that the PAL Network now consider ways in which the adapted ICAN can be rolled out more widely in schools across Pakistan and other countries in the Global South. It is also recommended that the PAL Network consider ways in which ICAN can be adapted according to the principles of Universal Design for Assessment, so it is accessible for children with diverse impairments and conditions, not just children with sensory impairment. The active participation of Ministries of Education in this process, along with organisations of persons with disabilities, is paramount.

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