Empowering Persons With Special Needs during examinations.

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Introduction: As per 2011 census, India has around 3 – 4 million Children With Special Needs (CWSN). However this number is skewed and doesn't represent the estimated proportion of world CWSN population considering the proportion of India's population v/s world population as per World Health Organization (WHO) report. Industry experts believe the numbers are way higher. Currently, there are close to 400 government-funded schools for the hearing-impaired in contrast to very few schools for visually impaired across the country. India is home to 20% of world's visually impaired nearly 40 Mn – including 1.6 Mn children. The Govt of India through the Rights of Persons With Disabilities (RPWD) Act, 2016 has identified 21 different categories of Persons With Disabilities (PWD)s as an extension to the earlier 7 different categories and further ratifies the UN Sustainable Development Goals – in particular SDG 4 – Global Education Development. There are innumerable types of disabilities that can affect a human being. Some of these conditions are more common than others. Some of the types of disabilities are recognized by the government in order to provide disability benefits to the needy ones. The list of 21 disabilities that have been identified under the RPWD Act 2016 of India are : (i) Blindness, (ii) Low vision, (iii) Leprosy cured persons, (iv) Hearing impairment, (v) Locomotor Disability, (vi) Dwarfism, (vii) Intellectual Disability, (viii) Mental illness, (ix) Autism Spectrum disorder, (x) Cerebral Palsy, (xi) Muscular Dystrophy, (xii) Chronic Neurological conditions, (xiii) Specific Learning Disabilities, (xiv) Multiple Sclerosis, (xv) Speech and Language Disability, (xvi) Thalassemia, (xvii) Hemophilia, (xviii) Sickle Cell disease, (xix) Multiple Disabilities including Deaf-Blindness, (xx) Acid-Attack victims, (xxi) Parkinson's disease.

India's National Education Policy NEP 2020, aligns to the UN SDG – goal 4 : Inclusive education as part of Global Education Development - ensuring free, equitable, and quality primary and secondary education for all children and have mandated the following to enable equal opportunities to CWSNs. Some of the key focus areas are

a) Creating enabling mechanisms for giving CWSN the same opportunities of obtaining quality education, learning & assessment

b) NEP 2020 further stresses on standardizing Indian Sign Language across the country and National and State curriculum materials developed, for use by students with hearing impairment. Local sign languages will be respected and taught as well, where possible and relevant.

c) Most classrooms have children with specific learning disabilities who need continuous support. Teachers must be helped to identify such learning disabilities early and plan specifically for their mitigation. Specific actions will include the use of appropriate technology allowing and enabling children to work at their own pace, with flexible curricula to leverage each child's strengths, and creating an ecosystem for appropriate assessment and certification.

d) Assessment and certification agencies, including the proposed new National Assessment Centre, PARAKH, will formulate guidelines and recommend appropriate tools for conducting such assessment, from the foundational stage to higher education (including for entrance exams), in order to ensure equitable access and opportunities for all students with learning disabilities.

The Objective
The aim of this paper is to discuss how we could transform the current baneful experience of CWSN students who appear in any examination as mentioned above in point no d). The choice of selecting particular 2 categories of CWSN students: Deafness & visual impairment was primarily due to the practical experience while interacting with such special children in schools, that triggered an action to see how technology could empower special category of children and once this has proved to be successful, could then be further scaled up to cater to remaining 19 categories.

Survey : 1-2-1 Interviews with CWSN (Deaf, Hard of Hearing, Blind students), Special Teachers, Parents
Considering the problem statement, the data set for the survey comprised:

➢ 2 categories of CWSN who are pursuing some form of continuous learning and who have or are appearing in examination(s), conducted by various institutions.

➢ Special Educators working with institutions such as deaf / blind society school

➢ Parents of PWDs

Survey Outcome – The Challenges
Some of the challenges explicitly expressed by survey participants are:
(i) Starts from the day the examination date is declared → looking for the interpreter
(ii) Once the interpreter is identified → establishing clear understanding as different interpreters might have different level of comprehension capabilities & ensuring that the interpreter is available on the exam day
(iii) Experience of Midway / Last minute cancellations are a major stress points for the CWSN candidate.
(iv) Painful experience while sitting in high-stake examinations and that too at faraway centers – requiring the CWSN / parents to make logistical arrangement for the interpreter
(v) Can we reduce the travel needs of CWSN for examinations
(vi) In spite of successful examination with the help of the interpreter – candidate still has the additional worry of whether the interpreter did the right comprehension or not – as the response of the candidate is 100% dependent on right comprehension

Most of the CWSN students who are Deaf or Hard of Hearing have highlighted, the challenges faced with the interpreter, as they have difficulty comprehending written text unless translated to them in any Language they understand and thus interpreter plays a crucial role in not only understanding the question asked in the question paper, but also be in a position to translate the same to the candidate without changing the meaning. Nearly, 99% have categorically stated that the question was not correctly interpreted / translated.
 i. Most of the CWSNs in this category have highlighted that the availability of the interpreter during the exam duration which generally lasts 20 days / 1 month, poses major challenge during every examination. Their days are spent searching an interpreter.
 ii. CWSN – Blind candidates, also face the similar challenges – in this case they need the services of a Scribe, who will have to write the responses spoken by the candidate. CWSN other categories – who have physical disabilities / limitations of writing at speed also need the services of the scribe.
 iii. Many CWSNs, their parents and institutions have together expressed the above set of challenges as one of the major reasons for drop-out rates increasing year-on-year.
 iv. Apart from the above set of challenges, the economic strata of such drop-outs also had to be taken into consideration. While, CWSNs belonging to affluent class were in a position to avail the latest gizmos, the affected strata belonged to the weaker section or economically challenged class. Additionally, the %age of CWSN students who are impacted more are those who are from rural areas.

The TCS iON Assessment Solution
The solution required to address the above challenges

S No	Challenges	The Aim should be to
(i)	Starts from the day the examination date is declared → looking for the interpreter	Accessible Question Paper that CWSN candidates can comprehend easily – No need for interpreter
(ii)	Dependency on Interpreter on Exam day	Easy response submission by CWSN directly – no need for interpreter
(iii)	Cancellation related stress for CWSN candidate	Question Paper that is accessible by CWSN candidates – No need for interpreter
(iv)	Logistical needs for interpreter	No need for interpreter / logistic preparations
(v)	Reduced mobility for CWSN	Solution that empowers institutions to take exams to the nearby location
(vi)	Sync-up challenges with interpreter	No interpreter required - No sync up required

TCS Assessment solution: TCS iON has been conducting large scale examinations since over last 10 years now, covering all districts Pan-India. We conduct both online and offline examinations at our test centers. The robust assessment engine supports all Indian languages which are being used in all large scale and high-stake recruitment / entrance examinations. Basis discussions with various customers, we felt there was an increasing need to innovate and design an examination delivery mechanism that would cover remote locations with little to no internet coverage. Moreover, the dynamic geographic coverage requirements of different customers posed a challenge that a fixed examination infrastructure would not be a viable option and hence we worked towards creating mobile exam labs which would enable us to create examination infrastructure on-the-go, with very little time to setup.

TCS iON PAPER Education Appliance is an innovative product – aimed at extending online / offline learning & online / offline examination delivery. The features of this appliance enables institutions to conduct examinations both online and as well as offline. The offline feature caters to the examination needs at remote locations – which lacks proper ICT infrastructure. The unique feature of this product is that Internet connectivity is required only for download of questions papers and at the time of uploading of responses to the TCS iON Cloud. This is a secured examination delivery appliance which has the capability to replicate the question paper from parent to child device using its peer network and thus enabling the invigilator to quickly deliver the Question papers to the candidates devices. It supports audio, video type questions as well other than all other forms. The camera recording and audio recording functions enables the CWSN (Deaf, Hard of Hearing & Visually challenged) student to record their responses.

The Solution Piloted:

Was conducted with Deaf and Blind societies where, special educators, deaf students and blind students were given hands-on training for an hour. Post this training, they took their assessment using the PAPER appliance.

a) The deaf students were able to use the device all by themselves and didn't require any 3rd person involvement while understanding the video questions. They also recorded their responses themselves on the device. Self Sufficiency level was : 100%

b) The visually impaired students submitted their response in audio format, but required assistance of a 3rd person to start the Question playback, record the response and submission.
   a. Self-sufficiency level was : 80%
   b. Needed help with start/stop inputs while moving from question to question

Based on the set of challenges expressed by the affected student categories and also considering the geographic location of most of the affected category of students, we thought of addressing all the major areas of concern. Thus a solution that should cater to majority of the CWSN categories and that work in areas with low / no internet connectivity. The solution had to be network agnostic / should address the mobility aspect. So in other words, the solution required the capability to be portable i.e. should not be bulky, that could be taken across places easily, with the added capability to work offline / without any network dependency. The below mentioned features of our TCS iON PAPER education appliance were the key differentiators.

i. Capability of pushing video / sign language based questions, enabling CWSN – Deaf / Hard of hearing to comprehend what is asked. This empowered the candidate being self-sufficient in understanding the question without the need of interpretation
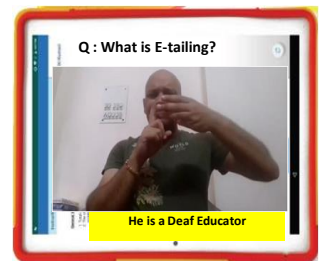
ii. The capability enabling the Deaf candidate to submit response through sign language. This feature removed the need for the Deaf candidate to be dependent on the interpreter to write the response. Thus the above 2 features made the Deaf candidate completely independent to sit in the exam.

iii. Capability of the solution to push audio questions and also accept audio responses empowered the blind candidate to listen and submit the response. This feature empowered the blind CWSN to be self sufficient and being independent of a SCRIBE.

iv. Another important feature of the solution was the capability to conduct assessments offline – where there is no internet connectivity. This feature helped the institutions to take the assessments to the home of the candidate / in other words reach CWSNs who are staying in remote locations.

Conclusion

The successful pilot suggested that the current product version addressed the need of the PWDs with Deafness / Visual impairments. While the solution is a 100% fit for PWD – Deaf / Hard of Hearing, the accessibility features are currently in the roadmap for visual impairment use. Furthermore, development and enhancements are in the product roadmap to address the need of other categories adhering to the international standards for accessibility.

Abbreviations Used

CWSN	:	Children With Special Needs
RPWD	:	Rights of Persons With Disabilities
PWD	:	Persons With Disabilities
WHO	:	World Health Organization
UN	:	United Nations
SDG	:	Sustainable Development Goals