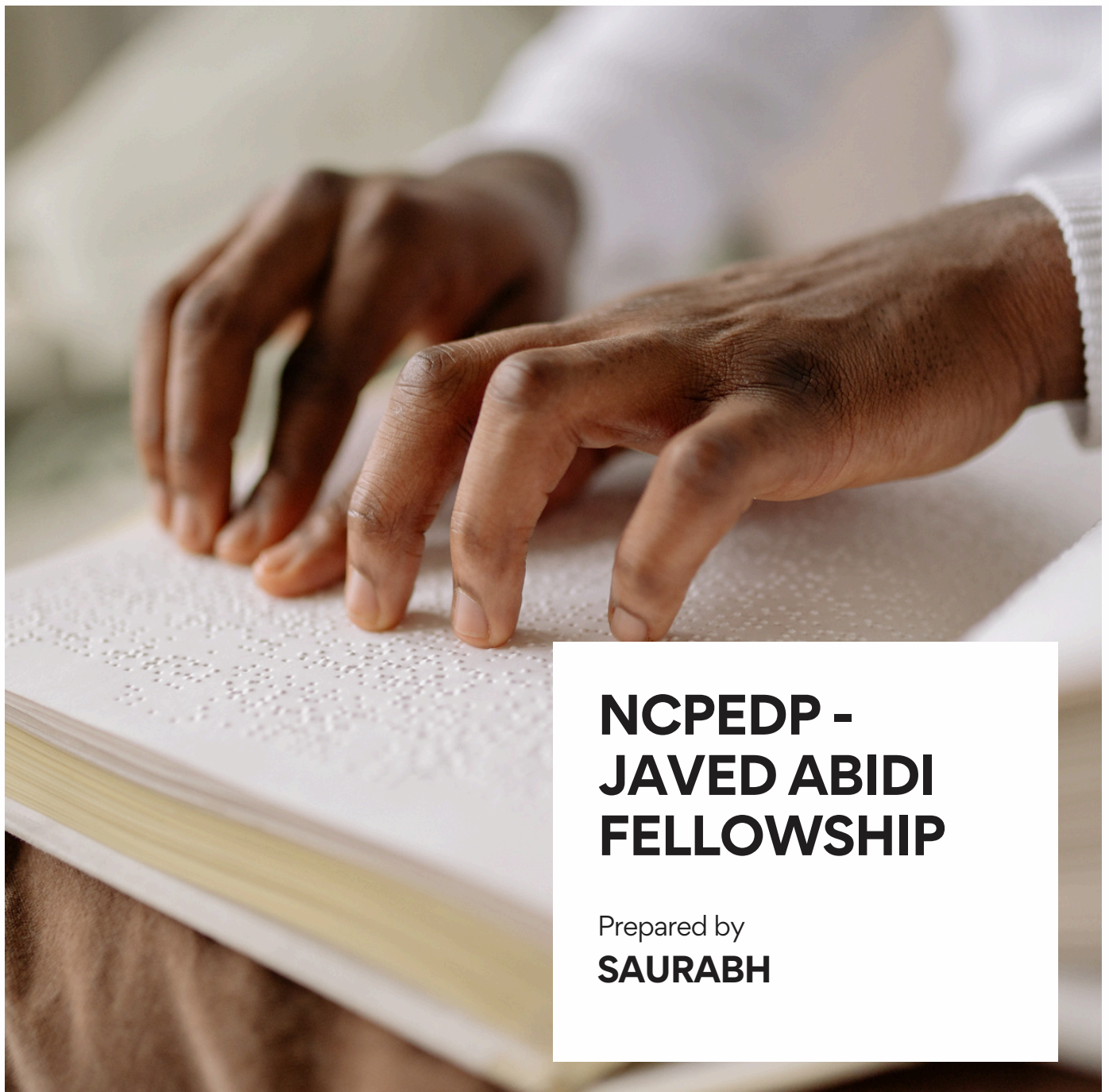


IMPARTING STEM BASED EDUCATION FOR VISUALLY IMPAIRED



NCPEDP - JAVED ABIDI FELLOWSHIP

Prepared by
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BACKGROUND

Saurabh Prasad is a 2023 CSE graduate from IIIT Delhi and currently employed as a software engineer at Microsoft. He is a dedicated learner with a passion for programming and addressing challenges in daily lives through innovative ideas. Hailing from the small village of Tandwa in the Chatra district of Jharkhand, he was born with Glaucoma, an infantile eye disease that progressively damages the optic nerves, leading to complete blindness.

At the age of 11, Saurabh realized his difficulty in keeping up with studies in the general classroom setting of his village's local school. Fortunately, his parents discovered St. Michael, a special school for the blind in Ranchi. Despite not knowing Braille script, he started his education from kindergarten. Although excelling in Braille, he faced setbacks, not being promoted to the 5th grade for two consecutive years. This disappointment prompted him to convince his parents to secure admission at NIVH (now NIEPVD) Dehradun, in the 8th grade. In 2014, he cleared the entrance exam and enrolled in the 8th grade. While managing most subjects well, Mathematics became challenging due to his weak foundation from skipping the 6th and 7th grades. With dedication and extra classes, he gradually gained confidence in Math and excelled in class. This experience transformed Math into one of his favorite subjects.

Saurabh actively participated in various school and national-level speech, debate, and essay writing competitions, winning several prizes. In the 10th grade, he received the "Student of the Year" award and achieved a CGPA of 9.8. Despite his dream of pursuing PCM, he couldn't do so at Model School and had to return to humanities. Fortunately, the National Association for the Blind (NAB), Delhi, supported him, allowing him to join Tagore International School, Vasant Vihar.

This transition marked a shift from Braille to digital education, from a special school to a regular one, and from mere studying to studying with a purpose—to gain admission to IIT. Dr. Uma Maheshwari from Delhi University and Dr. T.K. Bansal, a retired Physics lecturer from IIT Kharagpur, aided his JEE exam preparation. Although he didn't qualify for IIT, his JEE mains score of 93.7 percentile secured his enrollment into Indraprastha Institute of Information Technology, Delhi, with a CSE branch.

After joining IIIT-D in 2019, Saurabh engaged in various curriculum courses, projects, and hackathons, both within and outside the curriculum. In the summer of 2021, he interned as a Software Engineer at Saxo Bank, Gurugram, and completed an "Engage" project under Microsoft. Following this, he qualified for the Microsoft summer intern 2022 through campus placement, where he completed a successful project at their Hyderabad main campus. Following two interviews, he received a pre-placement offer from Microsoft.

Additionally, he served as a Javed Abidi fellow under NCPEDP, working to enhance accessibility in STEM subjects for visually challenged students and increase their participation in higher classes. His vision is to promote the participation of visually challenged students in STEM fields, fostering a barrier-free environment where all students, with or without eyesight, can study together seamlessly. Furthermore, he aspires to contribute to improving product accessibility with screen readers, developing a common model adaptable by companies for their products and services.

PROGRESS OVERVIEW

NOVEMBER 2021 TO APRIL 2022

- “I was very interested in joining a fellowship and the topic of intervention was quite clear given my own past experience. But, this was a time when i was only looking disability inclusion from aspect of visual impairment and first workshop widened my thinking to also look at students with other disabilities interested in STEM education”
- He started to establish relationships with special schools and cohorts like NAB to conduct a primary study on needs, challenges and preferences of students with disabilities.
- However, it was not received well and instead of reaching out to organisations he started to reach out to teachers which helped him to reach students. He also realised that in few schools the students did not have access to smartphones restricting them to be part of study. So, he started to make visits to these schools by taking permission from respective Principals. It not only helped him in reaching out to students, having elaborate discussions with them and also sensitised and influenced the school authorities to promote access to technology even for a restricted period of time. “The teachers were really open to it and promised it as well”. You can view more of his [visit to St. Michael Scool](#), [St. Thomas school](#) and [AICB](#).
- He did not just rely on the promises and witnessing the love amongst students to learn coding while having similar workshops with students in other schools and started his own initiative to make an open source public resource facilitating that. “At the beginning, while 35 students showed interest, 25 students showed up and I divided them into two slots; one for those below ninth standard and others beyond that. In the classes I found other issues related to subjects like maths and also felt that while some are grasping things quite quickly and others needed their own sweet time.

- So it was important that I reached out equally to both sets and accordingly designed the pace so that even the most hesitant of students are on par with the track and after three months they all completed their project on game design. It was a lovely experience achieving the one of a kind initiative.”
- Simultaneously, in his studies he found in unstructured interviews that students are losing grasp of fundamental concepts as it is skipped by teachers for them; they were also not having notes to refer later given they were using Taylor Frame which has to be assembled and dismantled each time to learn a concept; majority of special schools were offering concepts in Hindi language and when they were promoted further to look at continuing STEM education they had to opt for the usual schools as none of the special schools were not offering these subjects beyond eighth standard so language came as a barrier when those concepts were being delivered in English and they ended up switching to subjects in humanities. Also, the most crucial reason derailing continuation of STEM education was school authorities instilling thought to pursue education in Music and Sanskrit and it is readily accepted as well given they end up not performing well in STEM subjects with the state of education. The books being provided did have braille embossing but that was not enough to describe visuals or diagrams in subjects like Geometry, biology and individual explanations on it is not feasible for a single teacher in a room. The resources were lacking to facilitate their development in STEM. [Click here](#) to know more about such cases.(CONSOLIDATED CASE STUDIES)
- He furthered his network by establishing relationships through [cross disability sensitization workshops](#) conducted with up to 60 people in April. Here's the link for the [presentation](#) and the [modules](#).
- These were done with TCS to sensitise employers on why persons with disabilities must be equally considered, others Bookshare and Prerna Education on how to write mathematical equations and symbols while making notes using Microsoft Word and Latex.

MAY 2022 TO OCTOBER 2022

- He started analysis of the [survey](#) done with 98 students to develop a detailed baseline report and found that majority students below standard eighth were interested in studying Maths and those in standards above ninth had lower proportion of below interested towards it as were the findings during focussed group discussions and unstructured interviews. [Click here](#) to access the detailed baseline report.
- He continued his classes with students to inculcate love for STEM and programming / coding. This led him to collaborate with Indic AI for social good to train children with disabilities beyond his own network over a period of two months training 16 students with disabilities from various parts of the country during June and July in 2022. He used weekends to pursue his education and extend the outreach as well.
- He also prepared a website to culminate all his similar recordings so that students can have access to it at their own pace. [Click here](#) to access it.
- He also initiated a [mentorship programme](#) around Sep'2022 with students pursuing undergraduate programmes to counsel them on career and facilitating them with the right resources. He connected in one on one mode with 15 visually impaired people. He also brought on board volunteers who were working in STEM fields with their disability.
- He was approached by [NIVH Hello Doon radio stations](#) where he did a programme on digital education and its impact on early childhood education to sensitise people on the positive impact of introducing technology to children at an early age.
- He continued collaboration with Indic AI, Score Foundation to use the opportunity to share his own experience and use it to sensitise the audience on STEM education in higher studies in Feb and March' 2023.
- He continued his social media engagement by sharing his opinion piece with his cohort on the experience of scribes for visually impaired people. [Click here](#) to look at it.

NOVEMBER 2022 TO APRIL 2023

- Post to the [EyeWay Encounter session](#), he received multiple calls from parents and students to have more individual sessions for their doubts. The discussion was around the same line as [earlier sessions](#).

Started a new campaign called "[Ideathon for Disability related challenges and issues organised on WDD 2022](#)". Purpose to bring innovative solutions against the problems faced by the persons of disability. This ideathon was aligned with the theme of WDD 2022.

1. Organised on India level
 2. Received around 500 registrations
 3. 150 participants
 4. submissions of ideas from 50 teams (each team having more than 1 member)
 5. 10 ideas got shortlisted for presentation during the closing ceremony
 6. 3 winners at the end (1) solution for parkinson's disease; 2) Web solution for Vertivious Disorder; 3) An accessible toilet for persons with locomotor disability)
- Post the event a [detailed report](#) was shared with the team.
 - Doing a few classes in collaboration with organisations likewhere he encountered a problem with time management. To solve this challenge, he thought of creating a [centralised web portal](#) having the programming lectures and other stem related resources.
 - At first he gave the designs and content to some companies like Zauca and Bluehost (website designers). But they were not able to deliver an accessible solution. Even the website was not scalable. For eg they were asking for extra money to add extra pages which is in general not required. Hence was not successful.
 - He himself started coding the website with the help of some college friends and successfully completed the design as required and got the website deployed with the [domain a11.com](#)

- Another activity included exploring stem education policies for marginalised communities (not just limited to students with visual impairment but to the whole fraternity). This activity was carried out on the international level studying their policies as well to help the students pursue stem education. The article was submitted to the team.
- Session with UNESCO on [Education on the International Week of Education 2023](#) in the month of Jan 2023 on the 31st. In this session, he focussed on education of students with disability , their existing challenges and expected future solutions. The report was submitted to the team.
- Another session on Tech Plus education in future for students with disability with Score Foundation in Feb 2023 dated.... To analyse the future in the upcoming times with the integration of technology and education
- He organised a podcast with [Radio Udaan in March 2023](#) and this was specially catered to the education of visually impaired students in pursuing stem in higher classes and going for employment in the tech sector. Another podcast was published with [Hello Dhun in April 2023](#) along the same lines on education and employment.

MAY 2023 TO OCTOBER 2023

- He studied the Impact of NEP 2020 and its implementation across a few schools in Bangalore and Delhi to make their classes more inclusive. Few schools were in the process of revamping their classes to accommodate persons with disabilities.
- Sent a mail to DEPWD team to enquire about their STEM lab scheme on 29th August 2023 . He received the response for meeting with Rajesh Aggarwal, Secretary of DEPWD. In the meeting on October 16th, 2023, he discussed the stem lab scheme, issues related with the scheme and challenges faced by students of visual impairment in pursuing STEM in higher education and proposed a solution for providing scholarships to the students.

- They agreed and he was asked to prepare a list of utmost 100 students from class 10th and willing to take maths in class 11th.
- He [prepared a google form](#) and circulated the same across social media channels and also approached ngos.
- Few interactions happened in the month of June-July 2023 and one such happened with the Physics Wala team from Delhi regarding making their JEE and NEET related content in accessible format.
- [Another online meeting](#) took place with Mr IJAL Bronshte based out in Israel and working to teach stem to the students with intellectual disabilities. The purpose was to explore the techniques used and if that could help similar students in India.
- There was a meeting with Dr Alka Rao to seek help for their lab for students with visual impairment as well.
- There was one more [podcast on disability inclusive attitude and role of education and technology](#) in the month of October 2023
- The NCPEDP team organised [another podcast with him on Radio Udaan](#) to promote his work

NOVEMBER 2023 TO FEBURARY 2024

- When he circulated the [STEM scholarship application](#) form across various social media channels, he received more than 30 responses. He carefully reviewed the entries and forwarded the final list to the team for further processing.
- The DEPWD team positively followed up on this and allotted the work to one of their groups.
- This way, they started the process to facilitate scholarships for students through collaboration with [national institutes](#) and [affiliated organizations](#). Depending on the students' location, the DEPWD team allocates the responsibility of managing fee reimbursement to the nearest national institutes or related bodies.

- As a part of the process, the team sends a registration form to the students, and students have to respond to them. This form is further shared with the respective affiliated organisations to issue funds for their school fees.
- Besides, Saurabh also got this news and his a11code initiative being published in Prabhat Khabar Ranchi edition.

ACHIEVEMENTS

- Saurabh successfully completed two programming classes with different cohorts, fostering active participation from students resulting in the completion of end projects.
- Saurabh orchestrated the Ideate for Inclusivity (I4I) event on a national scale during the 2022 Disability Day, through his institution, IIT Delhi. The event yielded numerous innovative ideas, with the top three selected as winners. This initiative also heightened awareness about disabilities and their needs among participants from diverse colleges.
- Saurabh launched a11code, a dedicated online portal providing accessible resources for STEM and programming lectures.
- Saurabh played a pivotal role in realizing the DEPWD Scholarship STEM program, providing crucial financial assistance to many aspiring STEM students, alleviating the burden of their educational expenses.
- Recognizing his advocacy for Accessible STEM, Saurabh was appointed as a Purple Ambassador to represent visual impairment at the International Purple Fest 2024.

Please click on [Impact and Policy Change](#) for details



EXPERIENCE IN THE FELLOWSHIP

When I first joined the Javed Abidi Fellowship, I thought it was just about learning things like law, advocacy, and the constitution. But as I explored further, I discovered that it was more about trying to change things through policies.

Initially, I believed that raising awareness about disabilities and inclusion was solely the responsibility of the people. However, I soon realized the crucial role of policies as the foundation for enforcing inclusive practices. For instance, without education being recognized as a fundamental right in the constitution, it's hard to challenge schools or colleges that deny admission based on disability.

Earlier, I shunned the idea of identifying with a "disability community," emphasizing our integration within society. I believed we shouldn't see disability as a special group. However, I learned that without acknowledging and communicating our diverse needs collectively, achieving uniform solutions is futile. The fellowship illuminated the significance of articulating our needs, backed by data and evidence, to drive meaningful policy changes.

Another important lesson was the value of advocating for all disabilities together. Focusing on just one type of disability creates divisions within the community and makes it harder for the government to address everyone's needs. Understanding the various needs and intersections between them is crucial for achieving inclusive policies, as seen in the RPWD Act 2016 and NEP 2020.

Regarding advocacy, I learned the importance of an evidence-driven approach. This involves research, data collection, analysis, and presenting clear findings to policymakers. It's not just about my group doing everything but about helping policymakers understand the real conditions and take necessary measures through actual data.

Throughout the fellowship, I engaged in various planned activities with fellow participants, such as preparing GANTT, documenting progress, social media outreach, engaging stakeholders, interacting with policymakers, and attending informative workshops. These experiences broadened my understanding and enhanced my potential for growth.

My primary goal in the fellowship was to increase the participation of visually impaired students in STEM disciplines. Seeing the STEM scholarship scheme come into existence has been immensely gratifying, knowing it will benefit many students. It motivates me to continue contributing to disability advocacy by identifying and addressing gaps through active advocacy.

In retrospect, my involvement in the Javed Abidi Fellowship has been truly transformative. It has enriched my understanding of disability awareness, advocacy, leadership, communication, and relationship-building with stakeholders. Every day brought new learning opportunities, and I am truly grateful for this experience.

Moving forward, I am committed to leveraging my experience to contribute meaningfully to the disability related cause.

RESOURCES

Follow Saurabh's work on their social media

