

# Inclusive Education Science Class: Exploration of Practices at Upper Primary Level in Schools of Delhi

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**Abstract:** India's educational system has grown tremendously in terms of the number of schools, students enrolled, and teachers. The purpose of this article is to investigate the extent of inclusion of children with special needs (CWSN) in science classrooms. The policy perspective is discussed initially, followed by an analysis of relevant literature and statistics on school practices. Furthermore, the study identified several strategies for promoting inclusion in science education, including activity-based learning, individual questioning of students, effective behavior management, utilization of ICT resources, and engaging in discussions with parents. It found that a total 86.4 per cent of teachers have not received any training for teaching children with special needs (CWSN). Those who claim to have received training for this purpose have typically done so through online training modules like 'Diksha app' that focus on material and content adoption tailored to the needs of children with special needs. It suggests in order to foster an inclusive environment, teachers take various initiatives, such as providing individualized attention, interacting with all students, treating every student equally, and addressing their doubts. In addition, each student was given the opportunity to engage in classroom discussions. Moreover, captivating subjects were taught initially to cultivate the students' interest.

**Keywords:** Inclusion, Science classroom, Upper Primary Level

## 1. Introduction

In India an exponential expansion in school education can be observed. Currently, there are 14.89 lakh schools, with 95 lakh teachers instructing 26.52 crore students (UDISE Plus 2021-22). As a result, the Indian educational system is among the one of the biggest school education systems in the world. However, in terms of qualitative growth, it appears to be not at par with the expected standard. However, according to UDISE 2021-22 data, only 18.41 lakh kids 10.76 lakh boys and 7.65 lakh girls are identified as having special needs (CWSN) out of the total number of pupils enrolled. Children with special needs comprise approximately 1.4 percent of India's total student population (CWSN).

In Delhi, the situation is not disjointed from that of the country. Specifically, the total number of CWSN is 15442. This includes 8732 boys and 6710 girls at the elementary level. It is crucial to note that the 'Right to Education' empowers every child (aged 6-14) with the right to education as every child must get equal quality of education, regardless of their specific needs in particular. Moreover, science is an essential component of the elementary curriculum. Moreover, administrators, legislators, and scholars discovered that "Right to Education" (RTE) is one of the potential answers that might guarantee fair, high-quality education for everyone, according to Jha (2018). Consequently, all students, including those with disabilities, are given this service by the school (CWSN). Moreover, the scientific classroom is always an experiential learning environment. The interest of CSWN can be cultivated towards learning in a broader sense. Engaging in practical activities necessitates the utilisation of cognitive, affective, and psychomotor aspects of learning.

This paper aims to examine the level of inclusivity in the science classroom for students with disabilities in the field of computer science. First, let us examine the policy perspective regarding the inclusion of children with special needs (CWSN). Next, we will explore the existing literature on this topic. Finally, we will analyse the field practices in schools under the Directorate of Education in Delhi.

### Policy Perspective of the Study

Both the union and state governments periodically make policy pronouncements that demonstrate their commitment to CSWN education. The Persons with Disabilities Act (1995), Chapter V, Article 26(b), (f-h), and II B (20), (21), as well as the National Policy (2006) and other government educational policies, contain the provisions for inclusive education. In the case of the Integrated Education for Disabled students (IEDC) programme, almost 20,000 normal schools were attended by about 124,000 students. The Sarva Siksha Abhiyan (SSA) initiative has successfully enrolled over 14 lakh children over the years. The notion of inclusive education is included either directly or indirectly in a number of National Policies on Education (NPEs) and the Inclusion in Education of Children and Youth with Disabilities (IECYD) project (Bhattacharya, 2010a).

All children are guaranteed access to education under the Right to Education Act of 2009, irrespective of their caste, religion, ability, or any other characteristic. In order to build a society that includes everyone, an approach that includes everyone must be used. In doing so, we have posed new questions about commonly held assumptions and core beliefs. It goes beyond simply using inclusion as a teaching strategy for kids with disabilities.

The recent enactment of the Rights of Persons with Disabilities Act (RPWD Act), 2016 is a highly robust

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initiative towards promoting inclusive education. Inclusive education is a system of education where students, both with and without disabilities, learn together. The teaching and learning methods are appropriately adjusted to accommodate the diverse learning needs of students with disabilities.

In order to address these challenges in Delhi's schools, the role of teachers is crucial in fostering a more inclusive and improved mindset/environment for the future generation. It will facilitate the advancement of education for all students, raise awareness among students and teachers, provide equal growth opportunities for all students, and ensure equal opportunities and participation for all students.

## 2. Related Literature

For teacher educators as well as instructors, inclusive practice is an indispensable part of professional progress. It's called an apprenticeship of the head, hand, and heart, according to Shulman (2005) and the European Agency (2011), and it's a process of accumulating information, skills, and attitudes/values.

Florian and Black-Hawkins (2011) highlight the necessity of a paradigm shift in pedagogical cognition, transitioning from a methodology that caters to the majority of learners to one that encompasses all individuals. Redirecting the focus from a majority or minority of learners to encompassing all individuals.

According to Husbands and Pearce (2012), inclusive pedagogy that considers the various needs of all students as well as concerns for student equality is necessary for it to be effective.

According to Florian (2012), it is necessary to take into account collective learning experiences in order to motivate teachers to create suitable approaches for all children.

Gilbert (2020) found in his research that teacher education programmes need to explore how science teachers use inclusive technologies in their science classrooms to promote inclusive education. Offering professional development classes on inclusivity at the school district level is one way to do this. It should be made clear in state requirements that inclusivity in general education classrooms must be addressed.

### Research Gap: Policy and Literature:

According to the findings of the policy analysis, a significant number of policies are developed and put into effect. In addition, the literature review that was presented earlier assists us in determining where the existing knowledge base is lacking.

The law known as "Right to Education" is effectively implemented, according to Jha (2018) as panacea to education system, and it can be seen as an umbrella law. Many of the children who had previously missed school were re-enrolled. Nevertheless, from an educational perspective, specific guidelines for CWSN must be created.

In addition, there were not a lot of in-depth studies that focused on this particular aspect. This work focuses on the strategies that teachers use to promote inclusion in science classes. These strategies attempt to provide teachers with greater responsibility and increase their ability to serve a wider variety of students' needs. Policies on evaluation and quality assurance that allow instructors to further develop pertinent skills, knowledge, and understanding are now being explored, along with the development of inclusive instruction in trainees and in-service professional development. This article's concluding segment reviews current studies on the professional development of teacher educators, which includes school administrators. This covers the skills, background, continuing education, and support needed to help teacher educators empower and assist teachers in adopting more inclusive teaching practices.

### Rationale of the Study:

Science supports the power of rational explanation by fostering reasoning, integrity, and inventiveness as well as by formulating questions, interpreting data, and coordinating these with hypotheses.

The citizens of modern society need to be able to solve problems in a rational and skilled manner in their day-to-day lives. In light of this, the inclusion of science has emerged as a pressing necessity.

Due to the fact that inclusion is a process that is ongoing and ever-changing for all of us. The aim of this study is to examine the pedagogy used by teachers to incorporate students in the context of the science classroom. Consequently, this type of research keeps focusing on the transit curriculum teaching method in a broad way.

### Objectives of the Study:

- To study the teaching-learning strategies used in classroom by teachers for inclusion.
- To study the teacher's competency of teaching science for creating/promoting inclusion.
- To study the problems faced by teachers in science classroom in relation to inclusion.

### Operational Definition:

**Inclusion:** Inclusion means to remove the barriers in learning.

**Inclusive Education:** This refers to classrooms where all children, regardless of their impairments, are helped to study, contribute, and participate in all elements of the school's life. children are welcomed by local neighbourhood schools into age-appropriate, regular classes.

### Method:

**Type of Study:** This is an exploratory study.

**Data collection procedure:** The research issues were addressed using both open-ended and descriptive questionnaire techniques. The mentor teachers evaluated the science instructors using a different questionnaire.

**Sampling:**

**Participants:** A sample has been taken consisting of teachers who teach science at the upper primary level and students from randomly selected schools in the central District of Delhi. The study recruited student and teacher participants from classes VI to VIII at the upper primary level in schools located in the Central District of Delhi. The sample consisted of 160 students and 21 teachers. The participant teachers possessed both bachelor's and master's degrees in specialised fields. Both seasoned educators and those undertaking teacher preparation participated in this study. The participating teachers provide science instruction in the three different subject areas of education for physics, biology, and chemistry.

**Tools Used:****Type of research tool**

**Questionnaire:** Tools used for the study purpose were questionnaire for students, teachers, and classroom observation by mentor teachers. The types of Questions used in questionnaire contained.

- Closed-ended questions that are structured.
- Open-ended, or unstructured, queries
- Multiple choice questions
- Scaled questions for students.

**Tools Administration:**

Implementations were utilised during the educational programme. The questionnaires were distributed in order to collect the necessary statistical data. The questionnaire is

divided into two main sections. The first section was meant for teachers and included questions on the kind of school, the teacher's demographics, years of experience, teaching specialisation, and any specific education training that they may have had. During the second section, teachers were queried about their strategies for designing lessons and organising student activities in inclusive classrooms.

The initial segment for students consisted of inquiries regarding the students' profile. During the second section, students were queried about their emotions and cognitive processes while engaging in activities within inclusive classrooms.

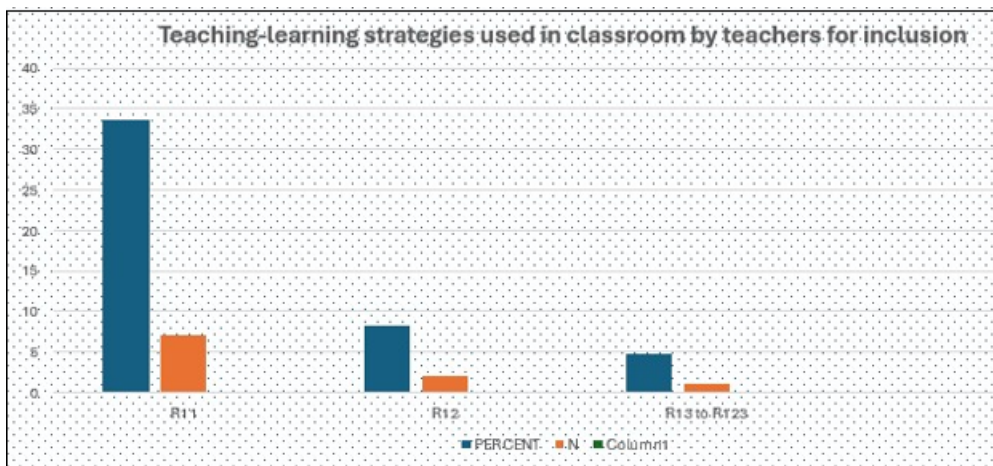
The initial segment for mentorship encompassed inquiries regarding personal details and queries pertaining to the individual's profile. In the subsequent section, mentors were queried about their methods of evaluating the teachers.

An analysis was conducted on the questionnaire responses provided by students and teachers. The process entailed thoroughly examining the responses in the questionnaires and lesson plans that were prepared by the teachers, with careful attention to detail and multiple readings. Subsequently, categories were derived by comparing the themes for similarities and differences, resulting in the creation of representative profiles for the study.

**Reflections from the School:****Teaching-learning strategies used in classroom by teachers for inclusion.****Table 1:** Strategies for promoting inclusive education.

Response	Res. Code	N	%
Activities and practical	R1 <sub>1</sub>	7	33.6
Asking questions	R1 <sub>2</sub>	2	8.16
By developing a strong behaviour management	R1 <sub>3</sub>	1	4.8
By giving a chance to all students to read lessons and to present a topic in classroom by giving a project to all not only to genius ones	R1 <sub>4</sub>	1	4.8
Empathetic environment	R1 <sub>5</sub>	1	4.8
Grouping method like peer group	R1 <sub>6</sub>	1	4.8
Individual attention is given.	R1 <sub>7</sub>	1	4.8
Making heterogeneous group	R1 <sub>8</sub>	1	4.8
Sharing Videos, creative activity through colourful presentations, riddles, puzzles, story form.	R1 <sub>9</sub>	1	4.8
Talking with parents.	R1 <sub>20</sub>	1	4.8
To make topic interesting and connect with daily life	R1 <sub>21</sub>	1	4.8
Use of videos and other source material	R1 <sub>22</sub>	1	4.8
Used other books	R1 <sub>23</sub>	1	4.8
<b>Total</b>		<b>21</b>	<b>100.0</b>

In table 1 responses have been coded as R11 to R123 and graphical representation has been done through bar diagram. The bar diagram of Table 1 as under



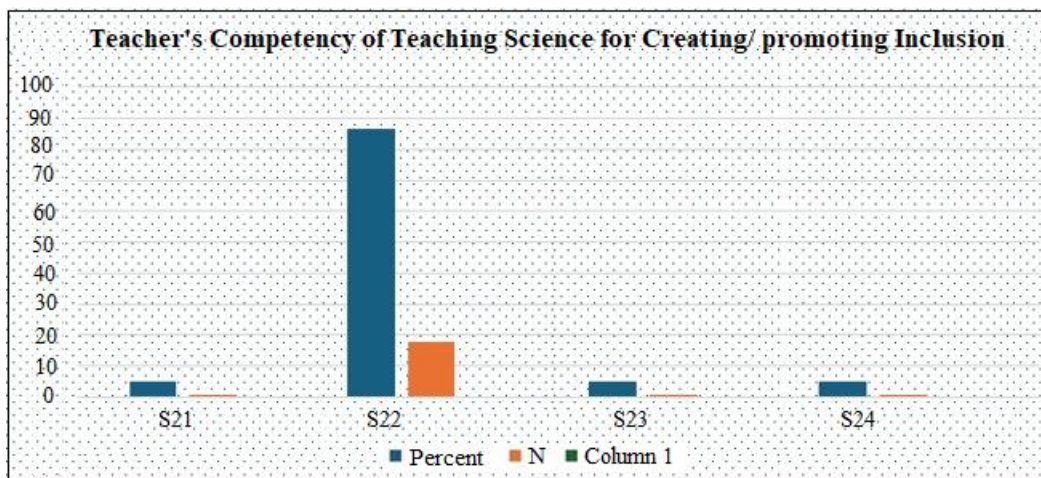
Strategies such as activity-based learning, individual questioning, behaviour management, utilisation of ICT resources, and communication with parents can be employed to foster inclusive science education.

**Teacher’s competency of teaching science for creating/promoting inclusion**

**Table 2: Training to teach CWSN**

Statements	Statement code	N	%
Cross disability, guidance, and counselling	S21	1	4.8
No	S22	18	86.4
One day workshop	S23	1	4.8
Training from CBSE diksha	S24	1	4.8
<b>Total</b>		21	100.0

In table 2 Statements have been coded as S2<sub>1</sub> to S2<sub>4</sub> and graphical representation has been depicted through the bar diagram. The bar diagram of Table 2 is as under



The overwhelming majority of teachers (86.4%) have not received any training for teaching children with special needs (CWSN). Those who claim to have received training for this purpose have done so through online training modules such

as 'Diksha App' that specifically address the adoption of material/content for children with special needs.

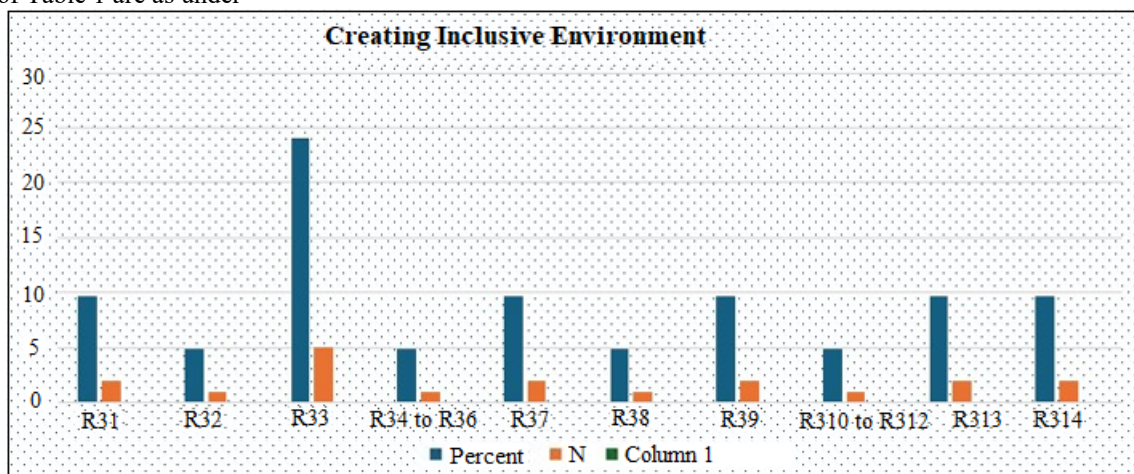
**Creating Inclusive Environment:**

**Table 3: Creating Inclusive Environment**

Response	Response Code	N	%
Asking questions to each student related to topic which topic is running in that time and ensure all students participate	R3 <sub>1</sub>	2	9.6
By delivering instructions in a variety of ways and by creating a safe space for students to share.	R3 <sub>2</sub>	1	4.8
By giving individual attention	R3 <sub>3</sub>	5	24
By not discriminate students based on their performance by dividing equal responsibilities among students and giving equal chance	R3 <sub>4</sub>	1	4.8
I am your friend not teacher and I am like you. Smiling and simultaneously making eye contact with each Student.	R3 <sub>5</sub>	1	4.8
I try to give lesson in practical way rather than theory only.	R3 <sub>6</sub>	1	4.8
Important and interesting topics are taught first.	R3 <sub>7</sub>	2	9.6
Involve all student	R3 <sub>8</sub>	1	4.8

Involve each student in group discussion	R3 <sub>9</sub>	2	9.6
Provide Opportunity	R3 <sub>10</sub>	1	4.8
Taking doubts one by one after teaching the topic to them.	R3 <sub>11</sub>	1	4.8
To give them the entire equal platform and always try to support them first and motivate them in every way possible.	R3 <sub>12</sub>	1	4.8
To interact with all students	R3 <sub>13</sub>	2	9.6
Treating all students equally	R3 <sub>14</sub>	2	9.6
Total		21	100.0

In table 3 responses have been coded as R3<sub>1</sub> to R3<sub>14</sub> and graphical representation has been done through bar diagram. The bar diagram of Table 1 are as under



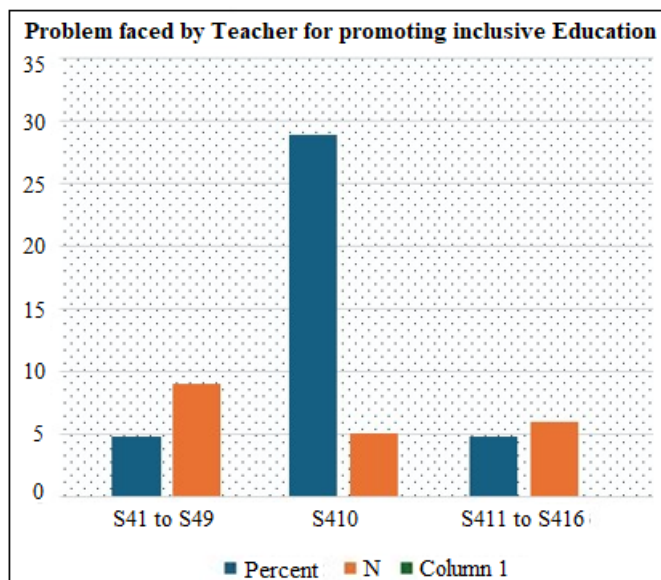
To foster an inclusive environment, teachers undertake various initiatives such as providing personalised attention, engaging with all students, treating each student equitably, and addressing their queries. In addition, each student was given the opportunity to engage in classroom discussions,

with interesting topics being taught initially to cultivate the students' interest.

**The problems faced by teachers in science classroom in relation to inclusion:**

**Table 4: Problem faced by teacher for promoting inclusive education**

Statements	Statement Code	N	%
Less understanding among students.	S4 <sub>1</sub>	1	4.8
All students in the classroom do not participate.	S4 <sub>2</sub>	1	4.8
Coordination	S4 <sub>3</sub>	1	4.8
Have Different level students so some students getting easily, and some take to more time.	S4 <sub>4</sub>	1	4.8
If CWSN student does not respond to what I say, then I feel helpless.	S4 <sub>5</sub>	1	4.8
Individual differences of students	S4 <sub>6</sub>	1	4.8
It is very challenging during the covid times to do practical work with the students.	S4 <sub>7</sub>	1	4.8
Lack of concentration of some students	S4 <sub>8</sub>	1	4.8
Language barrier, scientific aptitude	S4 <sub>9</sub>	1	4.8
No challenges	S4 <sub>10</sub>	5	28.8
Not access to much resources and trainings	S4 <sub>11</sub>	1	4.8
Shortage of time	S4 <sub>12</sub>	1	4.8
Some tools not available	S4 <sub>13</sub>	1	4.8
Sometimes hard Hindi words	S4 <sub>14</sub>	1	4.8
Student's arrangements during grouping	S4 <sub>15</sub>	1	4.8
Taking less interest in science practical.	S4 <sub>16</sub>	1	4.8
<b>Total</b>		<b>21</b>	<b>100.0</b>



Here statement codes have been assigned to each statement as S4 followed by S. No. Of the statement.

Teachers confront difficulties such as students' perceived lack of comprehension, students' lack of engagement in-class instruction and learning, students' unique learning styles, teachers' limited time and resources, and students' unique needs.

### 3. Major Findings

- Implementing activity-based learning, engaging in individual questioning with every student, effectively managing behaviour, utilising ICT resources, and engaging in discussions with parents are the strategies that can be employed to foster inclusive science education.
- The majority of teachers (86.4%) have not undergone any training for instructing children with special needs (CWSN). Those who claim to have received training for this purpose have done so through online training modules such as 'Diksha app', which specifically address the adoption of material/content for children with special needs.
- In order to foster inclusivity, teachers undertake various measures including providing personalised attention, engaging with all students, treating each student equitably, and addressing their queries. In addition, each student was given the opportunity to engage in classroom discussions. Furthermore, captivating topics were taught initially to cultivate the students' interest.

### 4. Discussion

What makes Indian society unique is its diversity. The Indian classroom is characterised by its inherited diversity. Furthermore, there exist various categories of children. It is imperative to address the requirements of each individual. Just like Delhi. There is an aggregate of 15,442 students with disabilities (CWSN) in Delhi, comprising 8,732 boys and 6,710 girls at the elementary level. The NCF (2005) emphasizes that inclusive education entails the acceptance and integration of all individuals (p. 82). The Constitution of India grants every child the fundamental right to education.

When it comes to teaching and learning strategies, it is important to utilise ICT resources and give individual attention to each student. The teaching and learning approach should be tailored to the specific needs of the classroom. The classroom should strive to be inclusive and embrace all students. Inclusion encompasses various dimensions at the policy, school, and teacher levels, among others. In addition, the science teacher consistently supplies learning materials to the CWSN half of the time. Teachers consistently prioritise providing individualised attention to children with special needs (CWSN). Teachers are addressing the academic requirements of all students while also attending to the emotional needs of children with special needs. They are offered a cosy classroom environment that fosters a strong teacher-student connection. The students have expressed a sense of connection to the classroom and a clear comprehension of the instructions provided. Furthermore, they have expressed that they never experienced a sense of ignorance during the class. Moreover, it is crucial to utilise multi-sensory educational resources. Simultaneously, the training of teachers is a matter of concern. The special education teacher's presence in some of the classrooms and the nested instruction may have an impact on the teacher's ability to manage the classroom. (Jones and Brownell, 2014; Pfister et al., 2015). Teachers should receive specialised training to effectively instruct children with special needs (CWSN).

### 5. Conclusion

The training of teachers to address the needs of children with special needs (CWSN) is insufficient. However, the teachers are seeking assistance from a special educator/teacher in the classroom. The inclusion of students with disabilities presents various challenges for teachers, including the creation of appropriate learning materials, the influence of parental factors, time constraints, the availability of special education and support staff, absenteeism, curriculum adaptation, fostering the confidence of students with disabilities, addressing diverse learning levels, promoting social acceptance, and addressing communication difficulties.

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