

Panel Discussion on Computational Thinking, Artificial Intelligence, Art Integration, and Advanced Science & Mathematics

The Chairperson and Moderator, Mrs. Mallika Preman, steered the discussion with the esteemed panellists: Dr. Ashok Pandey, Ms. Ameeta Mulla Wattal, and Dr. Rajesh Hassija.

1. Art Integration, Perspectives, and Brain-Brushing

- Perspective and Interdisciplinary Learning: Ms. Ameeta Mulla Wattal conducted visual perception exercises (optical illusions appearing as an old woman/young girl, and a duck/rabbit) to demonstrate that interpretation depends on perspective. Unless students actively experience perspective through art creation, art integration remains superficial.
- Mindset, Skill Set, and Heart Set: Ms. Wattal urged school leaders not to relegate art to annual day performances, stage props, or the physical art room. Art must unite the head, the hand, and the heart. Drawing upon research indicating that the heart signals twice as much to the brain as the brain to the heart, she stressed the concept of ‘brushing our brains’ with creativity and emotion to ensure learning is active and builds a genuine bridge between the child's inner and outer worlds.

2. Deliberations on Computational Thinking and Artificial Intelligence (AI)

- Five-Stage Roadmap and True Measures of Success: Dr. Ashok Pandey emphasized a structured five-stage roadmap for schools to review and scale up AI tools. He stated that every learner does not need to become a programmer or machine learning engineer; rather, success lies in a child's ability to approach complexity with structure, work intelligently with evidence and tools, recognize system limitations, and retain human responsibility. The benchmark of success is neither the presence of AI tools nor a dedicated AI lab, but how well young learners discern when, why, and how AI should be used—and crucially, when it should not be used.
- Computational Thinking Across All Disciplines: Mrs. Mallika Preman highlighted that computational thinking is a simple, structured process that must not be siloed into computer science alone. It exists organically across the curriculum—such as pattern recognition in history to predict future outcomes, and the systematic use of *matras* in Hindi grammar.
- Concept of 'Sumedha' and Ethical Discretion: Dr. Ashok Pandey clarified that AI is not '*kritrim bodh*' (artificial intelligence) because the data feeding it is real, human-generated data collected over millennia. He offered the term ‘Sumedha’—integrating *Medha* (the power of discernment/vivek) with human-centric judgment directed toward societal good. True discernment (e.g., understanding complex geopolitical issues like US–Iran relations) cannot be outsourced to tools like ChatGPT, which merely regurgitate fed data without contextual judgment.
- Age-Appropriate Use and Visible Thinking: Using the analogy of driving a luxury car ("we love our children and we love Mercedes, but we wouldn't give the key to a 12-year-old"), Dr. Pandey recommended that up to Class 5, students should not be exposed to direct AI use (except for limited presentation of learned work). Foundational culture building must stem from visible thinking routines rather than AI software.
- Risks of Synthetic and Tailored Data: Dr. Rajesh Hassija cautioned that AI-generated data can be completely fabricated and biased, citing instances of dataset tagging inaccuracies and pointing out that algorithms feedback personalized results matching user logic and tastes, which must not be accepted unquestioningly.

3. Advanced Science & Mathematics: Pedagogical Shifts and the K-I-T-E Framework

Addressing the widespread anxiety among students and teachers regarding CBSE's advanced science and mathematics syllabi, Dr. Rajesh Hassija conducted two hands-on mathematical problem-solving

demonstrations (a 5-digit addition puzzle arriving at 2,09,998 and an error-spotting " $2 = 3$ " proof). He presented the following key reforms:

- **The Three Pedagogical Shifts:**

- ✓ Shift from 'What' to 'Why, How, and What-if': Teachers must transition from declarative recall (e.g., *What is photosynthesis?*) to conceptual inquiry (e.g., *Why does photosynthesis not happen at night under artificial tube light? What if CO_2 concentration increases by 90%?*).
- ✓ Shift from Solving to Framing (Mathematical Modelling): Rather than routine textbook exercise computation, focus on parameter modelling (e.g., instead of calculating the area of a hall, determining the exact parameters required to arrange auditorium seating).
- ✓ Rewarding the Process over the Result: Appreciate the initiative, structured thinking, and analytical journey of the child rather than only grading the final answer.

- **The K-I-T-E Framework:**

- ✓ **K** – Knowledge (Deeper Knowledge): Going "10 stories below the concept" rather than artificially adding advanced chapters from higher classes (avoiding coaching-institute practices of teaching Class 11/12 curricula to middle school students).
- ✓ **I** – Inquiry-based Learning: Shifting from rote information delivery to motivated inquiry.
- ✓ **T** – Thoughtful Learning: Focusing on lifelong conceptual depth over intimidating, tough questions.
- ✓ **E** – Exploration: "Uncovering and discovering the syllabus" instead of superficially rushing to cover it.
- ✓ The Thread of Connect: Emphasized that this kite flies only through a meaningful pedagogical connect between the teacher and the learner's thought process.

- **Administrative and Academic Implementation:** Dr. Hassija shared Indraprastha School's practical timetable model to accommodate CBSE advanced science and math without creating an 'elite class' or overburdening the regular schedule:

- ✓ Open to all interested students without formal marks pressure.
- ✓ One 2-hour online class on Thursday evenings (4:00 PM – 6:00 PM) and one 3-hour offline class on Saturdays focusing on foundational topics like coordinate geometry and logarithms.
- ✓ Regular use of short classroom puzzles to cultivate a love for mathematics and science.

4. Vision for Future-Ready Classrooms

The panellists summarized their vision of future classrooms:

- **Ms. Ameeta Mulla Wattal:** Sought an elimination of student entitlement, teacher disrespect, and low self-esteem, calling for genuine personalized learning, emotional balance among genders, and an end to mutual demonization among learners.
- **Dr. Ashok Pandey:** Envisioned classrooms where rote chorusing ("Good Morning, Sir") and rigid textbook page references cease; every child falls within the teacher's empathetic 'antenna'; socioeconomic discrimination is dismantled; and no child is labelled superior or inferior.
- **Dr. Rajesh Hassija:** Warned that rigid, static 8:00 AM to 2:00 PM school structures risk obsolescence by 2047, giving way to specialized teacher-led academies unless conventional schools offer authentic, deeper relational learning.