

**REPORT OF NATIONAL CONFERENCE
ON
RECENT ADVANCES IN SCIENCE EDUCATION
(PAC-23.35)
26-28 FEBRUARY, 2024**

विद्यया ऽ मृतमश्नुते



एन सी ई आर टी
NCERT

CONFERENCE COORDINATORS

Prof. (Capt.) Rashmi Singhai

Dr. Kalpana Maski

REGIONAL INSTITUTE OF EDUCATION

NATIONAL COUNCIL OF EDUCATIONAL RESEARCH AND TRAINING

Shyamala Hills, Bhopal-462002

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National Conference on Recent Advances in Science Education

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Director, NCERT, New Delhi

PATRON

Prof. Jaydip Mandal

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Prof. (Capt.) Rashmi Singhai

Dr. Kalpana Maski

INTRODUCTION

Science education aims to develop an understanding of the natural and physical world through systematic inquiry. Learning Science also builds important capacities such as observation, analysis, and inference. This in turn enables the meaningful participation of individuals in society and the world of work with scientific temper, critical and evidence-based thinking, asking relevant questions, analysing practices and norms, and acting for necessary change.

Being an integral part of the nature and responsible citizen, our efforts need to be focused on to inculcate the sensitivity among student towards our environment, for which science plays a vital role in the progress of civilization and humanity. A quality science education is not only necessary for the intellectual development, but also for the advancement and prosperity of the human race as a whole. Science education promotes skills among the students for day-to-day problem solving, inculcating and bring about attitudinal change for science temperament as well as helps in developing scientific inquisitiveness. For the wake of effective teaching and joyful learning in science education, innovative practices, learning resources, learning activities, recreational activities and experiential learning plays a vibrant role.

Also, the emphasis of science education has been to enhance students' scientific literacy through investigative activities including planning, measuring, observing, analyzing data, designing and evaluating procedures, and examining their skills. Learning science will enable our students to lead a fulfilling and responsible life by encouraging them to become independent learner capable of facing new situations, thinking critically and creatively, making informed decisions and solving problems. A major challenge related to science in the school curriculum is the focus on facts and definitions, often with a neglect for the development of conceptual understanding and the capacities for scientific inquiry. Another challenge is the disconnect between the school curriculum and what students observe and experience outside school.

Learning Science requires an active engagement of students with the world around them to understand it. Science pedagogy achieves this through:

- i. Simulating the processes of Science such as asking questions, hypothesising, observing, testing, finding evidence, collecting data, analysing, modifying conclusions, communicating, and re-questioning.
- ii. Exposing students to a variety of aspects of learning Science in varied settings — the laboratory, classroom, and field — through approaches such as inquiry, discovery, didactic, hands-on Science.
- iii. Encouraging and sustaining curiosity by providing varied experiences that may challenge students' existing notions and ideas.

Science education enables the development of certain values, such as collaboration, sensitivity, empathy, equality of opportunities, respect for diversity, and other values mentioned in NEP 2020. This conference will also provide a platform for sharing the recent advancements and innovative experiences in science education.

Objectives:

- 1) To provide platform to share the best practices of teaching Science.
- 2) To know about concerns, issues and challenges in Science teaching as per NEP2020.
- 3) To present and discuss importance of innovative teaching learning Resources for promoting Science at school and higher level.
- 4) To demonstrate use and application of innovative teaching learning resources of Science in school situation at all levels.
- 5) To enable practicing teachers to share their experience in using ICT in teaching Science.
- 6) To organize science exhibition that promote experiential learning in Science Education.

Themes and Sub-Themes

1. Indigenous Knowledge in Science Education

- a. Incorporating indigenous knowledge in science curriculum
- b. Cultural and Indigenous Knowledge Integration
- c. Implementing indigenous knowledge in science teaching: challenges and issues
- d. Indigenous knowledge for Environmental Sustainability
- e. Indigenous Practices and Teaching Methods

2. Teaching-Learning in Science for 21st century skills

- a. Global and Cultural Perspectives in Science Education
- b. Cross-disciplinary Approaches in Science Education
- c. Innovative Teaching Methods and Pedagogies
- d. Inclusivity and Diversity in Science Education

3. Integration of ICT in Science Education

- a. Addressing digital literacy gaps among educators in their teaching practices
- b. ICT integration: Challenges and issues in Science Education
- c. ICT for Assessment and Feedback
- d. Integration of Data Science, Artificial Intelligence and Coding in Science Education

4. Integration of STEAM in Science Education

- a. STEAM vs Traditional Approaches
- b. Linkage of STEAM at different levels in teaching-learning of science
- c. Effectiveness of STEAM to students' career pathways
- d. STEAM in Everyday Life
- e. Environmental and Sustainable STEAM Practices

5. Experiential Learning: From Theory to Reality

- a. Outdoor and Nature-Based Learning
- b. Simulations and Virtual Experiments
- c. Collaborative Problem-Solving Challenges
- d. Development of life skills through Experiential Learning

6. Assessment and evaluation in Science Education

- a. Assessment in science learning- teaching process
- b. Assessment Strategies for 21st Century Skills: Issues & Concerns
- c. Addressing challenges in evaluating learning outcomes in science education

7. Inclusivity and Diversity in Science Education

- a. Environmental Stewardship and Community Sustainability
- b. Developing learning strategies and resources for children with special needs
- c. Language and Linguistic Inclusivity
- d. Addressing gender issues through science literacy

8. Science Education for Sustainable Development

- a. Cultivating Empathy and Social Responsibility
- b. Fostering Global Scientific Citizenship
- c. Promoting Holistic development through Science Education
- d. Science for Peace, Ethics and Values

9. Research in Science Education and its Educational implications

- a. Cultural and Socioeconomic Factors in Science Education
- b. Promoting student Motivation, Engagement, and Science Interest
- c. Teacher Professional Development and Training
- d. Research trends in Science Education

**NATIONAL CONFERENCE ON
“RECENT ADVANCES IN SCIENCE EDUCATION”
(February 26-28, 2024)
National Council of Educational Research and Training,
Regional Institute of Education, Bhopal**

Date	Time	Seminar-I(Hall No.: 53)	Seminar-II(Hall No.: 30)
26/02/2024	10.00 - 1.00 pm	Common Session Inaugural Session: Prof. Dinesh Prasad Saklani, Director, NCERT, New Delhi Prof. Jaydip Mandal, Principal, RIE, NCERT, Bhopal Keynote address: Prof. Gobardhan Das, Director, IISER, Bhopal	Rapporteur: Dr. L.S. Chouhan Dr. Chakradhar Behera
	1.30 - 2.30 pm	LUNCH	
	2.30 - 5.00 pm	T.1 & T.4-IA	T.2 & T.3-IB
	Chairperson	Prof. L.K Tiwary	Prof. H.K Garg
	Co-chairperson	Dr. Santosh Kumar	Dr. A.K Garg
	Moderator	Dr. Laxmi Singh Sengar	Dr. Pavan Kumar
	Rapporteur	Dr. Deepti Kavthekar	Dr. Poonam Agrawal
	10.00-11.00 am	Common Session Keynote address: Prof. Mukul Bora, Director, Institute of Engineering & Technology, Dibrugarh, Assam	Rapporteur: Dr. Alka Singh Dr. Mosarof Sarkar
	11.30 - 1.30 pm	T.3-II A	T.4 & T.8-II B
	Chairperson	Prof.(Capt.) Rashmi Singhai	Prof. Chitra Singh
27/02/2024	Co-chairperson	Dr. A. K. Shrivastava	Dr. Daksha Parmar
	Moderator	Dr. Chakradhar Behra	Dr. Manoj Mandal
	Rapporteur	Dr. M.S. Kariyappa	Dr. Binish Naqui
	1.30-2.30 PM	LUNCH	
	2.30 - 5.00 pm	T.5-II C	T.6 & T.9-II D
	Chairperson	Prof. R.K Shrivastava	Prof. Ajay Bhardwaj
	Co-chairperson	Dr. Rashmi Sharma	Dr. Saurabh Kumar
	Moderator	Dr. Kulveer S. Chouhan	Dr. Alka Singh
	Rapporteur	Dr. K. Srinivas	Dr. Dharini
	10.00-11.00 am	Common Session Keynote address: Prof. Vijay K. Agrawal, Vice Chancellor, RKDF University Bhopal	Rapporteur: Dr. Manoj Mandal Dr. Kulveer S. Chouhan
28/02/2024	11.30 - 1.00 pm	T.5 & T.7-III A	
	Chairperson	Prof. V.P Singh	
	Co-chairperson	Dr. R.P Prajapati	
	Moderator	Dr. Aji Thomas	
	Rapporteur	Mr. Dattel Singh	
	1.30-2.30 PM	LUNCH	
	2.30 - 4.00 pm	VALEDICTORY SESSION	

Technical Session	Date	Time	Chairperson/ Co-chair person	Moderator/ Rapporteur	Theme	Papers allotted	Papers presented
IA T1 & T4	26.02.2024	2.30-5.00	Prof. L.K. Tiwary Dr. Santosh Kumar	Dr. Lakshmi Senger Dr. Deepti Kavthekar	Theme 1: Indegenous Knowledge in Science Education Theme 4 : Integration of STEAM in Science Education	10	10
IB T2 & T3	26.02.2024	2.30-5.00	Prof. H.K.Garg Dr. A.K.Garg	Dr. Pavan Kumar Dr. Poonam Aggarwal	Theme 2: Teaching –Learning in Science for 21 st century Skills Theme 3:Integration of ICT in Science Education	09	07
IIA T3	27.02.2024	11.30-1.30	Prof.(Capt.) Rashmi Singhai Dr. A. K. Srivastava	Dr.Chandrakar Behera Dr. M.S. Kariyappa	Theme 3: Integration of ICT in Science Education	10	08
IIB T4 & T8 IIB	27.02.2024	11.30-1.30	Prof. Chitra Singh Dr. Daksha M.Parmar	Dr. Manoj Mandal Dr.Anandraj	Theme 4: Integration of STEAM in Science Education Theme 8: Science education for Sustainable Development	09	07
IIC T5	27.02.2024	2.30-5.00	Dr. R. K. Srivastava Dr. Rashmi Sharma	Dr. Kulveer S.Chouhan Dr.K.Srinivas	Theme 5: Experiential Learning: From Theory to Practice	10	08
IID T6 & T9	27.02.2024	2.30-5.00	Prof. Ajay Bhardwaj Dr. Saurabh Mishra	Dr. Alka Singh Dr. Dharini	Theme 6: Assessment and Evaluation in Science Education Theme 9: Research in Science Education and its Educational Implications	10	07
IIIA T5 & T7-	28.02.2024	11.30-1.00	Prof. V.P Singh Dr. R. P. Prajapati	Dr. Aji Thomas Dr. Darel Singh	Theme 5: Experiential Learning: From Theory to Practice Theme 7:Inclusivity and Diversity in Science Education	10	09
III B T5 & T7	28.02.2024	11.30-1.00	Dr. Kalpana Maski & Mr. Aji Thomas	Dr. Deepti Kavthekar	Theme 5: Experiential Learning: From Theory to Practice Theme 7:Inclusivity and Diversity in Science Education	08	08

A three Day National Conference on “Recent Advances in Science Education” was organized by RIE, NCERT, Bhopal and coordinated by Prof. (Capt.). Rashmi Singhai & Dr. Kalpana Maski from February 26-28, 2024. There were 6 technical sessions for presentation of papers by delegates from all over the country, three commons sessions as lead talk given by eminent speakers and two sessions of inaugural and valedictory. The Technical session of each day was based on different themes were conducted starting from 11.30a.m to 5.00 p.m. The days-wise reports of the inaugural, commons and technical sessions of the national seminar is given below.

INAUGURAL SESSION

DAY 1(26.02.2024)

Inaugural Session of National Conference on “Recent Advances in Science Education”

In the inaugural session a warm welcome was extended to the Prof. Dinesh Prasad Saklani, Director, NCERT, New Delhi and Prof. Sridhar Srivastava Joint Director NCERT, New Delhi and all Head of the respective Departments of RIE, participants from across the nation by Prof. Rashmi Singhai. The session started with the Gaurav Gaan of the RIE Bhopal, followed by Lighting of the lamp and Garlanding Maa Saraswati. Prof. Jaydeep Mandal Principal, delivered a welcome address. He extends his welcome words to all chief guests, committee members of the conference, and coordinators and participants of the conference. He welcomed Prof. Dinesh



Prasad Saklani, Director NCERT, Prof. Sridhar Srivastava Joint Director, NCERT, Programme Coordinators Prof.(Capt.) Rashmi Singhai, Dr. Kalpana Maski, and all the colleagues of the department.

The inaugural session of the National Conference on Recent Advances in Science Education marked the beginning of a collaborative effort to explore innovative strategies, share best practices, and discuss challenges in science education. Held at Regional Institute of Education (NCERT), Bhopal on 26 Feb.2024, the session brought together educators, researchers, policymakers, and industry professionals to envision the future of science education and its impact on society. The inaugural session commenced with the lighting of lamp by the Principal RIE Bhopal Prof. Jaydip Mandal, Chief Guest and keynote speaker of the session Prof Gobardhan Das, the Director of IISER, Bhopal, Head DESM and coordinator of the conference Prof (Capt.) Rashmi Singhai and Dr Kalpana Maski along with all the head of departments of RIE Bhopal. Prof. Sridhar Srivastav the Joint Director of NCERT, New Delhi joined virtually in the inaugural session. Prof. Mandal address the gathering by his opening remark and Prof (Capt.) Rashmi Singhai briefed on the national conference report. Prof. Srivastav focused on the professional trajectory of the student need to be achieved for the holistic development of the student via learning by doing. He emphasized on the deliberation of this conference should be included in the upcoming syllabus in the science education for the development of the text book at par with NCFSE and NEP-2020.

The session commenced with a keynote address by Prof Gobardhan Das, the Director of IISER, Bhopal, a renowned expert in science education. He emphasized the importance of fostering curiosity, critical thinking, and a passion for learning in students. He highlighted the role of educators in inspiring the next generation of scientists and innovators, calling for a student-centered approach that promotes exploration and discovery. He delivered a talk on the recent advancement of science education in line of modern science correlation with Vedic Indian science. He correlated the ancient science development of India starting from discovery of atom by Kanad to the recent development of astronomy by Prof A.K Rai Choudhary to the world of science. He emphasized on the sustainable development of the world via teacher through the holistic development of students. He commented on the remarkable achievement of Indian in the field of mathematic, medicine, astronomy, metallurgy in the ancient India where India was treated as the learning centre of the world by citing the example of Nalanda University. The development of science in ancient India was characterized by a deep curiosity about the natural world and a systematic approach to understanding it. The contributions of ancient Indian scientists and scholars laid the foundation for many scientific concepts and practices that are still relevant today. Understanding this rich scientific heritage is crucial for appreciating the depth and diversity of India's intellectual tradition.

Panel discussion-Following the keynote address a panel discussion was held on the theme "Transforming Science Education for the 21st Century as per NEP-2020 in accordance of NCFSE." The panelists, representing diverse perspectives from academia, industry, and government, discussed the challenges and opportunities in science education. They emphasized the need for interdisciplinary approach, the integration of technology, and the importance of inclusivity and diversity in science education.



Interactive Session: The inaugural session also featured interactive sessions where participants had the opportunity to engage in discussions and share their experiences and insights. Topics included innovative pedagogical approaches, the role of digital tools in science education, and strategies for promoting STEM education among under represented groups.



Conclusion

The inaugural session of the National Conference on the recent advances of Science Education set the stage for an enriching and insightful dialogue on the future of science education. It highlighted the importance of collaboration and innovation in preparing students for the challenges and opportunities

of the 21st century. As the conference progresses, it is expected to generate valuable insights and recommendations for advancing science education at all levels. The closing of the inaugural session was performed via unveiling the abstract by the dignitaries on the stage followed by the vote of thanks by Prof. Chitra Singh, Head DEE.



DAY 1: 26.02.2024

Technical Session –IA

Technical Session 1A was held on 26 February 2024 began at 2:30 pm in room no. 53. The technical session comprised of two themes. Theme 1 was Indigenous Knowledge in Science Education and Theme 4 was Integration on STEAM in Science Education. Prof. L. K. Tiwary Prof. in Chemistry in Department of Education in Science and Mathematics, RIE, Bhopal was the Chairperson and Dr. Santosh Kumar, Associate Professor in Physics in Department of Education in Science and Mathematics, RIE, Bhopal was the Co-Chair person of the session. Dr. Laxmi Sengar, Assistant Professor (Department of Education in Social Science and Humanities) was the moderator and Dr. Deepti Kavathekar, Assistant Professor (Department of Education) was the rapporteur for the session. In this session 10 papers were presented by the participants. The session began with the lead talk on “Indigenous Knowledge in Science Education” had given by Prof. L. K. Tiwary. Speaker elaborated on the local and indigenous knowledge and its essential inputs in Science Education. He also talked about Traditional Ecological Knowledge (TEK). He delved on the connections between the Local and Indigenous Knowledge holders on the aspects of biodiversity, climate assessment, natural disaster, Adaptation, Mitigation, etc. Through a poem the lead speaker expressed the use of language in communicating the climatic predications. He emphasized the use of language and its use to teach Indigenous Knowledge in constructing classroom knowledge. This may assist in strengthening classroom knowledge system. Chairperson also welcomed and motivated participants to put present their research works in the session.



The first paper presented was entitled “Incorporation of Indigenous Knowledge and Skills within school curriculum” by Laxmiram Gope. The paper was based on the work over Santhal Community and the Indigenous knowledge. It was a descriptive study. The paper specifically sensitized the need to have inputs from Indigenous Pedagogic Knowledge as compared to Techno- pedagogical knowledge. The work stressed to bring about change by including quality Indigenous knowledge and indigenous skills in education and classroom settings. The paper made a humble attempt to explore the indigenous

knowledge component within the space of community network and thereby suggest for inclusion of the community-based indigenous knowledge for the objective of an inclusive school curriculum through skill development technique and through community participative indigenous knowledge.

Second presentation was done by Yashoda Sharma on “Integrating Indigenous teaching practice in to Science Education”. The presentation discussed about the different indigenous practices in agricultural field, medicine and health care, healers, local herbalists and deeper depths on traditional craft skills. The paper discussed about linguistic practices and mythology with examples which may enhance teaching and learning. The point was raised on the Incorporation of more Orca related Tribes in understanding the practices independently.

Third presentation was done by Shailendra Kumar on topic " Integrating Indigenous Knowledge into Science Pedagogy: The epistemological perspective”. The paper talked about epistemology of indigenous knowledge and scientific knowledge. The paper concern that for integration from an epistemological perspective to highlight the need of further epistemic discourse and deliberations to help to achieve the vision of NEP 2020 *vis a vis* Indian knowledge system. The question raised was to how the action need to be taken to include it in curriculum and in what ways.

Fourth paper was presented Kritika Garg titled "The amalgamation of gamification with indigenous approaches in Science Education" paper investigates the innovative intersections of indigenous pedagogical approaches and gamification in the realm of Science Education. It explores the synergies that arise from blending gamified learning with traditional indigenous teaching methods, aiming to enhance the delivery and compression of scientific concepts of classroom.

Fifth paper titled “Indigenous Knowledge for environmental sustainability-A Case Study of a village near the Kanha National Park" by Trivenee Rahangdale. The paper conveyed different indigenous practices practiced in the field of medicine, food preservation, food protection and biodiversity conservation.

Next paper was presented by Prachi Bhagwani and on the topic "Incorporation of Indigenous Knowledge into Science Curriculum". This paper shows content and thematic analysis on the “Aryabhattyam” and “Mahdhavan” series. The ideas of these may benefit the students in understanding Mathematics.

Seventh presentation was done by Sandeep Kumar Ratnere on the topic "Development of STEAM Module for Middle School Stage: An innovative Exemplar". The paper talked about Industry 4.0. and essential 8 technology for science pedagogy and its need in 21st century learning skills.

Divya Maithil presented a paper on the topic "Fortifying Science Education through amalgamation of Mathematics, technology, toys and games" The paper discussed mixed method research which collected data through observation, checklist and questionnaire. Also software was developed which may aid in experiential learning. The presentation showed different tools in action.

Dr. Shivalika Sarkar mesmerized the session with her presentation on " STEAM project- based learning approach in capturing the cosmos and learning astronomy". The research work was based on the STEAM project in astronomy in which students were involved in the real time data collection while they were capturing the cosmos. Study focused on understanding the basics of deep sky objects

in particular and universe as a whole. Las Cumbres Observatory (LAO) 0.4 m Global Robotic Telescope Network, accessible through the Global Sky Partners Programme provided remote telescope access in current astronomy education. SAODS9 also known as Smithsonian Astrophysical Observatory Digitized Sky Survey was used in the image processing. Students learned the working of the telescope software while using software to process images and much more. Also how all the dimensions science, technology and STEAM are combined was discussed.

The last presentation of the session, titled " Brain- Based Learning: An effective tool for STEAM Education in Science" was delivered by Ms. Saloni. This was a conceptual study. It was a mixed method research. This work focused over the brain learning. Also, the issues in relation to individual differences and emotions were raised.

Dr. Santosh Kumar provided the feedback to all the paper presenters and motivated everyone to work in this direction. He tried to put puzzled pieces together not only Science but also system of ancestors.

Day 1 Afternoon Session

Technical Session IB

The theme of the technical session- IB is "Teaching-Learning in Science for 21st century Skills & Integration of ICT in Science Education". Prof. (Dr.) H. K. Garg, Professor, Institute for Excellence Higher Education, Bhopal was the chairperson of the session. Dr. A. K. Garg, Associate Professor, Regional Institute of Education, Bhopal was the Co-chairperson of this session. The moderator was Dr. Pavan Kumar and rapporteur of the session was Dr. M. S.Kariyappa Assistant Professor Regional Institute of Education, Bhopal.

The session started by moderator Dr. Pavan Kumar welcoming the chairperson, co-chairperson, paper presenters, and participants. The sessions continued with a lead talk on Teaching-Learning in Science for 21st Century Skills by the chairperson, Prof.(Dr.) H. K. Garg. In this session total of 7 papers were presented out of the scheduled nine.

In this session, the first paper was entitled "Effectiveness of Constructivist Strategies with Lecture Method". The paper presenter was Chandrang Pathak, Research Scholar, Department of Education, The Maharaja Sayajirao University of Baroda and Prof. R. C. Patel Professor, Department of Education, The Maharaja Sayajirao University of Baroda. The paper majorly expounds the constructivism; it advocates the construction of knowledge by learners through the incorporation of new knowledge in the existing schema. The study's objectives were to study the cognitive load and achievement of students in science subjects. Overall the study revealed that study shows that constructivist strategies like brainstorming, problem-solving, and questioning are essential methods for the teaching of science. If teachers use these strategies with the lecture, then they can improve the achievement of the students in the science subject.

The second paper entitled "Game as an Innovative Pedagogy in Science Learning for 21st Century School Learners". The paper presenter was Sonal Thakur, Ph.D. Scholar, Department of Education, Central University of Jharkhand (CUJ)-Ranchi. This research paper highlighted how a special game-based teaching approach (Telephone game) helped the students to understand the structure and functioning of neurons. The objectives of study were to study the importance of games as pedagogy in

learning science and to develop the module on game-based science learning for secondary school learners. The result of the study states that games as learning tools for students especially very young learners and also stresses the costs and effectiveness of the games in learning.

The third paper is entitled “Effectiveness of low-cost improvised apparatus in science education”. The paper presenter was Prof. K.N. Chattopadhyay, the University of burdwan, west Bengal. The objectives of the study were to develop a low-cost improvised apparatus and determine the effectiveness of the teaching of Archimedes Principle innovatively. The findings of the study said that low-cost improvised apparatuses are highly effective when utilized in the classroom because they significantly raise student performance in physics. In addition to being important from a pedagogical standpoint, the current study's creation of improvised apparatuses in physics can now be used as active strategies in classroom instruction to make physical concepts more holistic, meaningful, and enjoyable for physics learners.

The fourth paper is entitled “Effect of Metacognitive Scaffolding Strategies on Problem-Solving Skills in Physical Science of Secondary Students”. The paper presenter was Dr. Md. Jamal Uddin, Assistant Professor, Department of Education, Aliah University, Kolkata, West Bengal, India The most powerful predictors of learning are “thinking about thinking”, and knowing “what we know”. The objective of the study that to compare the adjusted mean scores of problem-solving skills in physical science between the experimental group and control group learners when pre-problem-solving skills is taken as a covariate. The experimenter pointed out that students' hands-on learning practiced through metacognitive strategies acted as a catalyst for improving the problem-solving skills of students in physical science.

The fifth paper is entitled “Relating Technological Pedagogical Content Knowledge (TPACK) Competencies of Science Teachers with Competency-Based Learning in Science at School Level”. The paper presenter was Sourav Biswas, Senior Research Fellow (SRF), Central University of South Bihar. The TPACK is one of the current frameworks that is used to integrate technology, pedagogy, and content in the classroom. TPACK represents a new direction in understanding the complex interactions among content, pedagogy, and technology. The objectives of the study to understand the concept of TPACK and TPACK framework and to relate TPACK Competencies of Science Teachers with Competency Based Learning in Science at School Level. The results revealed that the integration of content knowledge with pedagogy and technology is very essential in the present-day learning-teaching process.

The sixth paper is entitled “Towards a Digital Pedagogy: An Exploration of Science Educators’ Efficacy towards ICT Integration in STEM Education under the New Education Policy 2020”. The paper presenters were Rahul Paswan (Presenter), Vaibhav Verma, and Dr. Rana Pratap, Regional Institute of Education (NCERT), Ajmer. The objective of the study is to explore the efficacy of science educators towards the integration of ICT tools in STEM education in the light of NEP 2020. The study found that the effectiveness of incorporating technology into STEM education is similar among teachers from diverse backgrounds, such as government and private schools, urban and rural areas, and male and female educators.

The seventh paper is entitled “Scope for Development of 21st Century Skills among Students: A Qualitative Analysis of Science Textbooks at Secondary Level”. The paper presenters were Rashmi Sharma, Kalpana Maski, S. K. Makwana, Assistant Professor/s, Regional Institute of Education, Bhopal. The vital role of the skills, abilities, and learning dispositions, 3Ls, 4Cs, IMT, and FLIPS were discussed. The objectives of the study are to identify the scope, analyze, and provide suggestive measures for the development of 21st-century skills among students at the secondary level through curricular activities. The findings of the study were a. NCERT textbook provides ample of scope for the development of 21st century skills among students at secondary level (as per selected list of skills), b. Two important skills namely critical thinking and problem-solving are focused more in the textbooks (perhaps being science subjects) and c. Two skills namely initiation and self-direction and cross-cultural interactions find less scope for development through science subjects.

After the accomplishment of the presentation of the papers Dr. A. K.Garg portrayed the presented papers and vote of thanks.



Day II: 27.02.2024

Day II began with a common session. The lead talk was given by Prof. Mukul C. Bora (Director, DUIET, Dibrugarh University, Assam) presented on the topic of SCIENCE AND TECHNOLOGY FOR SUSTAINABLE FUTURE - VEDIC WAY in the national conference (2024) at RIE NCERT, Bhopal. He focused on the Indian Knowledge System (IKS) based ancient to contemporary level discussion and said that the roots of sustainability is hidden in Vedas. The pillars of Sustainability are Society, Environment, and Economy for maintaining the equity, removal of discrimination, poverty, and gender disparity

Sustainable development as seen in the sector of innovation, resilient infrastructure, sustainable production, and sustainable consumption. He explained the universe is created through *pancha tattva* (five elements) which is given already in ancient Indian Scriptures like the Rig Veda, Manu Smriti, Yajnavalkya Smriti (YājñavalkyaSmṛti), etc. He revealed about the over exploitation of natural resources for materialistic gain through the use of Linear Economic Model is the Root cause of making our planet un-sustainable. In this way, Science and Technology is essential for making smart decisions about how to use and conserve our resources. He explained all 17 SDGs goals to achieve a better environment and development in all dimensions of life on the planet earth. He recalled the document of Arthashastra, the State should follow a six-fold policy to develop and maintain their sustainability. Therefore, roots of sustainability lie in ancient Indian Vedas. He suggested the problems solving approach and suggests the way of adapting yesterday's solutions for today's problems that's generated by us.



Day 2 Morning Session

Technical Session II A

The theme of the technical session- IB is “Integration of ICT in science education”. Prof. (Capt.) Rashmi Singhai, Professor, Regional Institute of Education, Bhopal was the chairperson of the session. Dr. A K Shrivastava, Assistant Professor, Institute for Excellence Higher Education, Bhopal was the Co-chairperson of this session. The moderator and rapporteur of the session was Dr. Chakradhar Behera and Dr. M S Kariyappa was Assistant Professor/s, Regional Institute of Education, Bhopal.

The session was started by moderator Dr. Chakradhar Behera to welcome the chairperson, co-chairperson, paper presenters, and participants. The session continued with a lead talk on the Integration of ICT in science education by the chairperson, Prof. (Capt) Rashmi Singhai. In this session total of 8 papers were presented out of the scheduled ten.

In this session first paper is entitled “Enhancing Pedagogy: Integration of ICT in NCERT Class IX Science for Teacher-friendly and Learner-centric Instruction. The paper presenters were Himangshi Deka, Tonmoy Kashyap and Geetali Nath, NERIE, Shillong. This paper focuses on utilizing ICT facilities commonly found in well-equipped classrooms to develop pedagogy for Science. ICT in science education is a transformative force that challenges traditional methods and revolutionizes the

teaching-learning process. The objectives of the study were to point out some of the issues and challenges faced in the successful implementation of ICT in science education and to provide a sustainable pedagogy (ICT-based) for effective teaching-learning of Class IX Science. The results of the study listed challenges like no proper ICT infrastructure, technical support, and adequate training about ICT e.t. which were faced by teachers and students in the state of Assam.

The second paper is entitled “Digital Citizenship Awareness among science teachers”. The paper presenters were Mrs. Nandana Varma, Research Scholar, and Prof. Anil Kumar K. Department of Education, Regional Institute of Education, Mysuru. Digital Citizenship is to transform children from merely being digital natives to becoming proficient digital citizens, demonstrating safe, legal, and ethical online behavior, and contributing productively to virtual communities. The objectives of the study were to assess the level of awareness and status of training on digital citizenship principles among science teachers. The results said that the majority of science teachers have an average level of awareness of Digital Citizenship principles. Even within the three dimensions of the Digital Citizenship principles namely ‘Respect Yourself/Others’ ‘educate Yourself/Connect with Others, and ‘Protect Yourself/Others’, science teachers had an average level of awareness.

The third paper is entitled “Problems and Challenges in ICT Integration among Pre-service Science Teachers during Internship”. The paper presenters were Hamsika V, Student, B.Sc.B.Ed., and M Pavan Kumar, Research Scholar, Regional Institute of Education (NCERT), Mysuru. ICT integration means it goes beyond simply placing technology in classrooms; it involves seamlessly weaving ICT into the curriculum, pedagogy, and overall school culture to achieve specific learning goals. The objectives of the students are to find out the problems and challenges faced by pre-service science teachers concerning access infrastructure, pedagogical, and Social-Emotional for ICT integration during the internship. The results of the study key challenges faced by Pre-Service science teachers as follows

- Limited Access to Technology: Lack of sufficient technological devices and reliable internet connectivity create barriers to ICT adoption.
- Inadequate Training: Pre-service teachers often lack the necessary training and support to effectively integrate ICT into their science lessons.
- Infrastructure Issues: Schools may lack the necessary facilities and infrastructure to support ICT-integrated learning experiences.
- Resistance to Change: There may be a degree of resistance to the adoption of new technologies and pedagogical approaches among teachers and school leadership.

The fourth paper is entitled “Integration of ICT in Secondary School Education”. The paper presenters were Nayanjyoti Kalita, Ankur Nath, and Riya Singh NERIE-NCERT, Shillong. The purpose of this paper is to explore the rationale, challenges, and opportunities of implementing ICT in secondary education, as per the NEP 2020 and NCF 2023. The objectives of the study are to measure the impact of ICT on students’ learning outcomes, motivation, engagement, and skill development. The results of the study found that students and teachers face various challenges while using ICT for learning purposes in school. The most prominent challenge is the inadequate or unreliable ICT infrastructure, including electricity, internet, hardware, and software. Other hand studies revealed the positive impact

of ICT on their academic performance and achievement, more interested and motivated to learn, helping them stay more engaged and active in the learning process, and develop essential skills such as creativity, collaboration, communication, critical thinking, problem-solving, etc.

The fifth paper is entitled “Leveraging Analogy: A Pedagogical Approach to Unraveling Complexity in Biology Education”. The paper presenters were Ishika, Ph.D. Scholar, Indian Institute of Technology Bombay, and Atul Sharma, Assistant Professor, SIHER, CCS University. The central objective of this research is to assess the impact of analogy-based pedagogy on students' comprehension of complex biological systems. The study contributes empirical evidence supporting the efficacy of analogy-based pedagogy in biology education. Additionally, the research delves into the dynamics of crafting and selecting analogies, considering contextual relevance and appropriateness for different biological concepts.

The sixth paper is entitled “Fusing Realities: An Experimental Exploration of Augmented Reality in the Physics Classroom”. The paper presenters were Monika and Dr. Vinod Kumar Kanvaria, Department of Education, University of Delhi. The objectives of the study were to determine the role and place of AR technology in the educational framework and its implication to enhance the outcomes of the learning, to find out any significant difference in the academic achievements of students learning Physics through AR applications and learning through traditional methods, and to observe with the help of AR classroom teaching become more effective. The finding of the study revealed that the augmented module had some positive impact on the learning outcomes of the students. Hence, like ePathshala AR applications which have limited content of classes ninth and tenth Science subjects should be enriched with more content. Therefore, more such modules should be developed to introduce the sound impact for providing more interactive sessions.

The seventh paper is entitled “A Study of Use of Energized Text Books during Teaching & Learning Process by Science-Maths Teachers of Upper Primary Schools of Amreli District”. The paper presenters were. Nilesh R. Chapaneri, Senior Lecturer, District Institute of Education & Training, Amreli. The objective of the study is to know the role of ETB as a source of knowledge. The study revealed that most of the teachers were using the ETB app for students in classes 6 to 8. They preferred to use more in mathematics than science subject. More than 50% of the students were interested in using while teaching science animated videos.

The eighth paper is entitled “Assessment of Student Teachers' Awareness of Integration of Computational Thinking Skills in Science”. The paper presenters were Harijana Manohar and Prof. G Viswanthappa, Research Scholar & Professor in the Department of Education, Regional Institute of Education (NCERT)-Mysore. There is a need to explore and understand the current level of awareness on integrating computational thinking skills in science education inters of general understanding of computational thinking and its core dimensions which helps different stakeholders as per the recommendations of the national education policy (NEP- 2020). The objectives of the study are to determine the level of awareness of student teachers in integrating computational thinking skills in science and to compare the awareness level of student teachers in integrating computational thinking skills in science concerning different teacher education programs and genders. This study results revealed that most of the student teachers partially have an awareness of the integration of

computational thinking skills in science education and there is no significant difference between the four-year and two-year boys and girls in terms of their awareness on computational thinking skills. This study also supports the National Educational Policy 2020 recommendations that educators, teachers, and technical experts have to collaborate to inculcate, foster, to develop computational thinking skills in science education.

After the accomplishment of the presentation of the papers, Dr. A K Srivastava portrayed the presented papers and concluded with a vote of thanks by Dr. M S Kariyappa.



Day 2 Technical Session IIB

Day 2 technical session started at 11: 30 am on 27 February 2024 in Room number 30. For the session, the sub-theme of the conference was 'Integration of STEAM in Science Education'. The Moderator Dr. Manoj Mandal has welcomed the Chairperson Dr. Chitra Singh, Prof. of Chemistry, Department of Extension Education, Co-Chairperson Dr. Daksha Parmar, Assistant Prof. of Botany Department of Education in Science and Mathematics, Programme Coordinator Assistant Prof. of Physics Dr. Kalpana Maski, Department of Education in Science and Mathematics, the Rapporteur Assistant Prof. Dr. Anandaraj M, Department of Education and presenters from various parts of the country to grace the occasion. The session started with contextual clarity.

The first presentation was by, Dr. Shruti Tripathi Assistant Prof. RIE, NCERT, Bhopal presented “Assessing Collaboration and Communication Skills in STEAM-Infused Science Education: 21st Century Perspective”. The objective of the paper is to innovative approaches in STEAM-Infused Science Education for 21st-century skills. Discussed the strategies, Bruner and Vygotsky socio-cultural theories for interdisciplinary, scaffolding, collaboration, inquiry-based learning, knowledge extension, and innovation for the development of skills for the 21st century. Concluded with insights into future directions for research and policy implications, refinement, and expansion of assessment strategies within the STEAM framework. Also, she emphasized the importance of teamwork, leadership, authentic assessment, holistic skill development, and real-world experience.

Secondly, M Praveen Kumar presented “Socio-Scientific Issues with an Indian Lens: A Local Focus on Global Challenges”. The objective of the paper is pedagogy grounded in local values like Ahimsa, Sarva dharma sambhava, and Vasudhaiva Kutumbagam with a geographical and historical understanding of India. Discussed issues like water scarcity, food scarcity, and disaster management

and suggested. At last, concluded with insights to equip students with critical thinking skills, empathy, and intellectual pursuit of knowledge to make them responsible global citizens for the future.

Next in presentation was A. Saraswathi she presented “A Search into the Holistic Nature of Teaching Science”. The focus of the research study is to educate the principles of holistic education through a holistic approach to teaching Science. Discussed the holistic nature of teaching Science such as transdisciplinary, learner-centred, comprehensive, experiential, transformational, self-regulated learning, active learning, authentic and contextual, and integrated methods and strategies. Concluded that the holistic development of students is possible through the nature of holistic teaching of Science.

Next, Amritanshu Vajpayee presented “STEAM Lunar Nights: A Novel STEAM Approach to Elementary Astronomy Education on the Global Stage in the Digital Era”. The objective of the research paper is to observe iSTEAM Lunar Nights activities carefully and methodically the celestial bodies like the moon, the planets of the solar system, and other distant pointers of the night sky like Saptarishi, Duruva Tara, meteor showers, etc. The series of self-regulated learning activities could sharpen photographic skills and harmonize the Science and Art disciplines. Participants engage in group discussions using Padlets and make cultural interpretations of the sky objects like the moon, planets, etc. The utilization of robotic telescopes such as Micro Observatory, LCO-KIOSK, etc. to foster cross-cultural appreciation. The participants also get a chance to interact with professional scientists on the virtual platform to make astronomical imagination. He concluded that this approach can promote higher-order thinking skills of the celestial bodies like the moon, stars, galaxies, comets, etc. uniting Science, Art, and cultural experience, and developing a holistic understanding of the astronomical spaces. Finally, Nikhilesh Kumar presented the topic “Preliminary Study on Students’ Perspectives of Sustainability through Science Education: Understanding the Future Global Scientific Citizens”. The focus of the research study is to investigate students’ perception of sustainability in Science education. Discussed the sustainable practice 3Rs (Reduce, Reuse, Recycle) in the schools. The results of the study reveal that students have the required knowledge but more consistency is needed across disciplines. The study highlights students’ willingness to improve sustainability through Science education despite persistent difficulties. In conclusion, suggested refining curricular integration, boosting engagement, translating knowledge into practice, and enhancing educational resources to cultivate sustainability for future citizens.

Note: After each presentation, chairpersons, the organizing committee, and the audience raised their questions. Each presenter responded to the questions based on their results. Thus, the discussion led toward scientific newness which was fruitful.

Lead Talk: Science Education for Sustainable Development. The session was concluded by the Chairperson Prof. of Chemistry Dr. Chitra Singh, Head Department of Extension Education emphasized the importance of the Integration of STEAM in Science Education for sustainable development. The Lead talk was about sensitizing future generations through the integration of STEAM in Science Education. In addition, extended talk with examples of such as reducing the toxicity, greenhouse gas, ozone damage, etc. in green chemistry for the implementation starting from classrooms to society. She Stressed on the importance of connecting children in the classroom to the environment or universe of STEAM in Science Education. Also, emphasized the role of teachers,

students' active participation in the class, how the syllabus should be taught, and fulfilling the curricular needs. In the end, in a nutshell, practical life is more important at all levels in Science education to understand the scientific truth and generalize to the universal facts. The session concluded with a vote of thanks by Dr. Manoj Mandal, moderator of the day.

Day 2 Technical Session IIC

The theme for Technical Session-II C is Experiential Learning: From Theory to Practice. Prof. R. K. Shrivastava, IEHE, Bhopal was the chair person and Dr. Rashmi Sharma, Associate Professor, RIE Bhopal was co-chairperson, Dr. Kulveer Singh Chouhan, RIE Bhopal as the moderator and Dr.K.Srinivas was Rapporteur for the session. Total 8 papers were presented out of ten. Before the presentation of papers, Chairperson Prof. R.K Shrivastava gave the lead talk on “Experiential learning: From Theory to Practice”. Also, Co-chairperson Dr. Rashmi Sharma addressed the session and welcomed all the participants.



In this session the first paper entitled “Integration of Mathematics and science at primary school level” was presented by Chandiraleka Gurusamy. The paper was based on the integration of Mathematics and Science at primary school level as an improvised and innovative phase for the education system. Implementation of Integration of Mathematics and Science at primary school level will help all the modes of teaching i.e. auditory, visual and tactile with improvised understanding by the students and good reflection of knowledge that is understood. The objectives involved the comprehensive use of integratory methods of Mathematics and Science in primary schools by using different constructs of teaching practices. The concluding part of paper was focused that the Integration of Mathematics and science at primary school level has yielded positive results. The presenter has also emphasised on by implementing innovative activities that combine both Science and Mathematics, the teacher's workload can be alleviated.

Prof. R.K Shrivastava, questioned “To what extent the integration of Mathematics and science at primary school level will help the students?” and the paper presenter answered that the procedure has increased Problem-solving abilities, creativity, critical thinking and collaboration between the students.

The second paper entitled “On the Path to Life Skills: An Experiential map” was presented by Ekta Maheshwari. The paper narrated the author's experiences in developing the life skills in STEAM

education. The skills across the four domains: Head (cognitive), Heart (social-emotional), Hands (practical) and Health (self-care) were assessed. Over all the paper has emphasised the value of experiential learning in education with improvement of life-skills alongside. Prof. R.K Shrivastava has shared his experiences along with the experiences of author. Author has answered the enquires from the other participants.

The third paper entitled “A shift from rote learning to life-skill based learning” presented by Sushmita Singh. The purpose of the study was to identify the shift-measures in Indian education to move beyond rote learning and embrace the experiential learning. The objectives of the study are aimed at efficacy of shift from “teacher centred” model to empowering students to become co-creators of educational content so that the reflection can be seen in their lives. Prof. R.K Shrivastava and Dr. Rashmi Sharma have given few other examples in the field of educational science along with the author to answer the questions from the other participants.

The Fourth paper entitled “A Study to Assess the Lifestyle Practices among Prospective Teachers under Kannur University of Kerala” presented by Sahala PM. Author has expressed the need of health education programmes. In order to enhance this, the teachers must be fully aware about the life style practices. The objectives of the study include “extent to which the lifestyle practices among prospective teachers and to suggest measures to inculcate healthy habits in the improvement of their life. The outcomes included that along with physical education, health education awareness has paved a way for B.Ed students to inculcate good habits. The presenter answered the enquires from the co-presenters and participants.

The fifth paper entitled “Nature Walk: Learning of Science outside the Classroom” presented by Ashvin Sudhkarrao Kinarkar. The core topic was focussed on ‘outdoor classroom’ as a way to engage learners in practical science. The author has presented his research findings from his observations on students’ familiarity with butterfly knowledge understanding and reflection of the same. Author presented ways of avoiding confusion and to develop aesthetic and protective attitude in learners. Prof. R.K Shrivastava appreciated the teaching and research initiative followed by query answering.

The sixth paper entitled “Study on overcoming the challenges in the teaching-learning process of physical science by using online simulations and virtual labs at the middle stage in Kendriya Vidyalaya No.3, Bhopal” presented by Laxmi Thakur. The presentation was focussed on modes and models of experimental teaching and learning in physical science along with identification of learning trajectory in the topic of physical science using Realistic Science Education. The methodology employed was of learning trajectories of Physical Science using online simulations. The presenter concluded that the positive concurrent results in their research are a clear reflection of the effectiveness of the simulations and simulation-based software integration in education. The presenter has answered the queries from the chair and audience.

The seventh paper entitled “Integrating ICT tools for encouraging creativity and experiential learning in science teaching learning” was presented by Purva Sawant. The author has introduced audience to various online tools and simulation platforms for educational content creation (2D and 3D models in physical science). The presenter has showed that some of the online platforms are also dynamic platform for creating personalized, interactive simulations in real-time and cautioned with prudent use

by emphasizing the importance of retaining physical experiments in physics education. At the end the author has answered the common query by experiential learning with traditional teaching and learning materials and online simulated models will deliver the content practice effectively to the learners.

The last paper entitled “Effectiveness of Experiential Learning Pedagogy on Students’ Learning Outcomes in Science” presented by Raj Ballav Panda. The study emphasised the effect of experiential learning pedagogy on learning outcomes of learners in the context of science education. The methodology involved the qualitative in sights drawn from observations resulting in positive shift in learners. The research suggested that the hands-on approach not only improved academic knowledge with positive influence on learner’s motivation and curiosity in the subject matter. The topic is concluded with revealing significant potential of said observations. The presenter has answered the questions from the audiences from past experiences and study area selected etc.

After accomplishment of all the presentations Prof. R.K Shrivastava shared an emphasis on experiential learning theory and its applications in daily life. He said that cognitive ability of children can be improved with experiential learning and its applications in daily life. The contents of experiential education can be effective and eventually will reflect the subject of interest with improved understanding. People need to learn from their experiences and there is a need to understand through experience, and the strategies should be developed with keeping such thoughts in mind. Cognitive ability of children can be improved with experiential learning, and its application and Dr. Rashmi Sharma portrayed conclusive part of all the presented papers in brief.

Day 2

Technical Session – II D

The theme for Technical Session II D is Assessment and Evaluation in Science Education Research in Science Education and its Educational Implications. Prof. Ajay Bhardwaj, Institute for Excellence in Higher Education (IEHE), Bhopal was the chairperson, and Dr. Saurabh Kumar, Associate Professor RIE Bhopal was the co-chair, Dr. Aji Thomas, Assistant Professor RIE Bhopal was the moderator and Ms. Dharini Jyotishi, Assistant Professor RIE Bhopal was the rapporteur for this session. A total of 4 papers were presented out of 10 papers in this session. Before the presentation of papers, Professor Ajay Bhardwaj, serving as the chairman of the national conference on recent advancements in science education, initiated Session II with a keynote address on assessment and evaluation in science education. He provided an overview of the session theme and elaborated on the distinction between objectives and aims, illustrating his points with the example of Arjuna from the Mahabharata. Furthermore, he delved into the philosophical underpinnings of evaluation and assessments. During the session, a presenter raised a question: whether a student failure is attributed to the teacher or the student. In response, Professor Bhardwaj emphasized the responsibility of the teacher to cultivate an environment conducive to learning and teaching.



The first paper entitled Competency-Driven Pedagogy: A Conceptual Exploration of Transformative Assessment in Science Education was presented by Ms. Baria Prena A. Her study focused on Competency-driven pedagogy (CDP), which advocates a revolutionary shift in science education, prioritizing skill development and transformative assessment over rote memorization. She highlighted the advantages of CDP, while also addressing various challenges with (CDP), including implementation obstacles. Furthermore, attention was drawn to the establishment of the new National Assessment Centre named PARAKH under the NEP 2020, designed to serve as a benchmarking institution. In conclusion, it was emphasized that CDP represents not just a set of novel practices, but a fundamental paradigm shift in the approach to and experience of science education. It revolves around stimulating curiosity, cultivating essential skills, and empowering each student to emerge as a confident and enthusiastic explorer of the scientific realm. Prof. Ajay Bhardwaj questioned what forms of learning are suitable for incorporation into portfolio assessment? She responded – “problem-solving exercises, presentations, and performances and others”. What are the diverse methods in which learning can be facilitated? She answered -“adaptive learning, Socratic learning, experimental learning, collaborative learning, flipped classroom, and others”. How can we effectively introduce the trial-and-error approach to learning to students? Dr. Saurabh Kumar, questioned, “What tools did the researchers employ during your literature review process to explore the competency-driven pedagogy (CDP)?”

The second paper entitled Study of Attainment of Language of Physics among Secondary School Students in Kerala was presented by Mr. Mohamed Khaleel K. He emphasized the significance of developing a robust scientific vocabulary that extends beyond mere rote memorization of terms and their definitions. Surveying secondary school students in Kerala, data was gathered from 15 government and 18 government-aided schools across rural and urban areas in three districts. The methodology employed was random sampling, followed by further analysis based on mean attainment scores. The research findings revealed that girls exhibited higher proficiency in grasping the language of physics. However, there was no notable gender disparity observed in understanding measurements, symbols, or graphs.

Prof. Ajay Bhardwaj asked – “why the attainment of the language of physics amongst girls is higher than boys according to your study?” he answered, “One potential explanation is that girls may exhibit stronger verbal and linguistic abilities, which are crucial for understanding and effectively communicating complex scientific concepts”.

The third paper is entitled Exploring the Proficiency of Pre-Service Science Teachers in Applying Core Scientific Skills Through Non-Traditional Activities: A Comprehensive Analysis and was presented by R Premalatha. This study examines the competency of pre-service teachers in utilizing fundamental scientific skills (observation, hypothesis generation, data interpretation, inference, decision making, and communication) during unconventional activities such as tricky track and candle burn. A survey involving 40 female volunteers enrolled in the first and second year of B.Ed. programs were conducted. The findings indicate a robust proficiency in observation skills (82% correct application), but a comparatively weaker performance in data analysis, reasoning, generalization, and communication skills.

Consequently, there is a suggested need for improved integration of scientific content and the development of transferable skills within teacher education programs, along with ongoing assessment and feedback mechanisms for teachers.

Prof. Ajay Bhardwaj asked why you propose scientific skills for secondary-level teachers. She responded, The secondary level is pivotal for building students knowledge for higher classes. If secondary school teachers possess scientific skills, they can impart accurate knowledge, thereby establishing a robust scientific foundation for higher education.

The fourth paper is entitled Empirical Study on use of Pedagogical Content Knowledge (PCK) in Biological Science and was presented by Sara Sultana. Comprehensive study on Pedagogical Content Knowledge (PCK) An exploration of Pedagogical Content Knowledge (PCK) is undertaken in this comprehensive study by the presenter. PCK acts as a framework for guiding the analysis of data concerning the development of scientific instructor's knowledge over time. PCK serves as a model to elucidate how both novice and experienced teachers learn to interpret and convey subject matter in meaningful contexts. According to her thorough review, PCK provides a theoretical foundation for science teaching in classrooms. Finally, she highlighted a research gap: the lack of focus on the application of PCK in the Indian context. Research avenues in the Indian context could encompass: Cultural and conceptual factors Subject-specific PCK Teacher education and professional development Technological integration Dr. Saurabh Kumar questioned, Can a teacher engage in pedagogy devoid of content or curriculum? She responded, "No, a teacher cannot effectively engage in pedagogy without content or curriculum. Pedagogy relies on the structure provided by content and curriculum to guide teaching methods and facilitate meaningful learning experiences for students. Without content or curriculum, teaching would lack focus, direction, and the ability to effectively support student learning". Are you planning to employ experimental or survey research methods for further analysis? Later, Professor Ajay Bhardwaj suggested exploring the Indian knowledge system to enhance understanding of PCK in the Indian context. The penultimate speech was delivered by the co-chair, who underscored the long-standing issue of examination-centric education in India, dating back to Radhakrishna mission and extending to the recent NEP 2020. Additionally, he referenced India low ranking in the PISA assessment, where it placed 72nd out of 73 countries. Finally, he noted in his address that if a student fails an exam, the entire system, parents, and the education sector as a whole bear responsibility for it. In the closing remarks, Professor Ajay Bhardwaj extended good wishes to the presenters and urged them to prioritize original research, focusing on the development of new knowledge rather than solely disseminating existing research. Finally, Dr. Aji Thomas expressed

gratitude to the participants and commended the paper presentations as well as the efforts of each participant.

Day 3 28.02.2024

Keynote address

Day three began by a common session by Prof. Vijay K. Agarwal. In his keynote address on the third day of the conference on Recent Advances in Science Education, Professor Vijay Agrawal, VC RKDF University offered a comprehensive exploration of key topics crucial to the field. With a focus on various forms of energy, including wind and solar energy, he emphasized their pivotal role in addressing contemporary challenges. He likely elucidated on India's strides in this arena, shedding light on the nation's advancements and initiatives like "Viksit Bharat" (Developed India), which may encompass efforts towards technological innovation, educational reform, or sustainable development.

Additionally, by blessing the participants, Professor Aggrawal not only conveyed his goodwill but also emphasized the importance of collective endeavor and shared aspirations in advancing science education. His address likely served to inspire and motivate attendees, encouraging them to actively engage with the conference's themes and contribute to the ongoing progress in science education.

Technical Session IIIA

The session was organized on 28-02-2024, Time: 11:30:am to 1:30pm, in Hall No. 53, of the Regional Institute of Education (RIE), Bhopal with the Chairperson Prof. V.P. Singh, Professor of Science Education and Head of the Division of Educational Kits in the National Council of Educational Research and Training (NCERT), New Delhi. This session was Co-Chair by Dr. R. P. Prajapati, Associate Professor in the Department of Education in Science and Mathematics, Regional Institute of Education (RIE), Bhopal. Dr. Alka Singh, Assistant Professor in the Department of Education in Social Sciences and Humanities (DESSH), Regional Institute of Education (RIE), Bhopal was the moderator of this session. Dr. Dalel Singh, Assistant Professor in the Department of Education, Regional Institute of Education (RIE), Bhopal was the rapporteur. The session was based on two important themes i.e. "Inclusivity and Diversity in Science Education" and "Experiential Learning: From Theory to Practice". In the entire session, seven research papers were presented on the different unique issues closely associated with the themes of this session.



The session started with gifting of a sapling to the chairperson and the co-chair of this session with by Dr. Alka Singh, moderator of this session. In the beginning of this session, the chairperson, Prof. V.P. Singh, was introduced by Dr. Alka Singh, moderator of this session.



In the lead talk by the chair he highlighted different advancements and innovations in science, referring to the Sustainable Development Goals (SDGs). He also quoted a magazine named '*Namastey India*' for highlighting 'Mission LiFE'. Here, LiFE stands for Life Style of Environment. The honourable Prime Minister Shri Narendra Modi introduced Mission LiFE to the world at the 26th UN Climate Conference of the Parties (COP26) on November 1, 2021, in Glasgow, Scotland. The mission is a public movement to mobilize people to become 'Pro-Planet People'. Those who practice such a lifestyle are recognized as Pro Planet People. Nowadays, there is a great need for us to come together and take Lifestyle for the Environment forward as a campaign. Our country led a global mass movement to nudge individual and community action to protect and preserve the environment. Changing individual and community behaviour alone can have a significant impact on the environmental and climate crises. India has rich experience in implementing large-scale behavioural change programs. However, while the world is focusing on policy and regulatory measures to address the environmental crisis, India has demonstrated success in harnessing the power of collective action to solve complex problems. LiFE also builds upon India's environment-friendly traditional and cultural practices. Mission LiFE, as a global program, envisions three core shifts in our collective approach towards sustainability. There are three phases of Mission LiFE i.e., Change in Demand (Phase I): nudging individuals across the world to practice simple yet effective environment-friendly actions in their daily lives; Change in Supply (Phase II): changes in large-scale individual demand are expected to gradually nudge industries and markets to respond and tailor supply and procurement as per the revised demands; Change in Policy (Phase III): By influencing the demand and supply dynamics of India and the world, the long-term vision of Mission. LiFE is to trigger shifts in large-scale industrial and government policies that can support both sustainable consumption and production.

He also appreciated the different themes and sub-themes of this conference, such as 'Indigenous Knowledge in Science Education', 'Integration of ICT in Science Education', 'Inclusivity and Diversity in Science Education', and 'Science Education for Sustainable Development. He concluded his talk with some instructions for research paper presenters and handed over the session to the moderator.

The first research paper was 'Illuminating Pathways: Developing Inclusive Learning Strategies for Visually Impaired Children' presented by the first author, Kajal Khandelwal, and co-author, Devesh Yadav, a student of the B.Sc. B.Ed. at the Regional Institute of Education (RIE), Bhopal. She shared the disability wise detail records of our country. She also highlighted the Census of 2011, India's population of persons with disabilities is 268.10 lakh, of which 50.3 lakh have disabilities. Currently, there are an estimated 49.5 lakh blind persons and 700 lakh vision impaired persons in India, out of which 2.4 lakh are blind children. She also reported that an adequate amount of visually impaired students are not able to attain education due to the unavailability of 'proper infrastructure', 'inclusive education resources for teaching and learning', 'low social encouragement, 'no proper awareness', 'lack of trained teachers', etc. There were three major objectives of this paper, such as (i). To investigate the concept and principles of inclusive education, (ii) to analyze the role of technology in facilitating inclusive education; and (iii). To identify and evaluate various learning strategies and resources for inclusive education. She also highlighted that to make an inclusive learning environment for disabled students, they provided orientation and instruction in tactile skills with Braille books, assistive technology, and AI integrated software, using government websites and various schemes and inclusive language for visual learners in the classroom with the use of 'descriptive language; multimodal instruction; and 'universal design for learning (UDL)'. She also revealed that there are some major teaching strategies that should be considered while dealing with the visual impairment students, such as 'Permit lecture notes to be taped', 'Provide enlarged copies of lecture notes', 'Convey information written on the chalkboard in spoken words', 'Read aloud subtitles when using media resources', 'Record lessons', and 'Provide large print copies of classroom materials. The presented paper offers a comprehensive overview of the challenges faced by visually impaired students in traditional educational settings and proposes innovative solutions to create a more inclusive learning environment. By analyzing the strengths and limitations of various approaches, the paper paved the way for fruitful discussions and collaborative efforts to empower these students and unlock their full potential. The paper presenter also highlighted that by engaging in ongoing research, collaborative efforts, and continuous improvement, we can build inclusive educational systems that empower students with visual impairments to reach their full potential and contribute meaningfully to their family and their society.

At the end of this presentation, the chairperson asked the presenter to show the records and tools that were used during this research. The paper presenter showed some records that were used during this research.

The third presentation of this session was by Dr. Ganga Mahto, Assistant Professor in the Department of Education in Social Sciences and Humanities (DESSH), Regional Institute of Education (RIE), Bhopal. The title of this presentation was 'Universal Design in Learning (UDL) for Science Education. He reported that Universal Design in Learning (UDL) is an approach to teaching and learning that aims at offering flexibility to learners in terms of accessing materials and assessment. It is a scientifically valid framework for guiding educational practice that provides flexibility in the ways information is presented, in the ways learners respond or demonstrate knowledge and skills, and in the ways learners are engaged. It also attempts to reduce barriers to instruction; provide appropriate accommodation, support, and challenges; and maintain high achievement expectations for all learners, including those

with disabilities. Moreover, the paper presenter also shared some benefits of UDL in science education. It is useful for increased accessibility for all students and enhanced engagement and motivation among students. It is fruitful to improve learning outcomes and retention as well. The paper presenter also discussed principles of UDL like 'Support Multiple Means of Engagement' and 'Provide Multiple Means of Representation'. UDL can also be applied in science education by incorporating multimedia for varied representations of concepts and offering alternative assessments for diverse ways of demonstrating understanding. Furthermore, UDL advocates the representation of content for all types of learners and in multiple ways in the classroom. For example, appropriate technologies, such as large prints, pictures, etc., should be used to meet the needs of the learners. It will also help teacher's present information orally as well as visually to accommodate learners with visual or auditory difficulties while recognizing several other learning preferences of the learners. Although, UDL also provides examples of a wide range of assessment types, such as written assignments, presentations, simulations, authentic assessments, multimedia-based assessments, e-portfolio assessments, collaborative assessments, peer assessments, etc., In fact, the teachers should determine whether they can measure the actual capabilities of the learners by discussing with other teachers the answers and tasks completed by them and by taking their feedback. He also revealed that there are different resources for UDL implementation, like UDL Guidelines, UDL Book Builder, and the UDL in Education Podcast. A sample of the science UDL lesson plan and multiple means of representation, action, expression, and resources were also discussed by the paper presenter. The chairperson of the session asked the presenter, can you suggest any examples in which teachers can extend learning beyond text books? The presenter answered beautifully by showing a slide of writing a letter. No question was asked by anyone.

The next presentation was given by Aashish Chhatwani, a B.Sc. B.Ed., fourth-year student studying in Regional Institute of Education (RIE), Bhopal. The title of this presentation was 'Use of Geogebra to Enhance Graphing Skills in Physics among Students at Secondary Stage 2 of Jawahar Navodaya Vidyalaya Loni, Burhanpur' This research has been conducted with objectives such as (i). To highlight the importance of Geogebra in enhancing the graphing skills of students, which is one of the significant integrated process skills in science at the secondary stage,(ii). To demonstrate the application of Geogebra in physics at the secondary level, especially for concepts involving graphs, gradients, and vectors, (iii). To facilitate students at the secondary level in the visualization of abstract concepts mathematically with the help of Geogebra, (iv). To support students in demonstrating graphing skills using Geogebra and (v). To assess the learning outcomes of students after the intervention of Geogebra software for graphing and vector algebra in physics. The methodology of this research encompasses four major steps:(i). constructing, (ii). interpretation, (iii). connecting, and (iv). When and how? Moreover, different interventions were given to the respondents, like 'Addition and Subtraction of Vectors—Graphical Method', 'Projectile Motion', 'Simple Harmonic Motion', 'Centre of Mass, and 'Visualization of 3D Space'. The results of this research were shared with the help of different videos. At the end of the presentation, the presenter also concluded with a shared future implementation of Geogebra in physics and mathematics. Geogebra is useful in improving learning outcomes, and it will be an experimental and joyful learning experience for the students. After the completion of the presentation, the chairperson asked the presenter to kindly share some evidence and a worksheet, which reflect that working with Geogebra the students are having joyful experiences. Now, the

presenter was unable to share some worksheets on which it is reported by the student that they were enjoying working with Geogebra.

The next paper was presented by Mrs. Richa Motiwala, working in Reliance Foundation School, Vesu, Surat. The title of presentation was 'Effectiveness of Card Games in Learning Science to Attain Learning Outcomes at Secondary Level in Gujarat'. She highlighted that over the years, science education has been searching for new ways of teaching and learning to make a shift from traditional board paper processes in order to develop the students' competencies in terms of success. It is necessary for the children; they must be able to do much more than just read and write in a rapidly evolving modern society. Today, science is also focusing more on innovation, and pedagogies need to evolve. Moreover, she shared the objectives of the study such as (i). To study the effectiveness of integrating card games into secondary level science education to attain learning outcomes (ii) To analyze the engagement level of students during card game activities, (iii) To evaluate the development of 21st century skills during card game activities, and (iv). To suggest measures to enhance learning outcomes in science. The total sample size was comprised of 65 students (32 in the control group and 33 in the experimental group). The self-constructed 'Achievement Test' and 'Feedback Form' were used for data collection. The mixed methods design was used for this study. There were a total of 52 cards (dividing them into 26 grey and 26 orange). However, the maximum number of players was five. The orange stack would be kept aside, and the gray stack would be divided equally among each player. After that, each player has to pick one card on their turn from the orange stack. If the picked up card could be paired appropriately with any card in hand, then the player would get one point. On the other hand, those two cards should be kept aside. The game would be over, and the player who got all his cards paired first and had no cards in hand would be the winner. The control group was taught using the traditional lecture method, a text book, and homework assignments. Unlikely, the experimental group was merely taught by the basic teaching method and assisted by a card game. SPSS was used to analyze the quantitative data. T-test was used to compare the experimental and control groups' scores on the pre-test, post-test scores. Content analysis was used to analyze the qualitative data obtained from the open-end edquestions in the Feedback Form on the Use of Educational Games. The researcher herself designed a feedback form to know the views of students. The results revealed a significant difference in the value of t, in the t-test, which clearly indicates the significant impact of card games on achieving the researcher's desired learning outcomes. At the end of the presentation, the presenter also showed the Achievement Test Feedback for sharing respondents' experiences regarding the impact of playing card games on the topic of 'Cell'. All the information was shared and discussed beautifully by the presenter. One question was asked by the other presenters and other members that were present in the conference room.

The next paper was presented by Shivali Sahu and co-authored by Prof. Rashmi Singhai, working as a chairperson in the Department of Education in Science and Mathematics (DESM). The title of the presentation was 'Exploring the Effectiveness of Snake and Ladder Games in Periodic Table Learning for Secondary School Students'. She opined that the periodic table is important in chemistry, and we want to see if playing this game can make it more enjoyable and easier for secondary school students. By watching students play the game and looking at the results, we were figuring out if it is not just fun but also helps them understand science better. Moreover, she also shared the history of the snake and

ladder game and the Periodic Table. This game was designed just for secondary school students. There were two objectives of their search: (i) to evaluate the impact of the Snake and Ladder game on students' understanding of the periodic table elements, and (ii) to assess the effectiveness of gamified learning in reinforcing knowledge about cations and anions functions. The development model of the game encompasses five stages, namely (i) analysis, (ii) design, (iii) development, (iv) implementation, and (v) evaluation. The presenter also described learning elements such as 'Giving the Atomic Number', 'Giving the elements Name', 'Giving the Cation and Anion Configuration', 'Giving the Electron Configuration', and 'Color code the area to given the block knowledge'. The results and analysis highlighted that the students expressed positive attitudes toward competency and meanings. They believed that the game was an efficient way to learn. The majority of the students agreed that they had fun playing the Periodic Table board game and would recommend it to others as well. The majority of the students strongly agree that this game helps students with communication. During the game play, all students were cooperative and often communicated with each other. The student believed that this game had a positive impact on their learning. It was also confirmed by the students' responses that their perceived capability was increased with use of this game. At the end of the presentation, a suggestion was made by the chairperson of the session to the presenter; try to make a clear image of the periodic table, which will clearly show all the learning elements.

The title of the next presentation was 'Efficacy of Middle Stage Science Kits of NCERT in Teaching-Learning in Science in Government Schools of Delhi, which was presented by Dr. Ashish Kumar Srivastava. He shared some facts: 13 different types of educational kits have been developed by the Division of Education (DEK), NCERT, New Delhi. Out of these 13 kits, 6 were from the science domain only. The Middle Stage Science Kit was one of the oldest and most demanded kits in NCERT. It contains more than 150 items, which can be used for carrying out more than 200 activities. Many states and UTs have procured these kits from NCERT. What is more, the importance of hands-on experiences, experiential learning, and learning by doing has been emphasized by different policy documents, such as NCF 2005, NEP 2020, NCFSE 2023, and other policies and research. The educational kit contains different items that provide hands-on experience to users and help them learn the concepts holistically. There are many theories and principles in science that can be understood properly only when demonstrated practically. There were two objectives of the study, such as (i). To assess the efficacy of the Middle Stage Science Kit developed by NCERT in enhancing the conceptual understanding of science among students in the urban and rural schools of Delhi, (ii) To collect input for further improvement in kit items.

This presentation was part of the study conducted to assess the efficacy of the science kit developed by NCERT for the middle stage of schooling, in enhancing the conceptual understanding of science among students in classes 6, 7, and 8, in sample government schools in Delhi. The complete study covered the study of the efficacy of the NCERT Science Kit at the middle stage in government schools in Delhi. The study has also given insight for further improvement of the kit items to make them more effective. For this study, some schools in Delhi were identified as places where these kits have been supplied. Out of these schools, 12 were selected on the basis of the availability of these science kits and science teachers in the schools. The sample of schools consisted of boys' schools, girls' schools, and co-educational schools located in rural and urban areas of Delhi. Necessary permission for

carrying out the study in the selected schools was obtained from the Directorate of Education, Delhi. Out of all the selected classes, the control and experimental groups were formed. The students of the experimental group were taught concepts through the use of Science Kit, while the control group students were taught without the use of Science Kit or its items. After a few days, a post-test was administered. The questions for the post-test were based on the concepts used for the pre-test. Due to some administrative issues, the administration of the pre-and post-tests could not be done in 3 schools. Therefore, the data is collected only from 9 schools instead of 12 schools. After successful completion of the post-test, the scores of all the students who were common in both pre- and post-tests were compared, and the results of the comparison are shown in the next sections in tabular and graphical form. The overall findings of the study revealed that the Middle Stage Science Kit developed by NCERT is effective in enhancing the conceptual understanding of science among students in classes 6, 7 and 8. These kits were helpful for all the students, irrespective of the locality of the school, orientation of teachers was required for effective use of the kit and its items in the hands-on method of teaching and learning concepts of science, and in almost all the schools, it was observed that some or the other items of the kits were either missing, broken, or not functioning properly, and there was no proper mechanism in place for replacing these items.

After this presentation, a participant was asked a question: ‘All these developed kits are developed with a standardized procedure’. To answer this question, the presenter opined that some kits were developed with a proper standardized procedure. On the other hand, there are some other kits that were not developed with proper standardization. Such types of kits are also useful for understanding different concepts in science. The entire session ended with a vote of thanks to the chairperson and co-chair of this technical session, all presented in the conference room.

Technical Session-IIIB

Technical Session III B was held on 28 February 2024 began at 11:30 pm in room no. 30. The technical session comprised of two themes. Theme 7 was “*Inclusivity and Diversity in Science Education*” and Theme 5 “*Experiential Learning: From Theory to Practice.*”

Dr. Kalpana Maski(Physics)in Department of Education in Science and Mathematics, RIE, Bhopal was the Chairperson and Mr. Aji Thomas, Assistant Professor (Mathematics) in Department of Education in Science and Mathematics, RIE, Bhopal was the Co-Chairperson of the session. Dr. Deepti Kavathekar, Assistant Professor (Department of Education) was the moderator cum rapporteur for the session.

The session began by the lead talk by Dr. Kalpana Maski on the topic “*Beyond the Test: Evaluating 21st century skills in science through diverse assessment strategies*”. The paper delved into an experiential study in environmental education. A sample of 291 (class 6-8) were placed in experimental and traditional group. The study explores the necessity and efficacy of diverse assessment strategies beyond conventional testing Paradigms for evaluating 21st century skills in the realm of science education. It included performance task, project based learning, problem based learning, rubrics, peer assessment, authentic assessment, interactive simulation, games, multimedia presentations and tech8 enhanced assessments. Both pre and post-test were taken to understand the effectiveness. The alternative assessment methods were designed as per NCFSE.



In this session 6 papers were presented by the participants. All the presenters used Power Point for presentation. “*Addressing LGBTQ+ gender disparities through science literacy: A comprehensive exploration*” was the first paper of the session which was presented by Ms. Pragya Singh. This empirical study delved deep into the basic understanding, knowledge of LGBTQ+ and the disparities seen within the field of LGBTQ+. The paper talked about the safe space for every queer community.

The second paper presented by Ms. Nandani Biswas titled “*A study on learning resources of science towards inclusivity at secondary school level*” was an empirical study. The paper explored the status of the learning resources of science towards inclusivity at secondary level.

Nidhi Tiwari presented the paper titled “*Exploring gender fluidity and reproductive health in rural middle school: A reflective study*”. This Qualitative study was based on students in rural area of Rajasthan. The paper proposed concern over challenging traditional cultural standards over manifestation of identity.

Aditya Chaudary presented paper titled “*Bridging horizon: Pioneering the fusion of data science, artificial intelligence and coding in Science Education*”. The paper talked about digital equity and Access. Analysis of documentations and researches in the area of Data Science, Big Data, Learning Analytics and Artificial Intelligence in Education was done. Thorough analysis demonstrated that

Next presentation by Garima Sharma titled “*STEAM synergy: Assessing student's perception towards multi-disciplinary pedagogies in Science Education for career development*” was a qualitative research work where an attempt was made to know how STEAM education paves the way for the student's perspectives towards Multidisciplinary Pedagogies in Science Education for career development.

Sixth and last paper was titled “*An envelope of language and linguistic Inclusivity*” by Swati Gupta proposed that students from diverse background faces challenges in Science classroom. This paper emphasized the benefits of embracing multi linguistic will help the diverse learners to connect with the teaching learning in classroom more effectively. Local knowledge systems and cultural perspectives can also help in better understanding of science and the language related challenges can be overcome easily.

After accomplishment of all the presentation, Mr, Aji Thomas portrayed the conclusive part of all the presented paper in brief. He encouraged the young researchers to work effectively in increasing their knowledge as per suggestions given to them.



Special Event of the Conference

A Science exhibition was also organised as part of the National Conference “Recent Trends in Science Education” in Regional Institute of Education (RIE), Bhopal with a view to encourage, popularize and inculcate scientific temper among the students, where school students can showcase their talents in science and its applications in different areas of STEAM.



The theme for science exhibition was “STEAM and Sustainable Development”. STEAM (Science, Technology, Engineering, Arts, and Mathematics) education and sustainable development are closely intertwined, as STEAM disciplines provide essential tools and knowledge to address the challenges of sustainability. STEAM education encourages students to think critically and creatively to solve complex problems. This mindset is crucial for developing innovative solutions to sustainability challenges, such as renewable energy technologies, waste management systems, and sustainable

agriculture practices. By integrating STEAM education with sustainable development goals, educators can empower students to become informed global citizens who are equipped to address the complex challenges facing our planet. Subthemes of the exhibition were STEAM and astronomy, STEAM and coding, STEAM and virtual reality/augmented reality, Simple projects in STEAM, STEAM and Artificial Intelligence, STEAM and Robotics. Original working models were invited under the sub-themes of the Science Exhibition from students of upper primary, secondary and senior secondary school level from all schools. The models displayed in the exhibition were selected by an expert panel. The best models were displayed in the exhibition.



Total 11 innovative models were exhibited and presented by students from different parts of the country. The coordinator of the exhibition was Dr. Shivalika Sarkar, Assistant Professor, RIE Bhopal. The models were judged by a panel of three judges. First prize was given to the model **LOW-COST SOLAR TRACKING SYSTEM CATEGORY: STEAM and ROBOTICS** by Joyeta Mukherjee of Delhi Public School Bangalore East. Second prize was given to the model by Vyakhya Gupta of Delhi Public School Bangalore East. Third prize was given to Atal Divyang Rath by Pankaj Kewat and

Mohnish Dhruv of Swami Atmananda Govt. H.S. School Bilaspur Chhattisgarh. Two consolation prizes were given to the model AIR code by Nitya N. Chapaneri Smt. Jijiben Forward Girls High School, Amreli (Gujarat) of class 9 and designing a model which can trap vibrations causing noise pollution in an area and transforming the same into electric energy using piezoelectric material by Divansh Sharma (Class 8), Allan Saju (Class 8), Aryan Khola (Class 8), Devvrath Singh (Class 8), Yashvardhan Singh (Class 9) of Navy Children School, Karwar.



Valedictory Session

The valedictory function, of the programme marked the culmination of an enriching and transformative learning journey. The eminent personnel gracing the occasion included the chief guest Vice Chancellor, Barkatullah Univerasity Bhopal Prof. S.K. Jain, whose presence added prestige and significance to the event, the chair person Prof. Jaydip Mandal Principal of the Institute, Prof. Chitra Singh, Head Extension, and Prof. Rashmi Singhai, the coordinator of the conference and Dr. Ganga Mahto, who served as the comparer for the event.

Professor Jaydip Mandal, as the Chairperson of the event and Principal of the Institute, likely took the opportunity to encourage participants to not only reflect on their learning's but also to actively promote science education and engage in further research endeavors. Professor Mandal, extended a warm and gracious welcome to all attendees, fostering an atmosphere of commonality and collaboration among participants. His introductory remarks likely set a positive tone for emphasizing the importance of the conference's themes and the collective effort required to advance science education.

The valedictory function of the National Conference on Recent Advances in Science Education was a momentous occasion, graced by the esteemed presence of Vice Chancellor, Barkatullah University Bhopal Prof. S.K. Jain. His gracious acknowledgment of the institute's efforts inorganizing the conference likely served as a commendation of the dedication and commitment of

all involved. In his address, he praised the institute for its initiative in hosting the conference, recognizing the importance of such events in fostering dialogue, collaboration, and progress in the field of science education. Sir's, presence and words of encouragement added a sense of accountability and

inspiration to the valedictory function, reinforcing the importance of science education and the commitment to its ongoing advancement.



During the event, Professor Rashmi Singhai presented a comprehensive conference report, highlighting key discussions, insights, and outcomes from the various sessions and presentations. This report provided valuable insights into the progress made during the conference and served as a basis for future initiatives and collaborations in the field of science education.

Feedback from participants was solicited and acknowledged, recognizing the importance of their contributions and perspectives in shaping the conference's success and informing future endeavors. Certificate distribution honored the dedication and involvement of individuals who contributed to the conference's achievements, acknowledging their commitment to advancing science education.





Indeed, after gathering feedback from the participants, the felicitation of the Vice Chancellor, Professor S.K. Jain, would have been even more significant, as it would reflect not only the organizer sentiments but also the collective appreciation of those who attended the conference.



Professor Chitra Singh delivered a heartfelt vote of thanks, expressing gratitude to all stakeholders, including organizers, participants, sponsors, and supporters, for their invaluable contributions to the success of the conference. Her words likely conveyed appreciation for the collaborative spirit and shared commitment to excellence that characterized the event. The valedictory function came to a close with a stirring rendition of the national anthem, instilling a sense of patriotism and unity.

NATIONAL CONFERENCE ON RECENT ADVANCES IN SCIENCE EDUCATION

26-28 FEBRUARY, 2024



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