



GOVERNMENT OF INDIA
MINISTRY OF SCIENCE AND TECHNOLOGY
DEPARTMENT OF SCIENTIFIC AND INDUSTRIAL RESEARCH

PROCEEDINGS OF SANGOSHTHEE- A BRAINSTORMING EVENT ON “ICT TOOLS FOR SCHOOL EDUCATION- CURRENT STATUS AND EMERGING TRENDS”



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ACKNOWLEDGMENT

We are delighted to present the proceedings of the “Sangoshthee-A Brainstorming Event on ICT Tools for School Education - Current Status and Emerging Trends,” which took place on September 6, 2023.

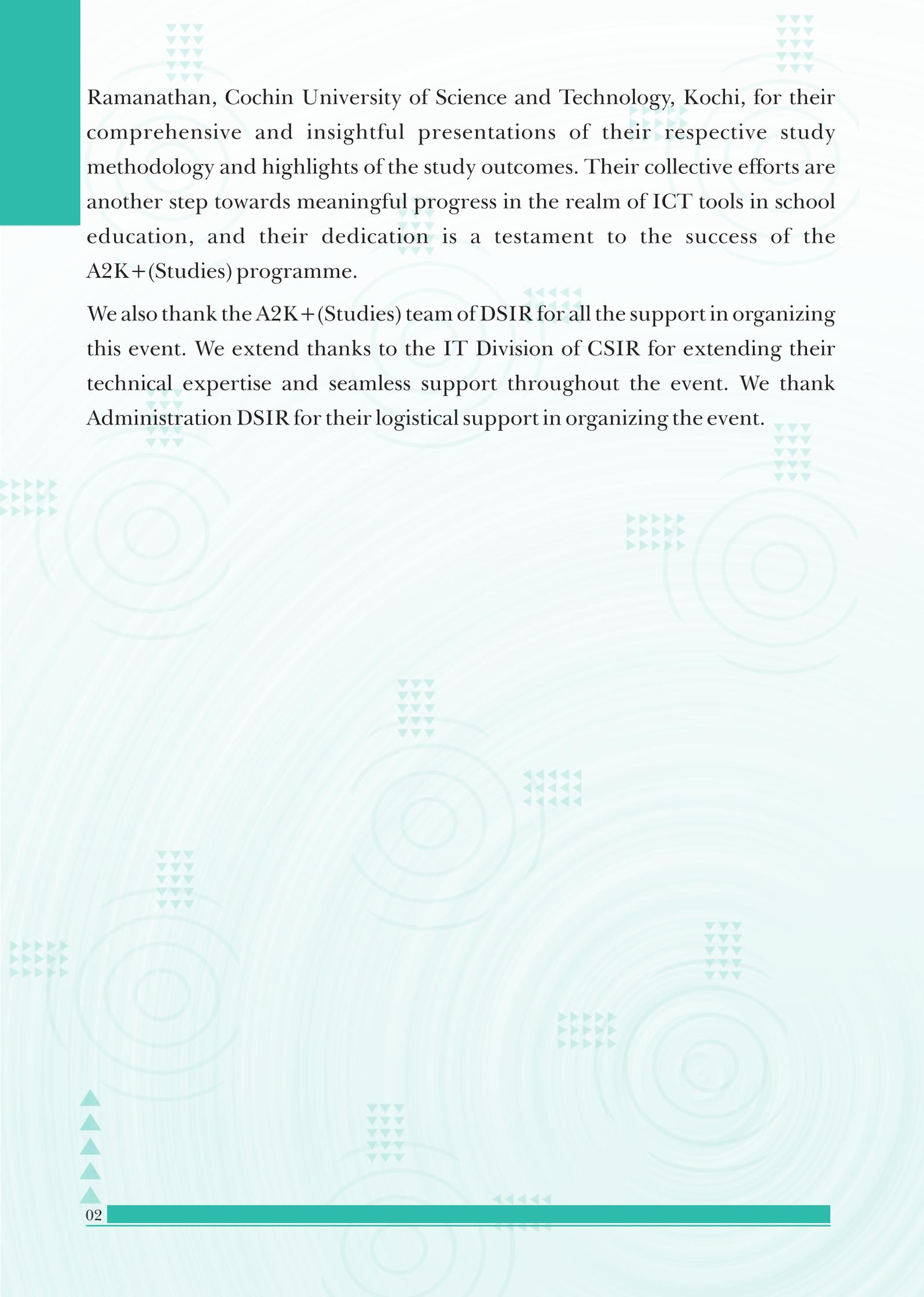
We extend our heartfelt gratitude to Dr. N. Kalaiselvi, Secretary DSIR & DG, CSIR, for her unwavering motivation and continuous support for the A2K+(Studies) programme, as well as for her instrumental role in conducting this event.

We also want to express our deep appreciation to Dr. Sujata Chaklanobis, Scientist-G and Head of A2K+(Studies) programme, for her invaluable guidance and unwavering support at every stage of this event's planning and execution. Her motivation and leadership were indispensable to the success of this event.

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We wish to express our sincere thanks to distinguished scholars and Principal Investigators(PIs) of the projects awarded under the A2K+(Studies) programme; Prof. Deepak John Mathew, IIT Hyderabad; Dr. Meenakshi Tripathi, MNIT, Jaipur; Prof. Praveen Kumar, SIMS, Pune, and Dr. Hareesh N



Ramanathan, Cochin University of Science and Technology, Kochi, for their comprehensive and insightful presentations of their respective study methodology and highlights of the study outcomes. Their collective efforts are another step towards meaningful progress in the realm of ICT tools in school education, and their dedication is a testament to the success of the A2K+(Studies) programme.

We also thank the A2K+(Studies) team of DSIR for all the support in organizing this event. We extend thanks to the IT Division of CSIR for extending their technical expertise and seamless support throughout the event. We thank Administration DSIR for their logistical support in organizing the event.



डॉ. (श्रीमती) एन. कलैसेल्वी
सचिव
वैज्ञानिक और औद्योगिक अनुसंधान विभाग तथा
महानिदेशक

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Government of India
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Message

India's ambitious goal of achieving a 5 trillion-dollar economy emphasizes the crucial role of education in this monumental endeavor. Aligned with the SDG4 Goal on quality education, the nation aims to ensure inclusive and equitable quality education and promote lifelong learning opportunities for all by 2030. Recognizing the dynamic nature of the educational landscape, the integration of Information and Communication Technology (ICT) with pedagogy, emerges as a powerful catalyst for educational progress.

The "Sangoshthee- A Brainstorming Event on ICT Tools for School Education – Current Status and Emerging Trends", organized under A2K+ (Support to Studies) programme of DSIR, highlights its commitment towards technology development in alignment with national visions. It is a matter of great pleasure that proceedings of the Brainstorming Session has been prepared by the A2K+ (Support to Studies) Division of DSIR. This publication has captured the event effectively and reflects upon DSIR's mandate to promote technology use by end-users.

The contents of the proceedings showcase the richness of discussions, offering a plethora of ideas, strategies, and best practices to elevate the educational experiences of children. From the promising applications of Mixed Reality (MR) and Virtual Reality (VR) to the transformative potential of Artificial Intelligence (AI), each contribution highlights the transformative power of technology in shaping a more inclusive and equitable future.

I extend my appreciation to all who participated in the "Sangoshthee" and contributed their time, expertise and enthusiasm to the success of the brainstorming event. The collective insights will undoubtedly resonate in classrooms and policy discussions alike, driving towards accessible and empowering education for all. Let us celebrate the achievements of the event and also renew our commitment to fostering innovation in education. May the ideas shared within these pages serve as a catalyst for future collaborations, inspiring continued efforts to leverage technology for the continual improvement of education.

December 20, 2023
New Delhi


(N. Kalaiselvi)

Introduction

The status of education in India is marked by both achievements and challenges. Over the years, India has made significant progress in terms of expanding access to education and enrolling more children in schools. The recent overhaul of the education system in India through the New Education Policy (NEP) 2023 envisions a modernized inclusive education system that equips students and educators with a skill set transforming both the learning and teaching environment. The NEP 2023 envisions an education system that goes beyond traditional boundaries, focusing on holistic development and equipping learners with a diverse skill set. One of the pivotal aspects of this educational transformation lies in the integration of new digital technologies.

The advent of ICT opens up new possibilities to initiate new pedagogical approaches apt to meet the overgrowing demands of the modern informed society integrated with the modernized education system. However, while the integration of ICT in education offers immense potential, it is crucial to recognize and address the challenges associated with its inclusive implementation in the vast and varied landscape of Indian education.

With this background and based on the valuable inputs provided by the Department of Education, while responding to a call of the A2K+(Studies) Programme Division seeking problem statements of Inter-ministerial stakeholders and allied Industry, DSIR is supporting four studies that intend to understand the current status of availability of various ICT tools catering to all types of learners, including students with special needs and ascertain the extent of use of these tools.

Using a stepwise approach, these studies awarded under the A2K+(Studies) programme of DSIR, aim to uncover both the challenges and opportunities in integrating ICT, VR/AR, and MR technologies into Educational Institutions. The studies will facilitate the researchers and Edtech Startups, and support educational leaders and policymakers to take leads on improvised policy

directions and scalable development and implementation of available educational tools. The following four studies are supported by DSIR under the A2K+(Studies) programme on the broad area of availability and adoption of ICT tools in school education across the nation:

1. “Study on Integrating AI, AR, and VR in learning models and their impact” awarded to IIT Hyderabad.
2. “A report on ICT tools catering to a wide range of learners, including children with special needs with a focus on schools in Haryana, Delhi, Goa, and Kerala” awarded to Cochin University of Science and Technology, Kochi, Kerala.
3. “A report on ICT tools catering to a wide range of learners, including children with special needs with a focus on the western region in India which consists of Maharashtra, Gujarat, Goa and Dadra and Nagar Havelli and Daman and Diu” awarded to Symbiosis Institute of Management Studies, Constituent of Symbiosis International, Khadki, Pune.
4. “A Study of the Usability and Accessibility of Various ICT Tools related to English Language Speaking and Reading Skills of Children with Autism Spectrum Disorder (ASD)” awarded to Malaviya National Institute of Technology, Jaipur.

Objectives of the Event:

The “Sangoshthee” was organized on 6th September 2023 at DSIR, Technology Bhawan, New Delhi. The event provided a unique opportunity for interaction between Principal Investigators (PIs) and Co-PIs of ongoing studies under the A2K+(Studies) programme and eminent experts with a wealth of expertise and experience in the field of education and technology. The following were the objectives of the event:

- Explore Innovative Educational Technologies: Delve into the potential of augmented reality (AR), virtual reality (VR), mixed reality (MR), and other cutting-edge technologies to revolutionize the education



landscape.

- Academia-Education Board Collaboration: To foster stronger ties between academia and policymakers in promoting knowledge exchange and implementation of innovations at the grassroots level.
- Promote Research and Development: Identify gaps and obstacles within the education system that require Science, Technology, and Innovation (STI) interventions to drive positive change.
- Networking: Provide a platform for networking among researchers, academia, social organizations, education boards, and government bodies fostering potential collaborations and partnerships.
- Dissemination: To share insights and knowledge about the latest trends and advancements in ICT tools that may be implemented at the educator and student level.
- Engage in Methodology Dialogues: Facilitate in-depth discussions surrounding various methodologies, allowing participants to explore diverse approaches to educational advancement.
- Foster Experience Exchange: Cultivate an environment for participants to share their experiences, successes, and challenges, promoting mutual learning and growth.

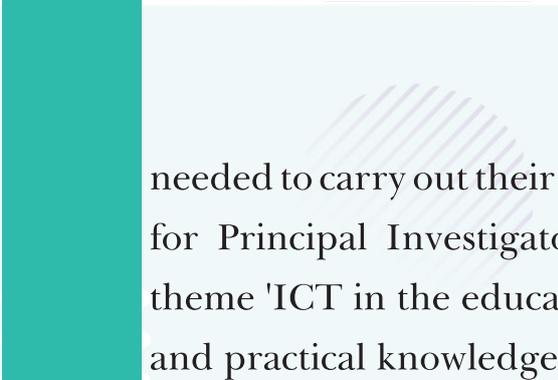
Welcome Address



DR. SUJATA CHAKLANOBIS,
Scientist G,
Head, A2K+,
CRTHD and PACE Programmes

Dr. Sujata Chaklanobis, Scientist G and Head of the A2K+ programme welcomed the guests, speakers and participants of the “Sangoshthee”. In her address, Dr. Sujata shared the vision and mandate of DSIR. She explained the efforts of the A2K+(Studies) programme in collaborating and engaging with 65 Ministries and Departments of the Govt. of India, seeking inputs on technological requirements and problem statements of their stakeholders and allied Industries. Dr. Sujata shared how efforts of the Programme Division led to the identification of 130 topics and areas of studies supporting the mandate of line Ministries aligned with the DSIR mandate of promoting indigenous research and making India an Industrial R&D hub. She highlighted the valuable inputs provided by the Department of Education. Their contribution and DSIR commitment have resulted in the awarding of five studies to premier Institutes across the Country. She introduced the PIs and Co-PIs of all four ongoing studies aimed to identify the current state of technology adoption in school curriculum, teaching and learning processes.

Dr. Sujata shared that the A2K+(Studies) Programme Division has been bringing in many incremental changes to expand the scope and outcomes of its supported projects. Interaction platform such as “Sangoshthee”, being organized by the Division, is a cornerstone of our commitment to empowering our Principal Investigators (PIs) with the tools, understanding and inspiration



needed to carry out their studies effectively. This event provides a rare occasion for Principal Investigators of the ongoing A2K+(Studies) projects on the theme 'ICT in the education system' to gain fresh perspectives, deep insights and practical knowledge directly from those who have dedicated their career to educational technology and inclusive education.

She shared with the participants that it is proposed to document the proceedings of the event and placed significant emphasis on capturing the recommendations and insights shared by experts and all the participants. These recommendations will not only improve our understanding of available ICT tools implemented across the school educational system but will also bring out suggestions for future research by academicians and Edtech startups and will guide educational boards and policy makers for devising implementation strategies.

The welcome address was followed by a quick round of Introductions of participants attending physically and online.

SESSION-I: Talk by Eminent Speakers

1. “Initiatives of CIET, and NCERT on integrating ICT with school education”



Prof. Shashi Prabha, Professor, CIET, NCERT, New Delhi

Dr. Shashi Prabha shared major digital initiatives of CIET NCERT especially the efforts during COVID-19 in interacting with the stakeholders. She provided insights into various portals and Applications developed by CIET NCERT promoting digital education like the Diksha platform (One Nation One Platform) an educational teaching and learning platform with material available for teachers as well as students. ePathshala- an application that provides access to NCERT books. Nishtha is the largest capacity-building programme for teachers pre-COVID COVID-19 around 18 lakh teachers were trained and post-COVID COVID it was transformed into an online interaction platform. Prof. Shashi mentioned how NCERT has harnessed television and radio in education with approximately 400 broadcast materials being transmitted through community radio. Dr. Shashi Prabha mentioned the creation of 6,805 video programmes in English and Hindi for students in classes 1-12 as part of this initiative. She highlighted how the Diksha portal includes e-content designed based on Universal Design for Learning (UDL) to

support children with special needs. And also shared how the DIKSHA platform has leveraged for coherent access through mobile apps etc. She spoke about NCERT's nationwide Vidya Amrit Maotsav, which celebrates innovative teaching practices by educators across the country. CIET NCERT has Vidya Samiksha Kendra introduced on 29th July 2022, collects and provides data related to all schools in the country. This data enables policymakers and administration in decision-making and future strategy. Dr. Shashi Prabha mentioned several mobile apps launched by NCERT, including the PRASHANT App, designed for the pre-assessment of special children, and to assist teachers in the initial screening of children with disabilities. The app also offers online and face-to-face training programmes and various ICT courses. She also shared that CIET has developed e-content along with Policy guidelines for Meta Data and data standards for school education, and specifications of NDEAR open standards. Prof. Shashi discussed research studies conducted to assess the effectiveness of Augmented Reality-based e-contents and evaluate ICT-based interventions. She shared details of various National and International Collaborations of CIET NCERT in terms of e-Content development and training programmes. Dr. Shashi Prabha ended her talk with the current and future strategies for implementing the National Education Policy (NEP) 2020. This includes the development of digital teachers and the launch of 200 PM eVidya DTH TV channels across India.

1. “Technology in Education-EdTech”



*Prof. T. Menem, Professor, Centre of Excellence in Teacher Education,
Tata Institute of Social Sciences, Mumbai*

Professor Menem initiated his presentation by raising a fundamental query concerning technology in education: "Are we asking the right questions?" He expanded on this notion, emphasizing that the introduction of Information and Communication Technology (ICT) in schools primarily aimed to teach and explore technology as a source of new resources. Educational technology, he stressed, is a subset of ICT, specifically employing technology for teaching and learning. However, he observed that students often have limited opportunities to utilize technology, typically confined to computer labs or self-directed learning.

In Professor Menem's view, ICT in schools is more about offering exposure to teachers and students, enabling them to grasp the vast potential of various technologies. It encompasses the art of utilizing technology for learning, communication, collaboration, and even the creation of novel educational resources and technologies.

Highlighting the rapid evolution of technology, particularly from technology

providers, he underscored the challenge of keeping pace. Consequently, he advocated for prioritizing pedagogy. He expressed concerns that ineffective pedagogy could undermine the potential of technology. Conversely, effective pedagogy, he believed, would yield significantly improved outcomes when paired with technology.

Professor Menem also explored the concept of tinkering and iterative design methodologies, emphasizing the benefits that teaching and learning can derive from such iterations. He placed particular importance on curated open educational resources and attributed the success of open education tools like GeoGebra to this approach. He urged educators to shift their focus away from consumption-oriented digital platforms and instead invest in open, interactive tools.

Touching on the complexity of the educational landscape, he encouraged teachers to engage students with these tools. He challenged the conventional question of how to integrate technology into the education process, asserting that reliance solely on best practices is inadequate. Instead, he stressed the importance of evidence-based practices over theoretical or intuitive approaches, pointing out the prevalence of untested, quantum-driven models. He emphasized the need for assessment-based questions and the pivotal role of interaction in educational technology.

Professor Menem underscored the significance of schemas in learning, describing them as mental structures that link memories, facts, and concepts into cohesive units. He highlighted the importance of technology interactions in shaping students' schemas, as well as the settings in which these interactions occur, be it in the classroom, at home, or in personalized spaces.

In this context, he commended the studies conducted under the A2K+(Studies) programme of DSIR, with a focus on ICT and its adoption in education, especially inclusive education. He viewed these studies as a step in the right direction, essential to inform design practitioners.

Concluding his presentation, Professor Menem drew a parallel between artificial intelligence (AI) and the contemporary landscape of personalized

services, likening it to "NeoMania." He explained that NeoMania represents an obsession with anything new, stemming from the belief that anything new is superior to the old, similar to a child's fascination with new toys and gadgets. He circled back to the central theme of his talk, underlining the primacy of pedagogy over technology and the value of interactive, immersive educational tools.

SESSION-II: Presentations by DSIR-supported projects under A2K+(Studies) programme

1. Integrating AI, AR, and VR in learning models and their impact



Prof. Deepak John Mathew (Principle investigator), Department of Design, IIT Hyderabad

Education has changed considerably with the advent of AI technology, which has been ingrained in today's modern societal framework. AI has been more widely utilized in education as a result of relevant research results demonstrating beneficial application impacts and assistance in the improvement of educational practices. Adaptive learning systems are intended to aid students in their learning by combining assessment, instruction, learning, and practice. With the advent of artificial intelligence (AI) in education, it is now possible to seamlessly integrate and change teaching and learning. One of the media-centric strong mediums virtual reality could be widely used for educational scenarios, especially in India. Virtual reality (VR) technology has gained significant attention in various fields, including psychology and neuroscience, due to its potential to enhance human experiences and

cognition. One area of research that has emerged is the investigation of VR-aided memory recall performance. Memory recall plays a crucial role in our daily lives, allowing us to retrieve and reconstruct past experiences, knowledge, and information. Understanding how VR can impact memory recall processes has the potential to revolutionize fields such as education, therapy, and cognitive enhancement.

The objective of research on VR-aided memory recall performance is to explore how VR technology can influence and improve various aspects of memory retrieval. By leveraging the immersive and interactive nature of VR, researchers aim to create ecologically valid and contextually rich environments that facilitate more accurate and detailed memory recall. VR interventions can recreate specific contexts, trigger emotional responses, and manipulate variables to study the impact of various factors on memory retrieval.

Moreover, VR-based memory recall interventions hold significant potential for practical applications. In education, VR can create immersive learning experiences that enhance retention and recall of educational material. In therapeutic settings, VR-assisted memory recall may aid in trauma processing, phobia treatment, or memory rehabilitation for individuals with cognitive impairments. Studies have shown promising results regarding the potential benefits of VR in memory recall. The contextual cues provided by VR environments can improve memory retrieval by reinstating the original context in which the memory was formed. Furthermore, VR can evoke emotional responses, which have been linked to enhanced memory consolidation and recall. The ability to manipulate and control variables in virtual environments allows researchers to explore the underlying mechanisms of memory recall and identify strategies for improving memory performance.

Prof. Mathew presented briefly the convenient sampling process of choosing a group of students to take part in the particular research project. He shared that the number of participants is 100 ($n = 100$) The selection criteria for participants depends on the specific objectives intended to find out Virtual Reality aided memory recall performance. Here are some common factors

considered during participant selection:

To investigate the impact of virtual reality (VR) on memory recall performance among school children, a pre-test- virtual reality intervention- post-test study design can be employed. This design allows for the assessment of memory recall abilities before and after exposure to VR interventions. Here is an outline of the methodology for conducting the study: Observation of the Pretest method, Intervention with VR content, and observation of the post-test method.

He also shared the procedure for Measurements of the test. Bloom's in its various forms represents the process of learning. The concept we adopted to validate the learning is the process of remembering is when memory is used to produce definitions, facts, or lists, or recite or retrieve material. The following key terms of remembering were studied:

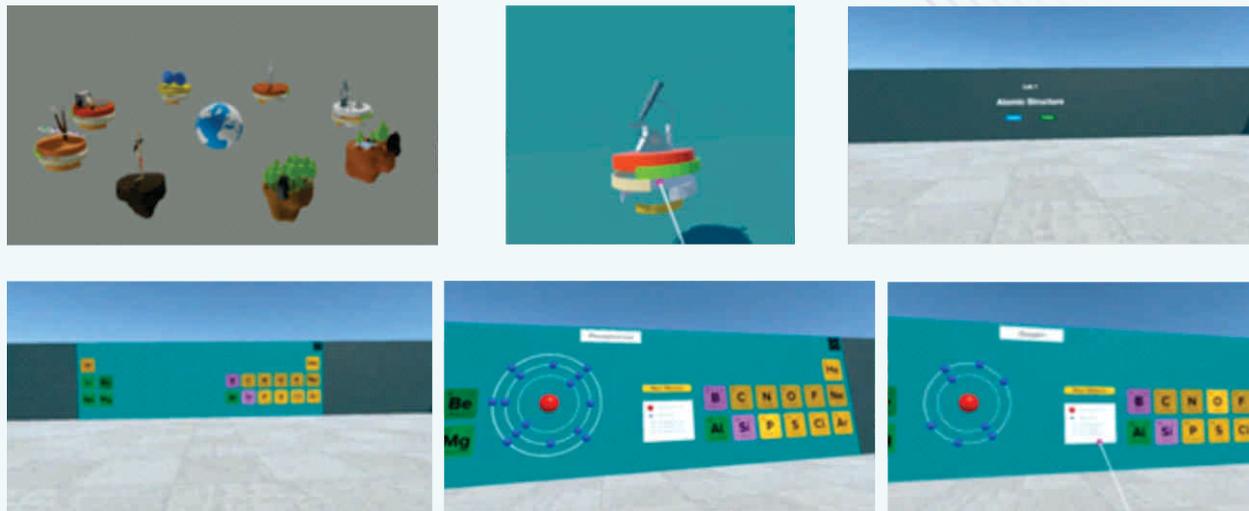
Recognizing, Listing, Describing, Identifying, Locating, and Finding. The criteria of measurement have been tested with students' mental ideation as well as their user interface recognition.

He presented that the data has been collected from 100 (n = 100) number of participants. The study focused on the retention power of the students followed by six key points of Remembering. Six key points contain twelve items. Each key point includes two items. Twelve items measure students' mode of remembering. 10 10-point rating scale is used to measure the student's performance.

Virtual reality content development

To design a virtual reality (VR) environment, the team considered several key elements and steps. First, choose a VR platform. We have selected Oculus Rift, which is a cost-effective and good-performance user base and is compatible with our intended audience. Right after we have sketched the environment on paper to develop a presumptive view. Sketching out the virtual environment consider the overall layout, structures, and objects that will exist within the virtual space. We have created a basic blueprint to guide the 3D modeling process.

Image 1: User interface visuals, Multiple views of the lesson structure



The study aims to find out the benefits of the VR-aided learning system. Following by Pre-test, intervention, and post-test methods, it was very significant that students' retention power is identical rather than the traditional teaching style.

Pre-test findings:

Followed by the traditional teaching method the survey finding shows that 56 pupils performed well in terms of memory recall performance. They scored 7-8. Among the 56 pupils, there are 14 pupils performed with a high score of 9-10. 27 pupils performed with medium scores of 4-6 and 17 people were low scorers they got 2-3.

Non-digitalized test method follows the process of the test was the oral question-answer method, writing on the blackboard and finding from the chat sheet. Overall study shows 14% of the pupils are the highest scorers and 54 % of pupils are good scorers. 27% of pupils performed medium and 17% did not perform well in this study.

Post-test findings:

After VR intervention finding indicates an overwhelming percentage of respondents. The study effectively shows that 78 pupils are well performed while using virtual reality devices, 7 pupils found eyesight difficulties while using VR devices, and 15 people found difficulties understanding and memorizing the content while using the VR devices and not well performed in

the retention (Memory) measurement test.

Among the 78 pupils, 53 people are well performed (up to 8 - 10 score) on all the items such as recognizing, listing, describing, identifying, locating, and finding. 25 pupils are finding difficulties (up to 6 - 8 score) while they are locating and finding the objects in the virtual environments.

Throughout the study, it came out that overall, 78% of pupils performed well and well in terms of memorizing the topics by experiencing VR environments.

Image 2: Pre-test and post-test session

Pre-test session



Post-test session



2. ICT tools catering to a wide range of learners, including Children with Special Needs

Dr Hareesh N Ramanathan (Principal Investigator), Associate Professor-Business Management, Cochin University of Science and Technology, Kochi, Kerala and Dr Simmy Kurian (Co-Principal Investigator), Associate Professor, CMS, Jain University (Deemed to be University), Bengaluru



The presentation started with a brief background of the theme on which the study is being conducted, wherein Dr. Hareesh said that education is one of the fundamental necessities that every child should have. No distinction should be made based on a person's degree of capacity, competence, or style of life. Children with exceptional needs should also have access to the education they deserve. The term "inclusive education" is gaining increasing recognition in the current environment. Special needs children may take a longer time to understand and cope with the school curriculum, but they cannot be left out or ignored. The educational needs of children with special needs require special emphasis so that their knowledge base, communication skills, and quality of life may improve in time. Numerous regulations and initiatives are underway to ensure children with special needs receive a high-quality education. One of the

key developments in the current educational environment is Information and Communication Technology (ICT). Researchers in the past have found that reading, spelling, writing, and math skills are improved in students using ICT, and it also offers more practical assistance for other subjects. Dr. Hareesh further added that children with special needs may see improvements in their quality of life as a result of ICT implementation. Hence, the current study intends to study the different types of ICT tools catering to children with disabilities.

The objectives of the study awarded under the A2K+ (Studies) programme are :

- I. To identify strategies and guidelines available currently for driving the adoption and usage of such ICT tools.
- ii. To identify the various ICT tools available across the country and understand the purpose of these tools
- iii. Assess the extent to which these ICT tools are integrated with the existing
- iv. curriculum
- v. To report the level of organizational support provided to facilitate the use of such tools
- vi. To gauge the extent of usage of these tools in real time by teachers and students.

Dr. Hareesh shared the preliminary results of research. Data collection from three states namely, Kerala, Goa and Haryana, have been completed and tabulated and presented along with the survey instrument used to collect data from selected special education schools in each of the four states. He shared that each school's data was captured from a triad of respondents viz, the school Principal, the special educator and the parent of the child with a disability studying in the school. The list of schools in each state was taken from the “National Institute for the Empowerment of Persons with intellectual disabilities (NIEPID)” website.

Dr. Hareesh shared the methodology being adopted for the study. The study is based on an exploratory and descriptive research design. The data obtained

from the National Institute for the Empowerment of Persons with intellectual disabilities website was used for selecting the states with the highest density of special schools. Topping the list included Kerala, Goa, Delhi and Haryana. A total of 34 schools in Kerala, 17 schools in Goa, 29 schools in Delhi, and 28 schools in Haryana were visited to collect the data. A survey questionnaire was systematically designed by covering demographic and tangible accepts relating to the availability of different kinds of ICT tools assessed through the first section of the questionnaire and the second section of the questionnaire was designed to ascertain psychological factors influencing the implementation of ICT in education.

The key aspects presented by Dr. Hareesh included findings from the preliminary analysis of the survey which covered children with hearing impairment, visual impairment, locomotor disability, intellectual disability as well as other types of disabilities. He shared that almost 90% of the sample has been so far completed and data in Kerala, Goa as well as Haryana have been cleaned and preliminary analysis completed. The preliminary analysis revealed that the infrastructure availability in the special schools in the states of Kerala and Goa was moderate only. In Kerala, 35% reported the availability of Tablets, while 38% from Goa reported the availability of the same. The usage of Desktop/laptop/ projectors was largely high with Kerala reporting 91% and Goa 70% usage. Kerala reported 50 % usage of smart TV while Goa only 41% of the respondents confirmed usage of smart TV. Availability of Smart Classrooms was reported as 31% and 24% respectively in Kerala & Goa.

The average attention span of children with disabilities on Tablet /mobile devices was reported as 21 minutes, on Desktop/laptops it was found to be 27 minutes, and on smart classrooms, it was found to be 28 minutes. Curriculum-related content was disseminated using school websites, and SCERT applications like Thenkood, Jyothirmayi, Ganitham, Majadi etc in addition to YouTube and freeware available on the web. Teachers were found to be using WhatsApp, Telegram, and social media apps like Facebook and Instagram to communicate with parents. YouTube, Pinterest, and smart educational apps were used by teachers to engage students. MS Office tools like Ms. Word, Excel,

and PowerPoint were used by teachers for preparing reports and learning content.

ICT integration with the special school curriculum was found to be relatively very high in Kerala, with 92% of the respondents reporting a 'yes' while it was found to be only 7% in Goa. An eight-dimensional curriculum framework was found to be implemented for special education in Kerala, referred to as the eight 'Naipunyams' or skills wherein ICT was embedded into the pedagogy for developing each of these skills among children with disabilities. These skills included language skills, environment awareness, mathematical ability, life skills, social skills, physical well-being, and extra-curricular activities. The survey also captured attitudinal scores on dimensions imperative for the smooth integration of ICTs into the Special school curriculum.

The Institutional dimension included institutional readiness which was found moderate in both states, institutional support was found to be moderate in Kerala and low in Goa and resource availability was found moderate in both states

Teacher-centric factors including peer and superior support were found to be moderate in both states. Technology Interaction was found to be moderate in both states. Attitude towards technology was found to be moderate in both states. Training on ICT was found to be moderate in Kerala and low in Goa. Teacher Competence was found to be moderate in both states. Dr. Hareesh in his presentation captured the grassroots level status of technology infrastructure, availability and competence of teachers, and acceptance by students and parents w.r.t to states of Kerala, Goa, and Haryana.



3. A Study of the Usability and Accessibility of Various ICT Tools related to English Language Speaking and Reading Skills of Children with Autism Spectrum Disorder (ASD)



Dr. Meenakshi Tripathi, Project Coordinator & Associate Professor, Department of Computer Science & Engineering, Malviya National Institute of Technology (MNIT) Jaipur, Rajasthan

Dr. Meenakshi Tripathi while sharing the objectives of the study highlighted importance of identifying the existing ICT tools available for children with Autism and analyzing current integration of ICT tools in enhancing English speaking & reading skills. She shared how the study employs a multi-faceted approach, combining personal interactions and questionnaire-based surveys with schools, NGOs, and professionals working in the field. The objectives encompass a thorough review of mobile applications, websites, and AR/VR devices available in the market, with the ultimate goal of recommending improvements in existing ICT tools.

The relevance of the study lies in several key aspects, including the predictable and consistent nature of ICT tools relied upon by users with ASD. Dr. Tripathi highlighted the imperative role of ICT tools in enhancing the learning process for children with Autism. The set of ICT tools used varies widely, ranging from mobile applications to websites and from desktop applications to AR/VR-based learning. Essential features to consider during the development of these tools were emphasized, taking into account accessibility, usability, and the specific needs of autistic users.

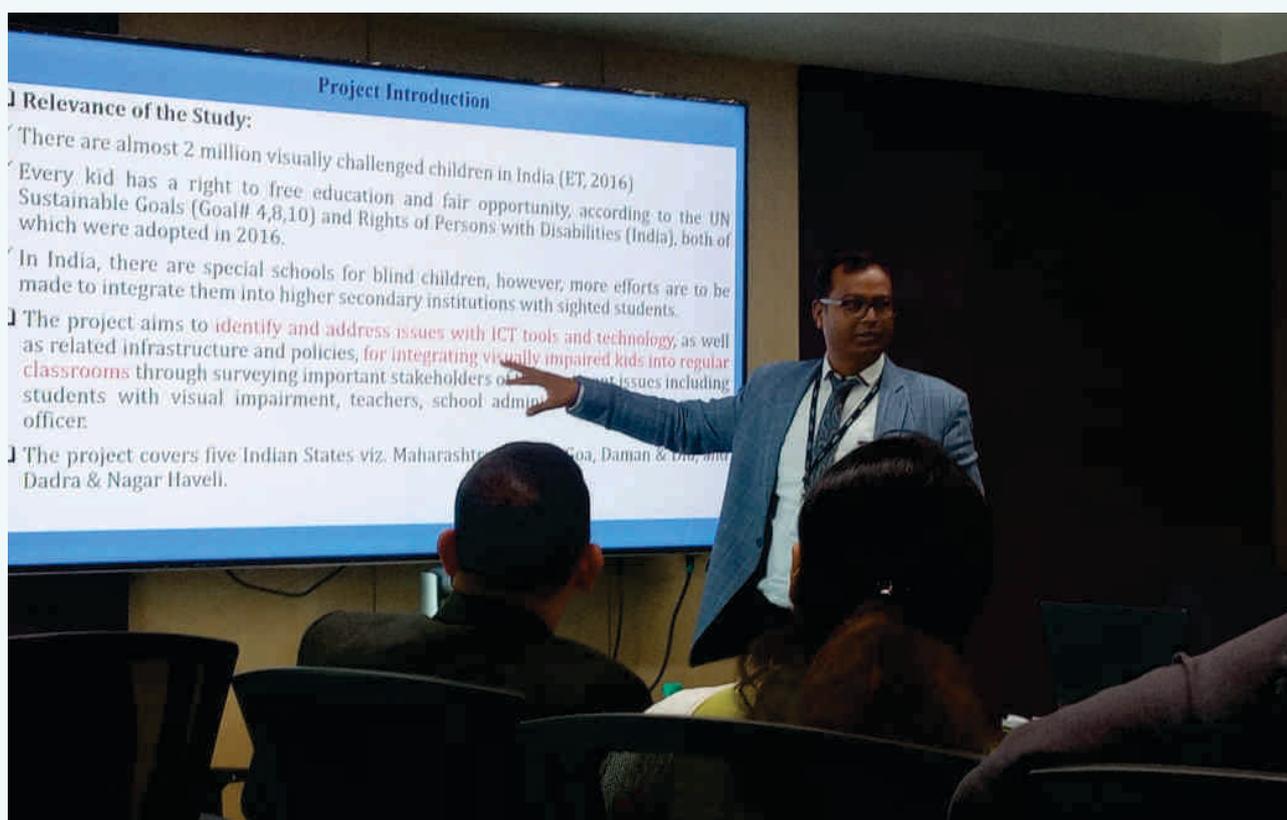
Dr. Meenakshi Tripathi stated the approach & methodology adopted for carrying out the study. She briefed about a comprehensive survey/ review of literature on various ICT tools designed from various sources to improve the learning capabilities of children with autism including Mobile applications, Websites, and AR/VR devices. She shared her experience during visits to NGOs and speech therapy centers conducted to familiarize herself with the characteristics of children with autism and to understand their requirements. In this direction visits to Umang School (Jaipur), Sunrise Learning: Special School for Persons with Autism and Other Special Needs (Noida), Shining Star Child Healthcare (Udaipur), Swar Speech and Hearing Clinic, Jaipur (Speech Pathologist), Dr. Vandana Choudhary, Child Psychologist (Jaipur) were shared.

Dr. Meenakshi briefed about the various modern ICT Tools and apps that follow a logical structure and others that are bilingual while sharing details of 10 applications having login options for teachers, 19 applications having login options for parents, and 11 applications allowing children to log in. Also, skills taught to children with autism vary across ICT Tools. She briefed that out of the 28-30 ICT Tools used, 12 are cost-effective, 13 ICT Tools engage the user with Games, 6 Tools with quizzes, and 13 tools with interactive animations. It was informed that only 3 ICT Tools take feedback from parents & teachers and 14 tools use captions while teaching Autistic children and also have readable fonts.

Dr. Meenakshi while covering the ICT tools and applications available for kids with autism, concluded her talk highlighting the limitations and challenges

associated with existing applications and stressing upon a feedback mechanism for further improvisation of each App and tool. The study serves as a foundational step towards fostering inclusive education through innovative ICT solutions.

4. A report on ICT tools catering to a wide range of learners, including children with special needs



Dr Pravin Kumar, Professor & Deputy Director, Symbiosis Institute of Management Studies, Constituent of Symbiosis International (Deemed University), Pune and Sanjay Mangla, Associate Professor, Symbiosis Institute of Management Studies, Constituent of Symbiosis International (Deemed University)

Dr. Sanjay Mangla commenced the presentation by introducing the objectives of the study conducted under the A2K+ Studies programme of DSIR. The first objective “Awareness Assessment”, aimed to explore the level of awareness regarding select ICT tools for visually impaired children among government, government-aided, and private higher secondary schools (HSS). The second objective focused on “Challenges Identification” seeking to pinpoint obstacles

in the adoption of ICT tools, including stakeholder's approaches and policy implementation gaps, for visually impaired children in government, government-aided, and private higher secondary school (HSS). The third objective aimed at identifying “Commercial Opportunities” To find commercially viable opportunities for integrating visually impaired children into HSS alongside sighted peers using ICT tools.

Dr. Mangla then proceeded to underscore the relevance and justification of the ongoing study. He highlighted that India is home to nearly 2 million visually challenged children, emphasizing the pressing need to address their educational inclusion. Connecting the study to global initiatives, he mentioned the United Nations Sustainable Development Goals (Goal# 4, 8, and 10) and the Rights of Persons with Disabilities (India), both adopted in 2016. These frameworks underscore the right to free education and equal opportunities for all, emphasizing the significance of the project.

Addressing the challenges faced by visually impaired children, Dr. Mangla listed limited access to books, the need for specialized teachers, web services, faculty sensitization, infrastructure support, and difficulties in exams. The presentation then delved into the findings of the study, identifying a range of ICT tools and technologies to aid visually impaired students. Notably, awareness of these tools was found to be higher in self-funded private schools compared to government-aided schools.

Furthermore, the study brought to light various challenges related to accessibility and ICT tools. These challenges encompassed limited access to ICT facilities in rural areas, early education in regular schools leading to social rejection, language barriers affecting career choices, varying education levels in subjects like math and graphs, and limited co-curricular activities in rural areas.

He also briefed the methodology adopted during the study encompassing study tours, one-to-one interactions with stakeholders, focus group discussions, field observations and detailed questionnaires tested and verified by experts.

Dr. Pravin and Dr. Sanjay Mangla shared that the scope and survey of the study is limited to only visually impaired kids from Maharashtra, Gujarat, Goa, Daman & Diu, and Dadra & Nagar Haveli and addresses a critical issue of integrating visually impaired students into regular classrooms using ICT tools and technology. The study identifies various challenges and shall provide recommendations to enhance the educational experience and opportunities for visually impaired children in India. Dr. Sanjay while addressing the challenges that distance VI students from taking STEM subjects, underscored the importance of awareness, sensitization, financial support, and policy implementation in achieving inclusive and equitable education for all, in line with global and national goals.

SESSION-III: Panel Discussion on “Nature of Different Disabilities and Their Learning Needs’ And “Successful ICT Integration Strategies, Identifying Gaps and Challenges In Its Adoption For School Children”.

The panel discussion focused on exploring the diverse nature of disabilities, the specific learning needs associated with them and delving into effective strategies for integrating ICT into education. The discussion aimed to identify existing gaps and challenges in implementing these strategies for the benefit of school children. Leading this insightful conversation was Dr. Sujata Chaklanobis, Scientist-'G' and Head of A2K+ at DSIR, who served as the panel chair.



Prof. Dasyam Venkateshwarlu, School of Education, IGNOU, New Delhi

The panel discussion commenced with introductory remarks from Prof. Dasyam Venkateshwarlu, representing the School of Education at IGNOU in New Delhi. Prof. Venkateshwarlu initiated the conversation by shedding light on how modern ICT tools are reshaping the educational landscape of the country.

He pointed out that the pedagogical aspect, often overlooked in recent times, is a crucial component, especially with the emphasis on inclusive setups in classroom teaching as per NEP-2020. He stressed the need to prioritize the adoption of technology to enhance educational practices. Prof. Venkateshwarlu highlighted the fact that about 70% of children attend regular classrooms, reinforcing the importance of integrating modern ICT tools. He emphasized the role of these tools in facilitating the progress of children with special needs, enabling them to access higher education opportunities. Prof. Venkateshwarlu introduced the concept of "Universal Design for Learning" with specific objectives. This approach is both unique and cost-effective, offering a versatile solution applicable to all students. He emphasized that when introducing modern ICT tools into the teaching and learning process, it's imperative to consider the needs of children with special requirements.

In conclusion, he underlined the significance of a balanced approach to successful ICT integration strategies. He urged the other panelists to join in the discussion, focusing on the identification of gaps and challenges in the adoption of these strategies for school education.



*Dr. Vinay Singh, Professor, Department of Education of Groups
with Special Needs (DEGSN), New Delhi*

Dr. Singh centered his discussion on the "Characteristics of Various Disabilities and Their Educational Requirements." He provided an overview of the National Education Policy 2020, highlighting its emphasis on fostering human values. In addition, he drew attention to Chapter 6 of the policy document, which underscores the importance of "Equitable and Inclusive Education." Dr. Singh also shed light on the specific rules and regulations outlined in the NEP-2020. He discussed about the significance of studying the nature of disabilities and the varying degrees of severity among children with special needs and health impairments, including Autism Spectrum Disorder (ASD).

He emphasized the need for "Alternative Learning Mechanisms (ALM)," which encompass approaches such as homeschooling, open schools, and home-based education. Furthermore, he stressed that modern ICT tools should be tailored to provide packaged activities, and he called for in-depth discussions on pedagogy. Dr. Singh placed strong emphasis on the importance of raising awareness and building the capacity of teachers to implement inclusive teaching methods. He pointed out that while classroom teaching methods can be diverse, the primary focus should always be on effectively educating students with special needs.

In his concluding remarks, Dr. Singh highlighted the potential of modern ICT tools in addressing the educational challenges faced by children with special needs, particularly those with Autism Spectrum Disorder (ASD).



Dr. A.K. Arya,
Associate Professor &
Head of the Department of
Extension Education,
Regional Institute of
Education, NCERT, Ajmer

Dr. Arya provided an insightful overview of the educational landscape. He discussed the involvement of Educational Boards, Kendriya Vidyalayas, and Navodaya Vidyalayas and how they are contributing to the advancement of education. He emphasized the vast scale of education in India, with approximately 25 lakh schools, 85 lakh teachers, and 26 crore students spread across the nation. He highlighted the collaborative efforts of both NCERT and numerous state bodies in addressing the unique challenges faced by children with special needs. Furthermore, he shared that all E-content have been carefully aligned with the curriculum, ensuring its relevance and applicability. Dr. Arya also noted the development of learning materials using Indian sign language, enhancing inclusivity.

Expressing his concern, Dr. Arya touched upon the critical factors of availability, accessibility, and cost analysis associated with the implementation of ICT tools. He stressed the importance of capacity building for teachers, particularly focusing on creating awareness about the needs of students with special requirements.

In conclusion, Dr. Arya reiterated the significance of addressing the challenges

faced by children with special needs, underlining the need to thoroughly examine factors such as the availability, accessibility, and adoptability of modern ICT tools, and conducting a comprehensive cost analysis to ensure their effectiveness.



Keynote Address



Chief Guest

Dr. Vasudha Kamat,

Member, NEP Draft Committee
Former VC, SNDT Women's University,
Mumbai
Integrating ICT in teaching, learning,
and assessment at School Education

Dr. Vasudha Kamath, former Vice-Chancellor of SNDT Women's University, Mumbai, delivered a compelling presentation on "Integrating ICT in Teaching, Learning & Assessment at School Education." In her introduction, she underscored the significance of technology in the classroom, quoting David Walick's statement that "Technology is needed in every classroom and every student and teacher's hand, as it is the pen and paper of our time and the lens through which we experience much of our world." She emphasized that while technology is invaluable, teaching and learning should not be solely driven by it, in alignment with UNSECO-2022 guidelines.

Dr. Kamath emphasized the transformative potential of Educational Technology in several thrust areas, including enhancing educational access, streamlining educational planning, management, and administration, supporting teacher preparation and professional development and improving the teaching and learning evaluation process. She envisioned that emerging technologies such as Artificial Intelligence, Machine Learning, Blockchains, Smart Boards, Handheld Computing Devices, Adaptive Computer Testing, and educational software and hardware are not only changing "what" learners will learn, but also "how" they will learn.

She stated that the integration of modern ICT technology in school education aims to achieve several objectives like :

1. Providing Learner-Centered Education
2. Increasing the Effectiveness and Efficiency of the Learning Process
3. Providing Access to Open Educational Resources (OER) for All Learners
4. Instilling a Collaborative and Cooperative Learning Spirit
5. Empowering Students for Self-Directed Learning

Dr. Kamath also elaborated on the utilization of online teaching platforms and tools, content creation, digital repositories, dissemination and the implementation of virtual laboratories. She highlighted the UNESCO ICT Competency Framework for teachers, which encompasses three levels of knowledge namely, Knowledge Acquisition, Knowledge Deepening and Knowledge Creation. Moreover, she emphasized the importance of ICT in promoting inclusive education, focusing on areas such as language and culture, gender equality, persons with disabilities and ability.

In the context of the National Education Policy (NEP) 2020, she discussed digital learning competencies that enhance leadership, professional growth and curriculum focus. She also provided insights into Open Educational Resources (OER) as outlined in the NEP-2020, covering learning repositories, podcasts, music, open textbooks, videos, images, libraries, games, Massive Open Online Courses (MOOCs), accreditation assessment learning objects and more.

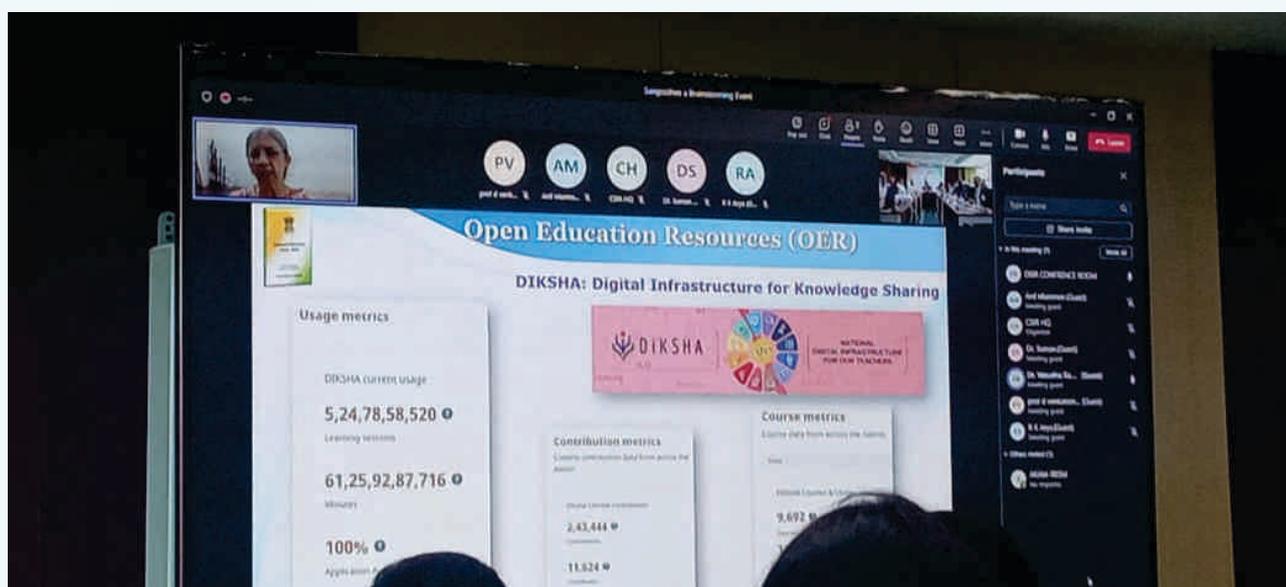
Dr. Kamath shed light on "DIKSHA" (Digital Infrastructure for Knowledge Sharing) and elucidated its usage metrics, contribution metrics, and course metrics. She mentioned SNT Women's University's partnership with OER University, aimed at reducing the cost of education to a mere 15% of its current expenditure. She highlighted the "International Online Mentoring Programme" on open technologies for OER and open learning, conducted by the University of Nova Gorica, Slovenia, and JOZEF Stefan Institute. This programme fosters collaboration between new developers of educational materials and expert mentors. Its overarching goal is to harness the potential of open education to achieve UN Sustainable Development Goals.

Dr. Kamath underscored the substantial participation of Indian mentors, experts, and developers in this programme. She also touched upon the concept of "User-Generated Content (UGC)" and its significance, exemplified by platforms like Google Earth, Google Chrome, Gmail, Google News, Google Voice, iGoogle, YouTube, and more. The presentation further included information about the top 100 ICT tools for teaching and learning, encompassing tools for personal learning, educational tools, and tools for workplace learning. Notable tools included Google, YouTube, Zoom, Vimeo, Padlet, Flipgrid, TED, OneNote, Quizlet, Powtoon, and Kanoot. Dr. Kamath emphasized the need to harness technology for playful, personalized learning using Augmented Reality (AR), Artificial Intelligence (AI), and devices like Alexa.

In conclusion, Dr. Kamath advocated for two crucial areas of exploration:

1. Supporting the Open Education and OER Movement for the Development of OER at the School Level
2. Establishing Low-Cost Computer Labs in 100 Elementary Schools, Experimenting with Raspberry Pi or Orange Pi, or Similar Low-Cost Technologies, to Assess Their Effectiveness for Learning.

Her presentation offered a comprehensive overview of the transformative potential of ICT in education and emphasized the importance of open, accessible resources and innovative learning environments.



Dr. Sujata Chaklanobis, Scientist – 'G' and Head of A2K+ programme, shared her closing remarks, reflecting on the vibrant and enlightening discussions during the event, featuring presentations by experts and principal investigators. She highlighted the valuable insights provided by Prof. Vasudha Kamath, noting that her lectures consistently offer meaningful takeaways.

Dr. Sujata commended Prof. Kamath's discussion on Open Education Resources (OER), a relatively new concept in India compared to its prevalence in the West. She also expressed her admiration for the impressive data presented by Indian OER Mentors. During her remarks, Dr. Sujata emphasized key points raised by the speakers, particularly focusing on the various courses offered by OER University, which are not only free but also a commendable initiative, as previously acknowledged by Prof. Vasudha Kamat. She also shed light on OER courses provided by the "Capacity Building Commission" through iGOT.

Dr. Sujata lauded Dr. Kamat's perspective on online mentoring programmes, which she viewed as a vital and forward-looking concept. She drew parallels between this modern approach and the traditional Guru-Shishya Parampara, recognizing the evolving nature of education and mentorship. Additionally, she delved into the concepts introduced by Dr. Sugata Mitra and recounted the intriguing "Hole in a Wall" project. Dr. Sujata encouraged the august gathering to consider following exemplary work, examples, experiments, or case studies of such distinguished individuals.



In conclusion, Dr. Sujata expressed her pleasure at having the opportunity to interact with and learn from various experts in the field of education who have made significant contributions. Her closing remarks encapsulated the spirit of the event, celebrating innovation and excellence in education.

The workshop culminated with a vote of thanks offered by Dr. Vandana Kalia, Scientist F, and Member Secretary of the A2K+(Studies) programme of DSIR. Dr. Vandana expressed her sincere gratitude to all the distinguished speakers and experts who generously shared their knowledge and insights. She further extended her appreciation to the participants, the dedicated team members of the A2K+ programme, the DSIR administration, and the CSIR NIC team for their active engagement, unwavering support and valuable contributions. Dr. Vandana emphasized the importance of the event's proceedings, noting that they will serve as a valuable resource for researchers, policymakers, and educators alike, providing a repository of knowledge and ideas generated during this workshop and concluding with calls for continued collaborations and progress under the A2K+ studies programme.



Suggestions / Recommendations of Sangoshthee:

1. **Capacity Building Workshops:** The need for capacity-building workshops that bring together experts from various domains for collaborative deliberations was highly appreciated and stressed by all Principal Investigators of the A2K+ Studies project who participated in the event.
2. **Universal Design in Curriculum:** Curriculum design, including the integration of various ICT tools, should prioritize universal design principles to make learning more inclusive, ensuring that no student is left behind.
3. **Early Detection and Intervention:** There is an importance of early detection and intervention for specific disabilities to facilitate the holistic development of children with disabilities.
4. **Affordable Technologies for the Visually Impaired:** need for low-cost, affordable, and indigenous technologies and products specifically designed for visually impaired children to enable scalable implementation.
5. **AR Tools in STEM:** Recognize the potential in developing Augmented Reality (AR) tools in the fields of Science, Technology, Engineering, and Mathematics (STEM), emphasizing the importance of public-private partnerships to harness this potential.
6. **Transition to Inclusive Education:** Advocate for a shift from special schools to inclusive education, with a strong focus on pedagogy alongside ICT tools, as pedagogy plays a pivotal role in ensuring effective inclusive education.
7. **Vernacular Language Integration:** Stress the importance of ICT tools being available in vernacular languages, and propose the harnessing of Artificial Intelligence (AI) for language tools to bridge language barriers.
8. **Feedback Mechanisms:** Recommend that all education-related ICT tools or applications should incorporate feedback mechanisms from educators

and learners to continuously improve their effectiveness and usability.

9. **Strengthening Regulatory Framework:** Acknowledge the strength of the regulatory framework for empowering People with Disabilities (PwD) in India but highlight the challenge of implementation, calling for measures to address this issue effectively.
10. **Awareness and Capacity Building:** There is a need for awareness and capacity building among educators and parents regarding the availability and application of ICT tools in school education to ensure their effective use.
11. **Partnerships with Scientists:** it is important to recognize the vast potential for partnership and collaboration between educators and scientists in the development of need-based Mixed Reality (MR) and Virtual Reality (VR) tools for children with disabilities.
12. **Open Access and Public-Private Partnership:** Address the cost barrier associated with assessing e-content by advocating for the development and promotion of open-access tools. Encourage increased Public-Private Partnership (PPP) initiatives with government support to make these tools more accessible.
13. **Experts highly recommend prioritizing the availability, accessibility, and affordability of all Ed Tech tools to effectively enhance capacity-building programmes for educators and students nationwide.**

Annexure I: List of Participants

1. Dr. Vasudha Kamat, Former Vice Chancellor, SNDT Women's University, Mumbai
2. Dr. Shashi Prabha, Professor, CIET, NCERT, New Delhi
3. Dr. Vinay Singh, Dept. of Education of Groups with Special Needs, NCERT, New Delhi
4. Prof. Dasyam Venkateshwarlu, School of Education, IGNOU, New Delhi
5. Dr. AK Arya, Chairman, Education Training Division, Regional Institute of Education, Ajmer
6. Prof. Anil Mammen, Centre of Excellence in Teacher Education, Tata Institute of Social Sciences, Mumbai
7. Prof. Deepak John Mathew, Professor, IIT Hyderabad
8. Dr. Hareesh N. Ramanathan, Professor, CUSAT, Cochin
9. Dr. Simmy Kurain, Associate Professor, Jain University Kochi
10. Dr. Sanjay Kumar Mangla, Associate Professor, SIMS, Pune
11. Dr. Meenakshi Tripathi, Associate Professor, MNIT, Jaipur
12. Prof. Praveen Kumar, Professor, SIMS, Pune
13. Dr. Sujata Chaklanobis, Scientist-G & Head-A2K+, DSIR, New Delhi
14. Dr. Vipin C. Shukla, Scientist-G, DSIR, New Delhi
15. Dr. Vandana Kalia, Scientist-F, DSIR, New Delhi
16. Dr. M.S. Shashi Kumar, Scientist-E, DSIR, New Delhi
17. Dr. Ranjeet Bairwa, Scientist-E, DSIR, New Delhi
18. Dr. Suman Mazumdar, Scientist-E, DSIR, New Delhi
19. Shri Rajesh Pathak, DSIR, New Delhi
20. Shri D Naveen Chand, DSIR, New Delhi
21. Smt. Saroj, DSIR, New Delhi

SCHEDULE

Time (Hrs.)	Event	Resource Person
10:00 – 10:15	Welcome address & Keynote on DSIR, A2K+ Scheme	Dr. Sujata Chaklanobis, Scientist G and Head A2K+ DSIR
10.15-10:30	About “Sangoshthee”	Dr. Vandana Kalia, Scientist “F” & Member Secretary, A2K+ (Studies) scheme
10.30-10:45	Initiative of CIET, NCERT on integrating ICT with school education	Dr. Shashi Prabha, Professor, CIET, NCERT
10:45-11:00	K-12 edtech	Prof. Anil Mammen, Centre of Excellence in Teacher Education, Tata Institute of Social Sciences, Mumbai
<i>Tea Break</i>		
Presentations- DSIR supported projects under A2K+ Study sub-scheme		
11.10-11:20	Developing and transforming education through cutting edge technologies-AI, VR and ML	Prof. Deepak John Mathew, IIT Hyderabad
11:20-11:50	ICT tools catering to a wide range of learners, including Children with Special Needs	01. Dr. Hareesh N Ramanathan, Cochin University of Science & Technology, Kochi 02. Dr. Meenakshi Tripathi, Associate Professor, MNIT Jaipur 03. Prof. Praveen Kumar, SIMS, Pune
Panel Discussion		
11:50-12:35	Nature of different disabilities, their learning needs	Prof. Vinay Singh, Department of Education of Groups with Special Needs (DEGSN), New Delhi
	Successful ICT integration strategies, identifying gaps and challenges in its adoption for school education	Prof. Dasyam Venkateshwarlu, School of Education, IGNOU, New Delhi Dr. A.K. Arya, Head, Department of Extension Education (DEE) Regional Institute of Education NCERT, Ajmer
12.35-12:50	Address by Guest of Honour	Dr. Vasudha Kamat, Former VC, SNDT Women’s University, Mumbai
12:50-12:55	Closing Remarks & key takeaway from the meet	Dr. Sujata Chaklanobis, Scientist G and Head A2K+ DSIR
12:55-13:00	Vote of Thanks	Dr. Vandana Kalia, Scientist F, Member Secretary A2K+ Studies, DSIR

Proceed for Lunch

ABOUT DSIR

The Department of Scientific and Industrial Research (DSIR), under the aegis of the Ministry of Science and Technology, GoI was set up through a Presidential Notification, dated 4th January 1985. The mandate of DSIR is to promote industrial research for indigenous technology development, promotion, utilization, and transfer.

DSIR undertakes programmes to facilitate R&D in the industry, supports industrial units in developing state-of-the-art competitive technologies, provides an enabling framework for commercialization of laboratory-scale R&D, augments technology transfer capabilities, enhances the share of technology-intensive exports in overall exports of the country, strengthen industrial consultancy and establishes a user-friendly information network to facilitate scientific and industrial research in the industry, science research foundations, and public funded organizations/ institutes. DSIR has two public sector enterprises, the National Research Development Corporation (NRDC) and Central Electronics Ltd (CEL), and one autonomous organization, the Council for Scientific and Industrial Research (CSIR). The Department also provides host facilities and assistance to a regional institution of the United Nations Economic and Social Commission for Asia and Pacific (UN-ESCAP), and the Asian and Pacific Centre for Transfer of Technology (APCTT).

ACCESS TO KNOWLEDGE FOR TECHNOLOGY DEVELOPMENT AND DISSEMINATION (A2K+ STUDIES)

The “Studies” programme, under the Access to Knowledge for Technology Development and Dissemination (A2K+) programme of the Department of Scientific and Industrial Research (DSIR), Ministry of Science and Technology, Government of India, undertakes study & analysis of developments in the emerging technology areas and documents the findings, learnings, and outcomes for wider dissemination. It intends to provide useful information and a knowledge base to industry, industry associations, academia, research institutions, consultants, entrepreneurs, research students, and policymakers for doing any further work in these areas.

Additionally, the programme supports the preparation of status reports on technologies from publicly funded institutions that are ready for commercialization to catalyze the translation of research output from institutions to the market while promoting partnerships between key stakeholders.

A2K+ (Studies) Programme

- Supports studies in emerging & current areas of technology
- Formulation of suggestive forecast models based on ML and AI technologies to support businesses and research
- Develop technology platforms that can be the access point of information for stakeholders

Scope of the studies supported by DSIR under the A2K+(Studies) programme:

- A go-to solution for stakeholders towards future research and commercialization strategy based on current national and global scenarios.
- The studies prepare status reports and capture, elaborate, review, and analyze various developments in emerging technology domains.



Department of Scientific & Industrial Research (DSIR)
Ministry of Science and Technology
Government of India

PRESENTS

SANGOSHTEE

संगोष्ठी

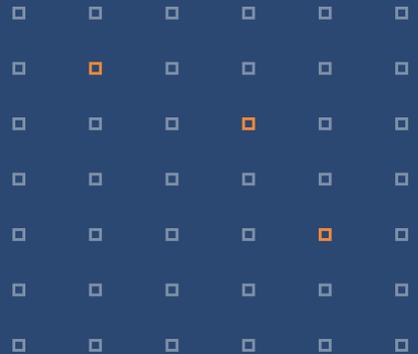
A Brainstorming Event
on “*ICT Tools for School Education*
Current Status & Emerging Trends”

6 SEPTEMBER
2023
10:00 AM



Room No 513
Technology Bhawan,
DSIR, MoST

Organized By
DSIR - A2K+(Studies) Programme
Department of Scientific & Industrial Research (DSIR)
Technology Bhawan, New Mehrauli Road



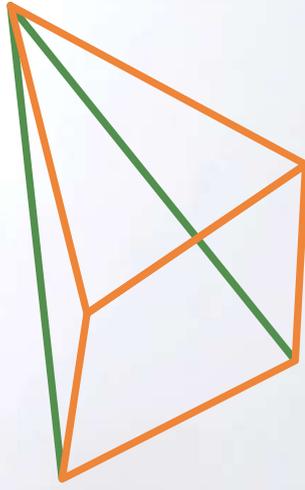
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Access to Knowledge for Technology Development and Dissemination A2K+(Studies)

The “Studies” programme, under Access to Knowledge for Technology Development and Dissemination (A2K+) scheme of the Department of Scientific and Industrial Research (DSIR), Ministry of Science and Technology, Government of India, undertakes study & analysis of developments in the emerging technology areas, and documents the findings, learnings and outcomes for wider dissemination. It intends to provide useful information and knowledge base to industry, industry associations, academia, research institutions, consultants, entrepreneurs, research students and policy makers for doing any further work in these areas.

Additionally, the programme supports preparation of status reports on technologies from public funded institutions that are ready for commercialization with a view to catalyse the translation of research output from institutions to the market, while promoting partnerships between key stakeholders.

Support to Studies (A2K+) Scheme

- Supports studies in emerging & current areas of technology.
- Formulation of suggestive forecast models based on ML and AI technologies to support businesses and research.
- Develops technology platforms that can be access point of information for stakeholders.

Scope of the studies supported by DSIR under Studies (A2K+) Scheme:

- A go-to solution for stakeholders towards future research and commercialization strategy based on current national and global scenario.
- The studies prepare status reports and capture, elaborates, reviews and analyses various developments in emerging technology domains.

Studies on Emerging ICT Tools and their Adoption in Education

The status of education in India is marked by both achievements and challenges. On one hand, India has made significant progress in terms of increasing access to education and enrolling more children in schools. However, the quality of education remains a concern, with persistent issues like inadequate infrastructure, poor engagement in studies, and lack of resources. With the broad introduction of new digital technologies in the field of education, we are presented with great possibilities to initiate new pedagogical approaches apt to meet the overgrowing demands of the modern information society.

With this background DSIR is supporting five studies that intends to understand the current status of availability of various such ICT tools catering to all types of learners, including students with special needs, and ascertain the extent of use of these tools. Using a stepwise approach, these studies would help the researcher to identify gaps and address them, support educational leaders and policymakers to take leads on improvised policy directions and scalable implementation of available tools. Following four studies have been supported by DSIR on the broad area of adoption of ICT tools in school education, under the A2K+(Studies) programme :

1. IIT Hyderabad - Study on Integrating AI, AR and VR in learning models and their impact.
2. Cochin University of Science and Technology, Kochi, Kerala: A report on ICT tools catering to a wide range of learners, including children with special needs with focus on schools in Haryana, Delhi, Goa and Kerala.
3. Symbiosis Institute of Management Studies, Constituent of Symbiosis International, Khadki, Pune: A report on ICT tools catering to a wide range of learners, including children with special needs with focus on western region in India which consists of Maharashtra, Gujarat, Goa and Dadra and Nagar Havelli and Daman and Diu.
4. Malaviya National Institute of Technology, Jaipur: A Study of the Usability and Accessibility of Various ICT Tools related to English Language Speaking and Reading Skills of Children with Autism Spectrum Disorder (ASD)



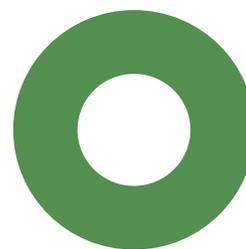
About The Event

The “Sangoshthee” is dedicated to connecting multiple stakeholders and Implementing Agencies of A2K+ awarded studies. The Event will gather experts from diverse fields to share their valuable insights and knowledge, facilitating a comprehensive and informed discussion. The event will focus on various initiatives by Government of India (GoI) and academic organizations in transforming education, and integration of ICT in teaching practices, to cater to diverse learning styles and improve learning outcomes. The discussions will also focus on the challenges faced in implementing ICT tools for learning, with special attention on ways which can ensure inclusivity of students with special needs.

These in-depth discussions among stakeholders will strengthen engagement and bring forward the potential solutions and opportunities. Additionally, the event aims to increase the awareness and capacity of Project Investigators (PIs) to maximize the impact & outcome of ongoing studies awarded under A2K+ (Studies) programme. These multi-stakeholder consultations will facilitate in drafting recommendations, which will strengthen the ongoing reports under the theme. These reports prepared under A2K+ (Studies) program will be shared with stakeholders for wider dissemination and adoption of recommendations. The reports target private and government schools, educators, researchers, policy makers, social organizations and academic bodies & boards.



SCHEDULE



Time (Hrs.)	Event	Resource Person
10.00-10:15	Welcome address & Keynote on DSIR , A2K+ Scheme	Dr. Sujata Chaklanobis, Scientist G and Head A2K+ DSIR
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10:45-11:00	K-12 edtech	Prof. Anil Mammen, Centre of Excellence in Teacher Education, Tata Institute of Social Sciences Mumbai
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Presentations- DSIR Supported Projects under A2K+ Study Sub-Scheme		
11.10-11:20	Developing and transforming education through cutting edge technologies-AI,VR and ML	Prof. Deepak John Mathew, IIT Hyderabad
11:20-11:50	ICT tools catering to a wide range of learners, including Children with Special Needs	Dr. Hareesh N Ramanathan, Cochin University of Science & Technology, Kochi Dr. Meenakshi Tripathi, Associate Professor, MNIT Jaipur Prof. Praveen Kumar, SIMS, Pune
Panel Discussion		
11:50-12:35	Nature of different disabilities, their learning needs	Prof. Vinay Singh, Department of Education of Groups with Special Needs, New Delhi
	Successful ICT integration strategies, identifying gaps and challenges in its adoption for school education	Prof. Dasyam Venkateshwarlu, School of Education, IGNOU, New Delhi Dr. A.K. Arya, Chairman, Education Training Division, Regional Institute of Education, Ajmer Expert from Ministry of Education
12.35-12:50	Address by Guest of Honour	Dr. Vasudha Kamat, Former VC, SNDT Women's University, Mumbai
12:50-12:55	Closing Remarks & key takeaway from the meet	Dr. Sujata Chaklanobis, Scientist G and Head A2K+ DSIR
12:55-13:00	Vote of Thanks	Dr. Vandana Kalia, Scientist F, Member Secretary A2K+ Studies, DSIR

Proceed for Lunch

OBJECTIVES OF THE EVENT

- **Explore Innovative Educational Technologies:** Delve into the potential of augmented reality (AR), virtual reality (VR), mixed reality (MR) and other cutting edge technologies to revolutionize education landscape.
- **Academia-Education Board Collaboration:** To foster stronger ties between academia and policy makers in promoting knowledge exchange and implementation of innovations at grass root level.
- **Promote Research and Development:** Identify gaps and obstacles within the education system that requires Science, Technology and Innovation (STI) interventions to drive positive change.
- **Networking:** Provide a platform for networking among, researcher, academia, social organizations, education boards and government bodies fostering potential collaborations and partnerships.
- **Dissemination:** To share insights and knowledge about latest trends and advancements in ICT tools that may be implemented at educator and student level.
- **Engage in Methodology Dialogues:** Facilitate in-depth discussions surrounding various methodologies, allowing participants to explore diverse approaches to educational advancement.
- **Foster Experience Exchange:** Cultivate an environment for participants to share their experiences, successes and challenges, promoting mutual learning and growth.

About DSIR

The Department of Scientific and Industrial Research (DSIR), under the aegis of the Ministry of Science and Technology, GoI was set up through a Presidential Notification, dated 4th January, 1985. The mandate of DSIR is to promote industrial research for indigenous technology development, promotion, utilization and transfer. DSIR undertakes programmes to facilitate R&D in the industry, supports industrial units develop state-of-the-art competitive technologies, provides an enabling framework for commercialization of laboratory-scale R&D, augments technology transfer capabilities, enhances the share of technology intensive exports in overall exports of the country, strengthen industrial consultancy and establishes a user-friendly information network to facilitate scientific and industrial research in the industry, science research foundations and public funded organizations/ institutes. DSIR has two public sector enterprises, National Research Development Corporation (NRDC) and Central Electronics Ltd (CEL) and one autonomous organization, Council for Scientific and Industrial Research (CSIR). The Department also provides host facilities and assistance to a regional institution of the United Nations Economic and Social Commission for Asia and Pacific (UN-ESCAP), Asian and Pacific Centre for Transfer of Technology (APCTT).



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VISIT

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Department of Scientific & Industrial Research (DSIR)
Ministry of Science and Technology
Government of India

PRESENTS

SANGOSHTEE

संगोष्ठी

A Brainstorming Event
on "*ICT Tools for School Education*
Current Status & Emerging Trends"

6 SEPTEMBER
2023
10:00 AM



Room No 513,
Technology Bhawan,
DSIR, MoST

Organized By _____
DSIR - A2K+(Studies) Programme
Department of Scientific & Industrial Research (DSIR)
Technology Bhawan, New Mehrauli Road

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Partners

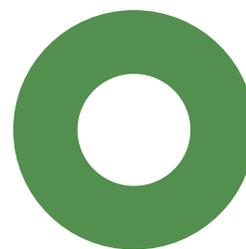


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भारतीय प्रौद्योगिकी संस्थान हैदराबाद
Indian Institute of Technology Hyderabad



संघ संस्थान
SYMBIOSIS INSTITUTE OF
MANAGEMENT STUDIES

SCHEDULE



Time (Hrs.)	Event	Resource Person
10.00-10:15	Welcome address & Keynote on DSIR , A2K+ Scheme	Dr. Sujata Chaklanobis, Scientist G and Head A2K+ DSIR
10.15-10:30	About "Sangoshthee"	Dr. Vandana Kalia, Scientist "F" & Member Secretary A2K+(Studies) scheme
10.30-10:45	Initiatives of CIET, NCERT on integrating ICT with School Education	Dr. Shashi Prabha, Professor, CIET, NCERT
10:45-11:00	K-12 edtech	Prof. Anil Mammen, Centre of Excellence in Teacher Education, Tata Institute of Social Sciences Mumbai
Tea Break		
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