DEEP–C

DELHI EFFECTIVE EDUCATION & PEDAGOGY CLUSTER

# DEEP-C Newsletter

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*Editorial*

## Changing Landscape of Education in the wake of COVID-19

By *Prof. L.S.Shashidhara*

*Professor & Dean, Ashoka University*

Education is a basic human right as per Article 26.2 of the United Nation's Universal Declaration of Human Rights (UDHR) which stipulates the role of educators in achieving the social order called for by the declaration that "Education shall be directed to the full development of the human personality and to the strengthening of respect for human rights and fundamental freedoms." Article 21-A of the Indian Constitution guarantees free and compulsory education to all children in the age group of 6 to 14 years.

COVID-19 has disrupted functionality in many sectors of human endeavor and one of the major areas impacted by the pandemic has been education. Although technology has provided much needed support during these testing times, its impact has been less ubiquitous. Recent surveys conducted by various governmental and non-governmental organizations (such as Azim Premji University and ASER (Annual Status of Education Report) Centre) have estimated the learning losses during and post-pandemic and the statistics are staggering. A significant learning loss has been seen in the reading, writing and arithmetic abilities of young learners. There has also been a shift from the private to government schools due to resource constraints within families.

The unequivocal reliance on an online education system requires integration of teaching philosophy, objectives, subject matter, student demographics along with balancing of the mode of delivery to keep it simpler and more engaging. This is coming as a challenge for most teachers as well as students. It has been also reported in these surveys that students belonging to EWS (Economically Weaker Section), disadvantaged, and PwD (persons with disabilities) categories have suffered more severe learning losses due to the online system of education. In order to bridge this gap, a concerted effort is required by the government bodies, school administrations, teacher

training institutions as well as start-ups with entrepreneurial mindsets in order to promote quality education at all costs. New initiatives, such as artificial intelligence (AI) and machine learning (ML), coding, blended learning, and game-based learning can accelerate the transformation of Indian school education resulting in better learning outcomes and preparation of a more creative and skilled workforce for the future as envisaged in NEP-2020.

DEEP-C (Delhi Effective Education & Pedagogy Cluster) is a step forward in this direction with the major objective of supporting teachers in their professional growth and development to adapt to the newer challenges in teaching and learning in the post-pandemic era through its many other activities and projects. This is the first issue of DEEP-C's newsletter which aims at showcasing all the efforts and initiatives undertaken by DEEP-C to address the teaching-learning gaps and educational problems in the city of Delhi-NCR.

## The Changing Face of Education Today

*By Dr. Nandita Narayanasamy*

*Sri Venkateswara College, Delhi University*

I have been in the field of education since 1990 and as I look back, it is very clear that the definition of the words 'Effective Education' needs a serious rethink. In the 90's, teachers held the advantage of having better access to information as compared to the students. This began to change marginally in the late 2000's when the internet became more easily available, and today a student can access all information at the click of a button. They have in fact grown up with this information technology and are very often more computer- and technology-savvy than their teachers and mentors. In the past 2 years, thanks to the Covid pandemic, the situation has changed radically and teaching has shifted to a predominantly online platform.

For an educator, disseminating information is now only a secondary requirement. We need to be able to help and assist students sieve through the information overload that they are exposed to, and effectively segregate the chaff from the grain. This is only going to be possible if we as educators are able to connect with students at the level where we can get across to them, and communicate in a language they comprehend and respect. So, we as educators need to observe, listen, and gauge the needs of the students. In the Indian context, especially in a government funded institution, the variety of students we are exposed to is huge. Hence, we have to improvise and adapt to different levels to be able to be effective educators.

Also, the students of today have grown up with abundant short timed audio-visual entertainment and hence, if we need to grab their attention, we need to be able to deliver content in short, crisp, interactive and exciting modules.

The word education itself is all-encompassing- more so today when the lines defining a disciple are blurring. Not only this, literally the world is visible on the various social media platforms and today's students are not only well informed with interdisciplinary opinions but are also fairly global in their outlook.

Given this scenario, our approach to making education effective needs a complete overhaul.

The 2 workshops I attended at DEEP-C (one on Air Pollution and the other on Public Health) were able to help me understand the changes that we need to bring about in our approach to education.

My take home from this is that we need to innovate and improvise our still-relevant ‘chalk and talk’ lectures with the various tools that technology has given us, so that learning becomes pertinent, interactive and enjoyable. We need to design assignments and interactive sessions that enable students to observe, analyze and hone their problem-solving skills. These modules should make them use concepts of different disciplines to arrive at solutions.

The positive outcome of being forced into an online teaching platform is that the teachers apprehensive of the online mode of education have adapted and learnt to work better with technology. Another outcome has been that students actually now appreciate the value of a traditional chalk and talk class.

The way forward, as I see it, is to adopt the hybrid or blended mode of instruction. The online platform is not bound by a time table or the paucity of space. Hence using this mode for small group interactive sessions scheduled to the convenience of the teacher and students will enable better one-on-one interaction with students. Assignments, interactive quizzes and presentations can also move to the online platform, allowing for flexibility in time and space. However, I still believe that at least 60% has to be in face-to-face contact to enable hands-on experimentation and interaction that are required for developing a student's communication skills. Of course, use of audiovisual aids needs to improve even in offline interactions.

One of the learning outcomes for me from attending these 2 workshops has been to understand the importance of different teaching and research based pedagogical tools. Many of us had probably been using such tools earlier also, but these workshops helped me understand how to innovate and improvise and blend both the online and offline instructional tools to achieve better learning outcomes for the students. Inquiry based learning is one tool that really impressed me as this shifts the onus on to a student and they can learn to suit their capacity. The focus should be that the teaching and learning process become bidirectional, such that the student can follow their only learning trajectory with guidance of the teacher. This will make the student more responsible towards their learning outcomes. Also in such a platform of education redressal, the teacher very often learns from the experience and gets a better perspective of the student’s needs.

I am looking forward to attending some more sessions organized here and am excited to implement some of the tools learnt in the coming teaching session.

**Making Education AI/ML Ready- A Report**

*By Dr. Astha Saxena*
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AI has been widely recognised as the fuel for the future of the digital economy in India. Therefore, there is a compelling need to train youth in AI/ML so that they can both participate in global markets as well as solve the pressing problems plaguing society at large. The National Education Policy (NEP-2020) also emphasises upon skill-based education and vocationalisation in education so as to create a workforce skilled at operating future technologies. Present and upcoming students are growing up in Artificial Intelligence and Machine-Learning influenced environments. Al/ML is providing multi-faceted solutions to various scientific, social, environmental, political and global level problems, increasing the need for its integration into our school and college curriculums across different subjects where it could be used to analyse data by drawing observations and identifying patterns.

Keeping in view the need for the integration of AI/ML in the school curriculum as envisaged by NEP-2020, a workshop was planned by the Delhi Knowledge Cluster, managed by DRIIV, under the Office of the Principal Scientific Advisor (PSA) to the Government of India. The workshop aimed at training teachers in the foundational methods that enable exploration of AI and Big Data; enable format, query, visualisation of data using R; creating opportunities for interactions with role models among global AI experts; and establishing a network of trainers to build capacity in India. The core instructors of the workshop- Dr. Gitanjali Yadav, NIPGR, New Delhi and Dr. Tavpritesh Sethi, IIIT, Delhi- introduced and explained the importance of R in data sciences and also stressed on the need for teachers of various subject backgrounds to learn R. A hands-on session on *"Interacting with R; Package Vignettes & Seeking Help"* was conducted by Dr. Tavpritesh Sethi from IIIT Delhi, who is ably using data sciences in the healthcare domain. He shared some interesting examples on how AI/ML is helping health scientists and biologists worldwide to predict patterns and solve problems. Dr. Gitanjali Yadav explained about Machine Learning and its systems by giving examples. She stressed upon the selection and training of learning algorithms with data and the things that can go wrong with 'bad algorithms' and 'bad data'. She threw light on flavours of machine learning (Concept Learning, Clustering Algorithms, Connectionist Algorithm, Genetic Algorithms, Explanation-based Learning, Transformation-based Learning, Reinforcement Learning, Case -based learning, Macro Learning, Evaluation Functions, Cognitive Learning Architecture, Constructive Induction, Discovery System and Knowledge Capture).

The workshop was appreciated by all the teachers, who liked the content and the mode of delivery of the workshop. The assignments and post-test forms kept the participants engaged, and they could understand well the concept of AI/ML in education. Teachers also shared their reflections and feedback which were quite encouraging and would help in organising better workshops in future.

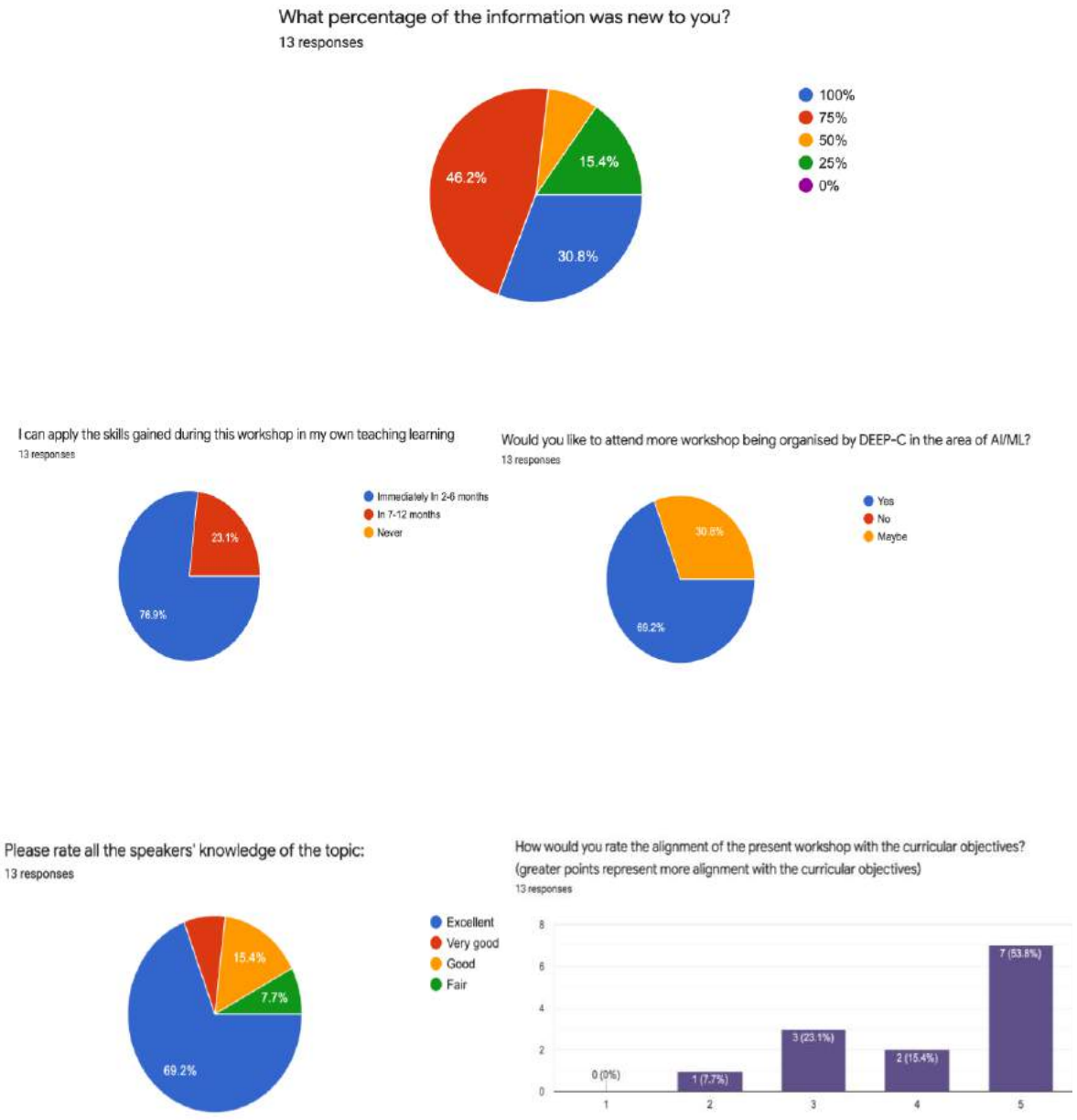


Figure 1.1: Overview of reflections and feedback received

**Glimpses from the 'Designing Classroom Pedagogy with Digital Tools' Workshop series**

*By Dr. Jagjit Kaur*
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The 'Designing Classroom Pedagogy with Digital Tools, Part 1 and Part 2' series was conceptualised keeping in mind the dire need for utilising digital platforms for the teaching-learning processes in the wake of the Covid-19 pandemic. The pandemic provided the push towards digitisation of work spaces around the world. At all levels of education systems such as school education, higher education etc., digital modes of teaching and learning became not only relevant and useful, but also a necessity. In fact, in India, the National Education Policy 2020 (NEP, 2020), aims at leveraging the importance of technology in not just "what" is being taught in the classrooms but "how" it is being taught as well, aiming to build a technology-equipped education system and economy. It was vital to understand the perspective of teachers on digital pedagogy, their proficiency in the same, and the requirements of the teachers for better pedagogical aims.

In the context of Delhi, schools have majorly collaborated with either Google and Microsoft for achieving their curricular goals in the online mode of teaching-learning. So to begin with, we at DEEP-C tried to assess the already acquired skills on certain chosen digital tools under this umbrella through the means of a pre-survey for the workshop. The results from the pre-survey confirmed that approximately 60%-70% of the teachers have been using Google Meet and Google Forms; 67% have been using Microsoft Word; 78.3% have been using Microsoft Powerpoint; and 59.1% have been using Microsoft Excel among the other tools. The results also highlighted that the teachers were either at pre-beginner or beginner level in the usage of the tools. Also, the responses identified that teachers were struggling to integrate the digital tools with their pedagogical processes in the appropriate ways. The teachers shared that they were grappling with the question of grasping student's attention in online classes, integrating the digital tools with the subjects, involving different kinds of learners, among many other issues. The workshop series was designed on the basis of these results and inputs, with Part 1 of the workshop addressing the issues with Google's G-suite; and Part 2 of the workshop on enabling teachers to integrate relevant Microsoft tools with the classroom processes. The entire series focused on addressing contemporary pedagogical issues with the utilisation of digital tools in the classrooms, for the purposes of making teaching-learning an effective process.

Part 1 of the workshop series was conducted with Samait Shala (a non- governmental organisation working in the domain of training teachers on digital tools, pedagogical skills etc.) as the main resource partners. As mentioned, the content was curated as per the pre- survey and the needs of the teachers. To be able to make the digital tools more relevant, they were aligned with specific pedagogical goals for effective learning and implementation purposes. The session on Google forms was curated for designing effective assessment procedures, Google documents for resource creation and visualisation, Google Jamboard for designing lesson plans and Google slides for interactive presentations and creative home assignments. The sessions were a combination of didactic modes of learning about the digital tools and their pedagogical relevance, along with the hands-on sessions on practising the tools during the session, followed

by experience sharing and discussions on the same. The course was centred around real-life classroom problems and issues around the relevance of digital tools (such as how to collaborate with student's on Google Jamboard for teaching-learning purposes vis-à-vis Google Meet; the best pedagogical position to use Pear-deck as a tool in the classroom and so on). The collaborative approach during the hands-on sessions aided in group learning among the teachers, as was shared by some of the teachers. The teachers' feedback revealed that the step-by-step hand-holding of the teachers in using the digital tools in the context of their everyday classroom problems also aided in effective learning. The teachers developed subject-specific lesson plans towards the end of the workshop utilising the G-suite tools learnt, along with the relevant pedagogical placement of the same. The follow up would further capture their utilisation of the skills with respect to the classroom realities and the challenges faced with the same.

Table 1.1 Overall learning feedback calculated from the questions in the feedback forms for all days of the workshop

**DESIGNING CLASSROOM PEDAGOGY WITH DIGITAL TOOLS WORKSHOP, PART 1 (31ST AUGUST, 2021- 4TH SEPTEMBER 2021)**

**Learning Feedback of the participants**

| NAME OF THE SESSION | SESSION MASTERY (AVERAGE) | AVERAGE SCORE |
|---|---|---|
| Google Forms-1 | 77.50% | 4/5 |
| Google Forms-2 | 64.71% | 6/10 |
| Google Docs | 61.52% | 8/10 |
| Google Jamboard | 87.78% | 9/10 |
| Google Slides (Peardeck) | 91.85% | 9/10 |

Table 1.2 Overall Reaction feedback calculated from the questions in the feedback forms for all days of the workshop

**DESIGNING CLASSROOM PEDAGOGY WITH DIGITAL TOOLS WORKSHOP, PART 1 (31ST AUGUST, 2021- 4TH SEPTEMBER 2021)**

**Reaction Feedback of the participants**

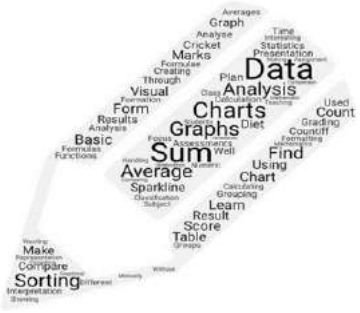
| NAME OF THE SESSION | PERCENTAGE REACTION (AVERAGE) | SCALE 1-5 |
|---|---|---|
| Google Forms-1 | 91.4% | 4.6 |
| Google Forms-2 | 92.7% | 4.6 |
| Google Docs | 94.9% | 4.7 |
| Google Jamboard | 94.0% | 4.7 |
| Google Slides (Peardeck) | 94.3% | 4.7 |

Part 2 of the workshop series focused on awareness of everyday data in classrooms, getting acquainted with the data (such as representing classroom visuals, and comparing student data), and utilising the same for designing smart assessment papers using Microsoft Excel as a digital tool. The workshop was conducted with Augmented Understanding Pvt. Ltd. (a corporate organisation training educators in understanding and utilising data in the educational spaces) as the main resource partner. The workshop was based on the results of the pre-survey and the need assessment of the teachers in designing the training sessions in accordance with the pedagogical requirements.

Engagement with 'Data' has become relevant in almost all the spheres of social, economic and political life. Education systems need to be aware of the important data that exists as a part of everyday school and college processes, and its importance in making educational processes effective and efficient for the purposes of fulfilling educational aims. The sessions focused on learning Microsoft Excel tools (such as system operators, number operators, 'If' statements, visual diagrams and charts) in the context of classroom issues such as attendance, assessment, and subject- specific data, among many others. The sessions were a combination of learning Excel through observation, along with the practice sessions. The course interaction evolved from some teachers getting involved in just knowing how to use MS Excel, and some others focusing on core subject related problems, such as how to analyse mathematical data alphabetically and by gender together and then, thinking through the kind of questions that can be more useful for assessment purposes with respect to data analysis. The teachers' feedback revealed how looking at the existing classroom data through the lens of data analysis and its implementation for educational purposes was something novel for them. The feedback also identified the major skills teachers would be using in their classrooms, including 'sorting, filtering, analysis, classification, data, charts, graphs, average'. For Digital Pedagogy 1 workshop, teachers commented that the sessions were useful and informative and hoped for more such endeavors , while suggesting that the creation of cartoon strips could be another source of getting student's attention; and that greater practice would be beneficial to grasp what was learned. Digital Pedagogy 2 too brought forth positive perspectives and feedback, with teachers commenting on the value they found in the session even as some of them felt that a slower pace would be beneficial, and their hope for more such sessions. The workshop culminated in teacher's developing assessment papers and infographics on the chosen themes and classroom data, with a follow up to analyse their learning and papers with respect to the implementation of the learning in the classrooms.

Figure 1.1. The figure is based on the responses from the feedback form on Day 1


Figure 1.2. The figure is based on the responses from the feedback form on Day 2




**'Effective Education for Long-term Sustainable Solutions to the Problems of Air Pollution'- An Undergraduate Workshop**

*By Dr. Vijeta Choudhary*
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Pollution has been one of the key barriers to achieving Sustainable Development Goals (SDGs), though efforts have been made in order to truly transform societies and economies. Asia-Pacific countries in particular are at the centre of a public health crisis, with more than 4 billion people exposed to unhealthy levels of air pollution (UNEP, 2021). To mitigate air pollution at both the national and global levels, different environment pacts and treaties have been signed between nations. To reduce the air pollution with a solutions-oriented approach, India formally joined the Climate & Clean Air Coalition (CCAC) in 2019 to work with CCAC countries on best practices and experiences for the effective implementation of India's National Clean Air Programme (NCAP). The NCAP is a comprehensive strategy to prevent, control and reduce air pollution, and improve air quality monitoring across the country). It aims to reduce fine particulate ($PM_{2.5}$) and particulate ($PM_{10}$) air pollution by 20 -30 % by 2024. India has identified 102 non-attainment cities, with city-specific action plans being formulated.

Air quality monitoring in Delhi is carried out through a number of air quality monitoring stations which are situated across the National Capital Territory. New Delhi is one of the worst

affected Indian cities and has the highest ambient particulate matter levels. In 2019, the average $PM_{2.5}$ concentration was 98.6 micrograms per cubic meter (μg/m³) in Delhi- compared to the national average of 58.1 μg/m³. Considering the pervasive and deep-rooted problem of air pollution in Delhi, it is important that every citizen of today and tomorrow is not just aware about the causes and harmful impacts of the air pollution, but can also imagine ways to reduce the level of air pollution in the city and develop innovative solutions and technologies that are less polluting, reliable and sustainable.

National Education Policy 2020 (NEP) proposes to bring about not only structural changes in educational system (viz. replacement of present system of '10+2+3' with '5+3+3+4' design corresponding to age groups) but also aims to have newer curriculums with reduced syllabi and greater emphasis on "Experimental Learning & Critical Thinking"; and encourage opening of campuses of top foreign universities, multidisciplinary universities/colleges etc..

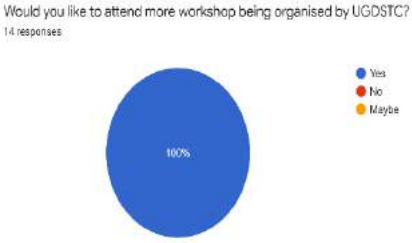
Bringing real-life problems, such as that of air pollution, into the classroom helps in imparting quality education by targeting problem-solving and critical thinking skills of the learners. At the same time, it is equally important to develop less expensive, highly interactive pedagogical tools in order to address the issue of air pollution. Research-based or inquiry-based pedagogical tools aim at achieving above-mentioned educational goals, and are considered ideal as they treat each concept in the textbook in the way knowledge is generated by researchers, by involving students in the process of arriving at fundamental concepts. This teaching learning approach recognises and rewards research in a classroom setting.

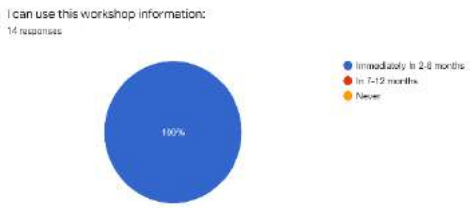
The workshop on 'Effective Education for Long-term Sustainable Solutions to the Problems of Air Pollution' was the first of its kind endeavour with a thrust on air pollution and research based pedagogical tools. The workshop helped raise awareness about air pollution, and how discussions on its different aspects can be integrated into existing curricula at the UG level to the participants. Group-based presentations after attending the session talked about how the integration with curriculum at colleges of Delhi university would have the potential to generate substantial awareness about the air pollution and ways to mitigate the same among students. Use of research-based pedagogical tools in teaching learning adds to the knowledge of teachers on one hand; and it can be helpful in the holistic development of students on the other. Feedback from the participants confirmed that the information in the workshop was new to them, and that they would be able to disseminate these learnings into their classrooms within 2-6 months of participation.Participants evaluated the workshop as either excellent or good, and indicated their interest in attending future workshops organised by DEEP-C; DRIIV.

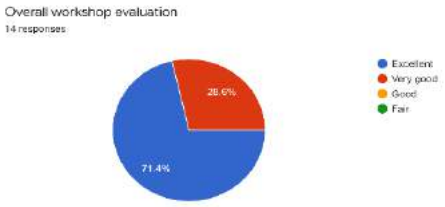
The workshop started on a strong note with opening remarks by Professor Hemalatha Reddy (member, Advisory Committee, effective education vertical under DRIIV). Prof. Reddy gave an overview of the aims and objectives of the workshop and emphasised on the need for a rethink about the avenues for controlling the air pollution and how teachers play a crucial role in achieving these goals. This was followed by remarks by Prof. L. S. Shashidhara, (Principal Investigator, effective education vertical under DRIIV), who stressed upon the need for a holistic approach to solve the problems of air pollution and encouraged all the participants to become a part of the movement. Prof. Shashidhara emphasised on the need for analytical thinking, its applications and the use of digital pedagogies for effective education in every field. The inaugural address was delivered by Dr. Shipra (CEO, DRIIV) during the inaugural ceremony. She apprised participants about the initiatives taken by different centres set up in

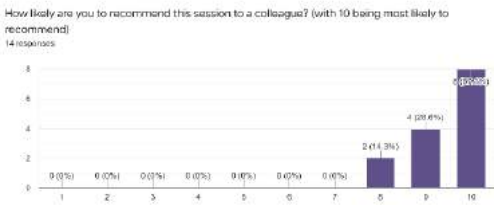
IIT, AIIMS, Ashoka University, and other government and private institutions to address the problems and propose solutions at different levels of education. All the sessions conducted by the resource persons were followed by highly interactive question-answer sessions which were very informative and intuitive. All the presentations were followed by extensive discussions between advisory members, organisers and participants. Overall, it was a highly informative and engaging workshop. All the sessions were delivered by experts in the field of air pollution and its related aspects. The speakers were Mr. Vivek Chattopadhyay (Centre for Science and Environment, Delhi); Dr. Sagnik Dey (IIT, Delhi); Dr. Vikram Singh (IIT, Delhi); Dr. Rahul Chopra (TROP ICSU Climate Change Education and IISER Pune); Dr. Meghna Agrawala, (Ashoka University,Sonipat); Dr. Vandna Luthra (Gargi College, University of Delhi); Dr. Mallika Pathak (Miranda House College, University of Delhi); Dr. Apurva Bharve (IISER, Pune) and Dr. Dorje Dawa (Cluster Innovation Centre University of Delhi).

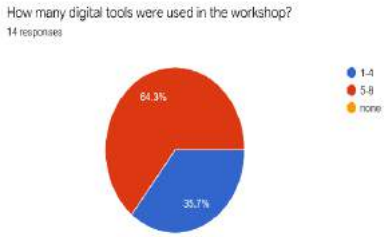
During the workshop, the following feedback was received-

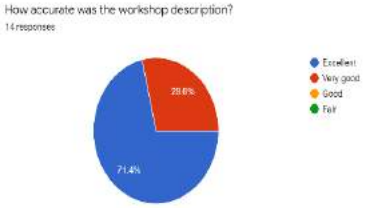



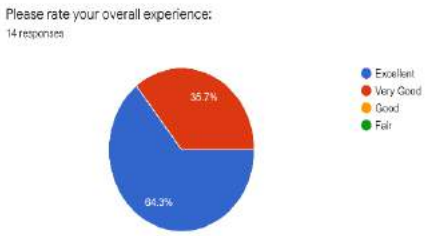






**Understanding Public Health from an Interdisciplinary Perspective**

*A Report*

By *Dr. Astha Saxena*
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Public health has emerged as an interdisciplinary area of study and research. It refers to the science and art of preventing a disease, and involves epidemiology, biostatistics, social sciences, and management of health services. Keeping in view the present pandemic, it becomes pertinent for each and every individual to be aware about public health issues and concerns plaguing the society and communities at large. The workshop on public health aimed at generating awareness about the emerging public health issues and ways of addressing them through education. Another important objective was to impart advanced skill-sets in order to engage young learners with these issues so that they develop a deeper understanding and the skills needed to effectively deal with them in their homes as well as in their localities. The workshop provided a detailed understanding of the changing nature and scope of public health issues, particularly policies and practices; nutrition and biology; infectious diseases and sanitation; social and preventive medicine; environmental and community health; the role of epidemiology in public health; and the collection, generation, and analysis of public health data.

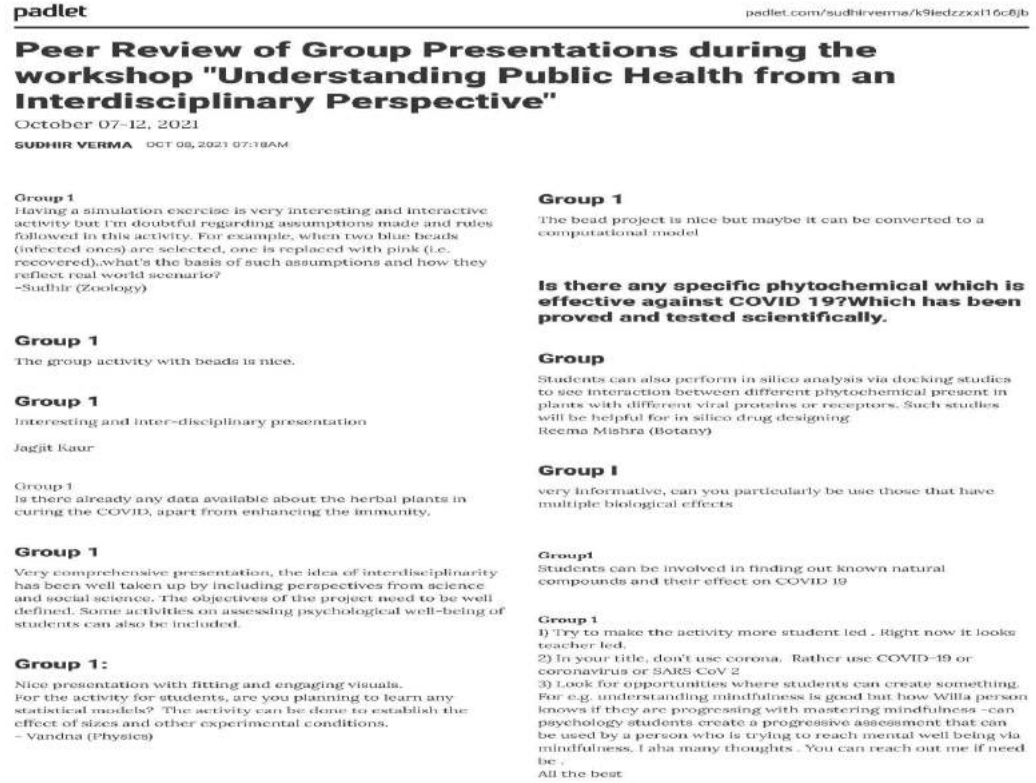
The following were the major learning outcomes of this workshop in order for the participants to be able to:

- Map public health issues with the existing curriculum and activities
- Adopt and adapt skills to address the public health issues at the local as well as global level
- Devise solutions to some of the public health issues in the city
- Design questionnaires and survey forms to collect relevant data related to public health issues
- Initiate Research-Based Pedagogical Tools (RBPTs) in the area of public health at college/university level
- Network and collaborate with researchers and experts in the field

The workshop sessions were conducted by eminent scientists, social scientists, experts and pedagogues to address the issue of public health from an interdisciplinary perspective. The speakers included, Padmashree Prof. K. Srinath Reddy, President, Public Health Foundation of

India (PHFI); Dr. Brian Wahl, Johns Hopkins University; Prof Gautam Menon, Ashoka University; Dr. Tavpritesh Sethi, IIIT-Delhi; Prof. Rajib Dasgupta, JNU; Prof. Satyajit Rath, IISER, Pune; Prof. Namita Ranganathan, Department of Education, University of Delhi, among many others.

On the final day of the workshop, participants gave group presentations on diverse areas related to public health in the undergraduate curriculum. Participants presented their research ideas/group activity addressing a public health issue using RBPTs . The review of all the presentations was done by participants, advisory team and organising team of the workshop using Padlet.



padlet

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**Peer Review of Group Presentations during the workshop "Understanding Public Health from an Interdisciplinary Perspective"**

October 07-12, 2021

SUDHIR VERMA OCT 08, 2021 07:18AM

Group 1
Having a simulation exercise is very interesting and interactive activity but I'm doubtful regarding assumptions made and rules followed in this activity. For example, when two blue beads (infected ones) are selected, one is replaced with pink (i.e. recovered),what's the basis of such assumptions and how they reflect real world scenario?
-Sudhir (Zoology)

**Group 1**
The group activity with beads is nice.

**Group 1**
Interesting and inter-disciplinary presentation

Jagjit Kaur

Group 1
Is there already any data available about the herbal plants in curing the COVID, apart from enhancing the immunity.

**Group 1**
Very comprehensive presentation, the idea of interdisciplinarity has been well taken up by including perspectives from science and social science. The objectives of the project need to be well defined. Some activities on assessing psychological well-being of students can also be included.

**Group 1:**
Nice presentation with fitting and engaging visuals.
For the activity for students, are you planning to learn any statistical models? The activity can be done to establish the effect of sizes and other experimental conditions.
- Vandna (Physics)

**Group 1**
The bead project is nice but maybe it can be converted to a computational model

**Is there any specific phytochemical which is effective against COVID 19?Which has been proved and tested scientifically.**

**Group**
Students can also perform in silico analysis via docking studies to see interaction between different phytochemical present in plants with different viral proteins or receptors. Such studies will be helpful for in silico drug designing
Reema Mishra (Botany)

**Group I**
very informative, can you particularly be use those that have multiple biological effects

**Group1**
Students can be involved in finding out known natural compounds and their effect on COVID 19

**Group 1**
1) Try to make the activity more student led . Right now it looks teacher led.
2) In your title, don't use corona. Rather use COVID-19 or coronavirus or SARS CoV 2
3) Look for opportunities where students can create something. For e.g. understanding mindfulness is good but how Willa person knows if they are progressing with mastering mindfulness -can psychology students create a progressive assessment that can be used by a person who is trying to reach mental well being via mindfulness. I aha many thoughts . You can reach out me if need be .
All the best

-Adita Joshi

**Group 2**

The activities designed to take the information to Community level are very interesting

**Group 2**

Awareness is MUST, but younger generation still may not able to do away with it. An active game or app to understand and monitor real time detriment while eating a kind of food may be good motivator !

**Group 2**

The topic says impact of ultra processed food on human health, can we have a detailed study on the impact of various ingredients in these foods and their particular effect on human body ?

**Group 2**

Do you think lack of awareness is the actual reason of high usage of processed food? Many a times, it is a necessity or at other times, its just used as a reflection of one's financial standard too!
-Sudhir (Zoology)

**Group 2**

I think one more concern these
Days is we are getting enough calories but not enough nutrition from these calories.we should focus on to enhance nutritional value of our main cultivation.
Samra Jamal

**Group 2**

Community involvement using activities ....how to make alternate recipe using healthy ingredients...publish such handouts and circulate !

Group 2
Can we plan activities to encourage students to consume less of junk food. Maybe we can have some online games prepared and executed
- Uma Chaudhry (Biomedical Science)

**Group 2**

Crisp presentation. Nice. you could also focus on giving an alternative to these foods such that the shift occurs from a calorie dense food to a better balanced food group.

**Group 2**

Fast food industry/Processed food industry is more linked to the commercialization of food industry, neo-liberalism, quick solutions, habitualization of it, etc., these need to be considered as well while planning curriculum integration at the school and college levels of education.

Jagjit Kaur

**Group 2**

What kind of data would provide evidence for attitude shift for opting against processed food . You should ponder on this ?
-Adita Joshi

**Group 2**

It would be interesting to see who all go for more fast-food - their socioeconomic and demographic profiles. Are they socially, economically and culturally very different?
-Pradeep Kumar Choudhury

**Group 3**

Group activities and resources mentioned are well planned.
1. Confidentiality of information and client identification would be of prime importance.
2. Counselling for Persons with Disabilities would be helpful for the society at large.
Uma Chaudhry (BMS)

**Group 3**

Very nice slides

**Group 3**

A nice presentation with a lot of hands on activities.

**Group-3**

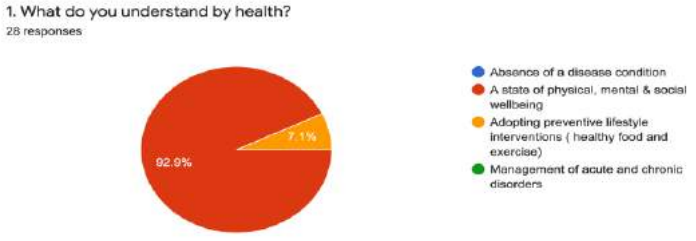
very interesting ppt

**Group 3**

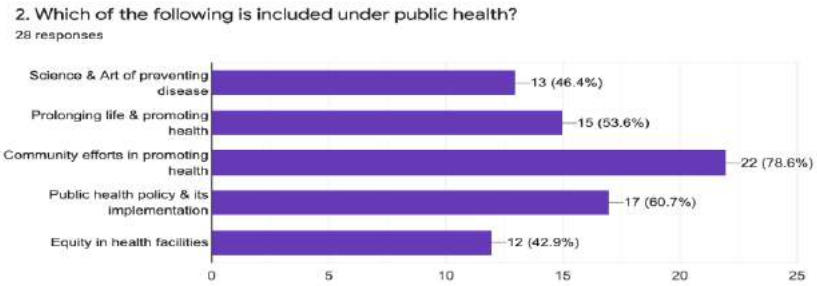
Nice presentation. How is heterogeneity of class composition taking into consideration? particularly wrt to the availability of resources/reach-out/recharge activities to the students.

## Analysis of Pre-Workshop Data

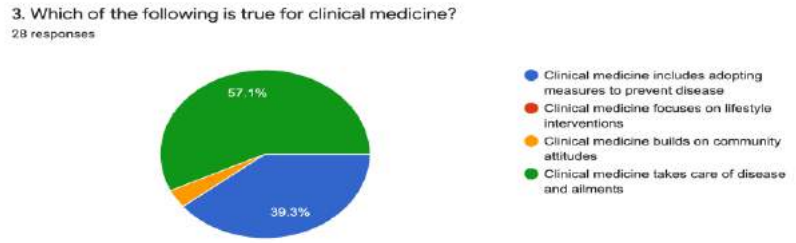
Most of the participants of the workshop understood health to mean a state of "physical, mental and social well-being".



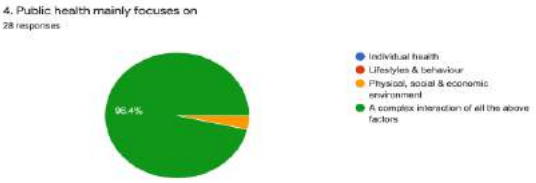

Around 80% of the participants included "community efforts in promoting public health" and more than 60% of the participants also regarded "public health policy and its implementation strategies" as important factors in assuring public health facilities for all.



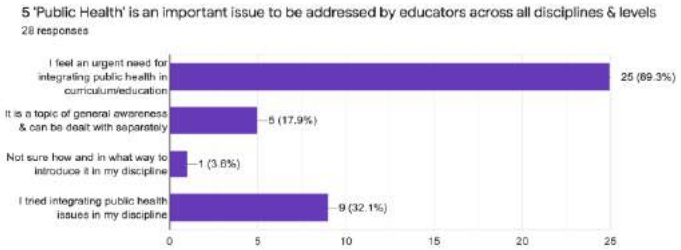

The perception of more than 50% of the participants about clinical medicine involved taking care of disease and ailments.



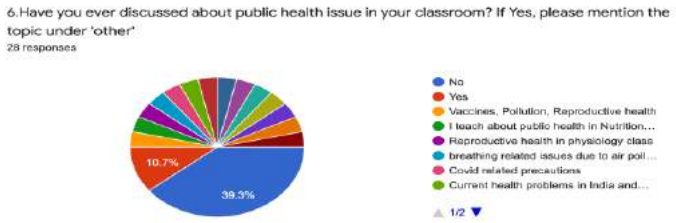

Almost all the participants felt that public health involves a complex interaction of factors including individual health, lifestyles, behaviour, physical, social & economic environment.



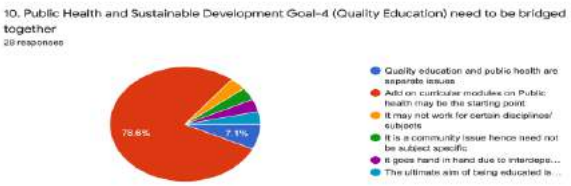

Most of the educators felt an urgent need to integrate public health issues within the curriculum and education system, however, some of them (around 17%) also felt that public health issues are a topic of general awareness and can be dealt with separately.



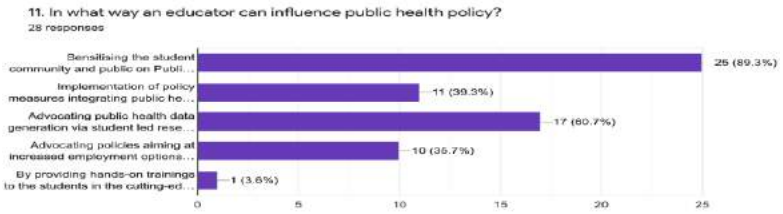

Almost 40% of the educators had never integrated public health issues in their classroom and the rest responded that they did try to integrate public health issues with topics such as vaccines, air pollution, reproductive health, health & nutrition, haematological parameters, disease modelling and nutritional biochemistry.




Public Health & Sustainable Development Goal-4 (Quality Education) are aligned to each other and around 80% of educators felt that some curricular modules on public health can serve as a starting point.




A majority of educators (around 90%) felt that educators can influence public health policy by sensitising the student community and public about public health issues.




## Collective Creativity in Using Tech-Tools

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With the sudden school closures due to SARS-Cov 2, educators around the world faced a challenge of how to keep teaching and learning without face-to-face interactions. While some were well equipped, most were not. However, this was neither the first time schools have had to be closed, nor is the dilemma social and educational institutes face as to how to keep the young minds engaged fruitfully and deliver education novel. School closures have been observed in France during the 1957 pandemic, and school holidays between 1984–2006; in US and Australian cities during the 1918 influenza pandemic; and during the severe acute respiratory syndrome (SARS) outbreak in Hong Kong in 2003 and again in March 2008. Governments have had to close schools and universities in all these instances.[1]

The virus took us all by surprise not just in terms of our physiological immunity but in other respects too! Online academic management for school students at day-to-day level seemed like a herculean task for educational administrators.

As per the goals for school education stated in NEP 2020, the broad focus should be on the holistic development of children through an interdisciplinary and inclusive approach, leveraging the use of ICT. Furthermore, the learning must be based on competencies like developing scientific temper, creativity, innovation, and so on. The teaching should take learners away from rote learning, and instead make them learn 'how' to learn. Strategies for competency-based education should include integrating content for the promotion of life skills along with curricular goals, and

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[1] Fox Robert *SARS epidemic: Teachers' experiences using ICTs* [ ASCILITE ] [ 2004 Proceedings Contents ] https://www.ascilite.org/conferences/perth04/procs/fox.html

rubrics and parameters for assessment to be based on learning outcomes. [2] The NEP 2020 calls for a 'shift from [an assessment system] that is summative and primarily tests rote memorization skills to one that is more regular and formative, is more competency-based, promotes learning development for our students, and tests higher-order skills, such as analysis, critical thinking and conceptual clarity.[3]

The pandemic, accompanied by the NEP 2020, brought a sea-change in the pedagogy, as the use of educational tech tools became essential to conduct curricular as well as extra-curricular activities. Some of us managed to stay afloat but were still looking for an anchor to hold us stable. At such a moment of crisis, DEEP C floated the idea of workshops for educators to train them in digital pedagogical tools in a two-part series.

"Digital pedagogy" refers to the use of electronic elements to enhance or change the experience of education (Croxal, 2012). Kivunja (2013, p.131) presented a more detailed definition, referring to "digital pedagogy" as the skill of embedding digital technologies into teaching so that they enhance learning, teaching, assessment, and curriculum. Therefore, digital pedagogy can also be considered a pedagogical use of digital technologies.

In the first part- 'Designing Classroom Pedagogy with Digital Tools' workshop, the Samaitshala team went through the use of Google tools like slides, docs and forms; while the second part - 'Designing Classroom Pedagogy with Digital Tools, Augmented Understanding (AU.)' supported us on use of Microsoft excel sheets to prepare data for analysis, diagnostic analytics and design smart assessment.

In a recent research study by Väätäjä, J. O., & Ruokamo, H. (2021), teachers' pedagogical orientation, attitudes, self efficacy and collaborative skills were found to be the key issues in the context of digital pedagogy. Technology integration is more likely to be successful if the teacher possesses a constructivist, student-centred pedagogical orientation (cf. Montebello,

[2] https://www.education.gov.in/shikshakparv/docs/Competency_based_Education_Learning_Outcomes.pdf

[3] http://cbseacademic.nic.in/cbe/

2017; Wadmany & Kliachko, 2014). They need more than plain technological, pedagogical, and content knowledge to integrate technologies successfully into their teaching (cf. From 2017; Mena et al., 2018). Attitude, self-efficacy, and peer collaboration skills were raised as some competencies that can contribute to the successful integration of technologies in teaching (cf. McCarthy et al., 2017; Mannila et al., 2018).

During the workshops on digital pedagogy, the resource persons did a great job elaborating the step-by-step procedures for using tools, that too with examples from a real-life classroom. Creativity is using these same tools to reach out to all learners in the classroom, and while the onus is entirely on the educators there is nothing better than approaching this challenge together. It was the reactions and responses of the participant teachers that brought life to the sessions. The level of involvement could be seen in the fruitful outcome from the breakout rooms. The collaborative efforts made by these educators also indicates their potential to guide their students to approach the problems posed to them collaboratively. Reflecting on their teaching practice makes teachers improve classroom effectiveness. As observed by the advisory member Dr Jyoti Sharma, "When our students become so friendly, so comfortably raising their doubts and we as teachers answer them patiently, that is the time when we say we have achieved mastery of teaching".

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2. Kivunja, C. (2013). Embedding digital pedagogy in preservice higher education to better prepare teachers for the digital generation. International Journal of Sustainability in Higher Education, 2(4), 131–142.
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4. From, J. (2017). Pedagogical digital competence: Between values, knowledge and skills. Higher Education Studies, 7(2), 43–50.

# Research Based Pedagogical Tools: An Overview of Need, Relevance and Beyond

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Techniques and methodologies have been evolving since time immemorial with the aim to redefine the roles of teachers and students in multiple ways. This article emphasizes the benefits as well as the challenges of using research based pedagogical tools (RBPTs) in the classroom. It is the need of the hour to incorporate such approaches for equipping students to solve the problems of the real-world in a way in which they realize the importance of interdisciplinarity, and are able to extend their learning beyond the curriculum.

Real-life problems need solutions beyond the domains of subject boundaries, thereby necessitating an interdisciplinary approach for the students to be apt at realizing them. Often, education is more bound to the curriculum and knowledge without practical experience. Thus, it is drastically restrained from providing applicable solutions to ever-challenging and evolving problems such as the Covid-19 pandemic, climate change, global warming etc. A quest to understand our very existence also propels more and more real-life applications with each passing day. On the one hand, there has been phenomenal progress in our understanding of the universe and living systems while on the other hand, we still need more effective learning tools and methodologies preparing our students to be proactive in solving complex problems. Many approaches have been adopted and evolved across the world since the "learning by doing" approaches by Confucius and Aristotle to enhance the hands-on and practical aspects.

A well-known quote by Confucius[1], is all the more applicable in current times due to the availability of many other methods and tools available for consolidation.

"I hear and I forget,
I see and I

remember, I do

and I understand"

*Confucius (551 BC- 479 BC)*

[1] BrainyQuote, Confucius Quotes, https://www.brainyquote.com/quotes/confucius_136802, accessed: Dec **2021**.

Many of these approaches which have been used include project-based learning (PBL)[2]. Research Based Pedagogical Tools (RBPT)[3] are also one of the approaches with far-reaching benefits, using research as a pedagogical tool for the teaching and learning processes.

Why are RBPTs needed?

RBPTs can be used to incorporate many aspects centred around the learning objectives of a class while at the same time may provide opportunities to learn skills and gain experience beyond the curriculum. It is worth mentioning that sometimes the benefits may be beyond the targets. By providing our students with an enjoyable hands-on experience instead of concentrating on a curriculum-centric topic, they get empowered to tackle interdisciplinary problems, which also enhances their problem solving, computational, cognitive, communication and analytic skills to name a few.

[2] S. Boss, Project-Based Learning: A Short History, *Edutopia* https://www.edutopia.org/project-based-learning-history, accessed: Dec **2021**.

[3] Z. N. Kashmiri, A.S. Masram, Elements of Research Based Pedagogical Tools for Teaching Science, *Educational Quest- An International Journal of Education and Applied Social Sciences*, **2020**, 11(3), 189, doi: 10.30954/2230-7311.3.2020.6.

Components of Interdisciplinarity

The skills transferable to real-life are not specific to any particular domain and so are currently important for tackling critical problems like climate change, pandemics, etc. Science is ubiquitous and its advancement should aim for the well-being of society. Here, the example of the accidental invention of X-Rays is worth mentioning. X-Rays were invented by Roentgen[4] accidentally while he was engrossed in another experiment, demonstrating that curiosity is a driving force for science. One may ask to which branch of science do X-Rays belong? Answering this won't be easy. Now, we know these are a part of the EM spectrum and knowing this itself has taken a lot of time. X-Rays are used in physics, chemistry, crystallography, astronomy, food technology, security and have a multitude of other applications. For the clinical and security applications of X-Rays, one needs to know about their properties, production and suitability for a particular field and how to take preventive measures for its appropriate use. Similarly, interdisciplinarity is needed for solving other problems.

Enhancing Team-Work

In a conventional class of one teacher to many students, the learning rates, the ability to grasp and reflect, and the level of interaction varies from student to student. Therefore, it is imperative that those strategies are adopted which offer a room for the students to learn from collaboration and communication with each other. If they are assigned individual tasks and then required to collate the data of other group members, and provide their inputs and reflections before the final presentation or report, this may provide them with an opportunity to understand various aspects of a given problem from a different perspective and assimilate the final outcome. Some students are shy in the class and working in groups may provide them with an opportunity to overcome this barrier and may help them to enhance their communication skills and build their confidence level.

What are 5Rs of RBPTs?

The 5Rs of a RBPT are

[4] Z. N. Kashmiri, A.S. Masram, Elements of Research Based Pedagogical Tools for Teaching Science, *Educational Quest- An International Journal of Education and Applied Social Sciences*, **2020**, 11(3), 189, doi: 10.30954/2230-7311.3.2020.6.

**1st R: Recognise Research** This would provide a real-life context to the problem which is at hand. For example, for teaching a topic on addressing the issue of cleaning of solar panels could be linked to self-cleaning windows and hence to nanotechnology[5].

**2nd R: Require Research** The activities to be performed by the students should require research unlike the conventional way of doing a practical with set protocols.

**3rd R: Refine Research** It should aim to refine the skills of the students, keeping in mind the objectives of the given problem.

**4th R: Reward Research** The aim of this 4th R is to assess which can be in the form of summative, formative or diagnostic. What has been gained by the students can be accessed in a variety of ways. Various novel forms can be tried for such assessments and emphasis should be on the process not on the final result.

**5th R: Report Research** The dissemination of results is a key component in which the outcomes can be presented by the students in a group or can be shared in various other ways in print form or through websites or displays in the library.

RBPT Workshops by IISER Pune: Paradigm changers in teaching-learning

In this regard, the first and foremost step was to influence and train the teachers. This task has been very dedicatedly and meticulously done by IISER Pune[6] under the PMMMNMTT Scheme. The most striking features of this workshop were that these were conducted at various levels in a well-structured manner. It was such a delight to see participation from across the country. After the introductory level 1, a team was selected for training at level 2 and later they were recognized as trainers for training others to the remotest corners of the country.
Another aspect of documentation and planning of lesson plans was undertaken in the level 3 workshop which emphasized on producing packages for classroom applications.

Outcomes of the Training Workshops

Apart from receiving training, these workshops helped us use the acquired training and knowledge in our own classrooms and have also influenced other fellow teachers to adopt it. It is a very well-known proverb that one can spread good work only if one is convinced themselves. The workshops created a network of teachers, who could collaborate and share their experiences, thereby acting as facilitators of constructive changes in the teaching-learning

[5] RBPT Resource package - Google Drive, https://drive.google.com/drive/folders/1p3Nr0VYVE-l8t0VjF7IU47gwLh8eNx38, accessed: Dec **2021**

[6] CoESME - Outreach and Training - IISER Pune, https://www.iiserpune.ac.in/engage/outreach-and-training/coesme, accessed: Dec **2021**

processes. Some of the RBPTs undertaken by different teachers were developed into packages and can be used by any teacher for their classroom.

## Challenges

In the curriculum-oriented academic calendar, teachers may find it difficult to implement RBPTs for all the topics. A teacher can initially choose any 1-2 topics per semester in which the RBPT approach can be implemented. It is a challenge for teachers to design such packages which not only aim to inculcate learning of the topic but also aim to teach skills (cognitive, computational, analytic or data handling, communication) and provide valuable experience for use in later life. The work by one teacher on the development of a particular problem can be shared for the implementation by other teachers across the country. A mechanism of feedback and suggestions can be incorporated for further refinements. In this way, by sharing and networking, a pool of resources can be prepared for various problems not only in STEM but also for other streams.

## Conclusions

The introduction of RBPTs at the undergraduate level can pave the way for orienting students towards understanding the benefits of research.It can help them understand a problem from the fundamentals to the applications, induce logical and critical thinking, enhance communication skills and provide capacity building of a skilled workforce.

## Acknowledgements.

The author has completed three levels of training at IISER Pune and has acted as a resource person at Patiala, Bengaluru, BHU Varanasi, Raipur, Delhi and Goa. She has contributed to a package for implementation in class and uses RBPTs for her classes. She is thankful to IISER Pune, CoESME under PMMMNMTT for organizing workshops at various levels and providing this unique opportunity. The author thanks DBT, Star College Grant to Gargi College and Principal, Gargi College for their immense support. The author can be contacted at vandna_arora@yahoo.com to share more details on RBPT.

## The Rising Teacher

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The unprecedented situation created by the COVID-19 pandemic, which led to shutting of the entire country, roused interest in researchers on the impact on education, universities, teachers, and students. . The sudden shutdown of schools and colleges gave rise to remote learning and an era of online education. This resulted in changes in the teaching-learning process in educational institutions and influenced the interaction between teachers and students. As a consequence of the pandemic, educators were constrained to carrying out their activity with students exclusively online.

"When learning and teaching continually improves, everything improves."

The quote above has been stuck in my head since the alternative reality of classrooms came into being. Digital pedagogy is gaining popularity due to its advantages of greater flexibility, wider access, and lower cost. This requires restructuring course components using new pedagogical approaches and technological tools.

The 'Designing Digital Pedagogy' workshop by Delhi Effective Education and Pedagogy Cluster (DEEP-C) came into the picture for me just when I was trying to build my online classroom as a teacher in a non-profit organization. The workshop aided my learning of a new approach to education. The two parts of the workshop were days spent not just receiving knowledge but also creating knowledge together and making a collaborative space for teachers to come together and add value to each other's journey in digital pedagogy.

The workshops introduced and strengthened my understanding of the most used applications in the classroom, and provided a structured approach to their applications in the classrooms. The first part of the workshop was about Google applications like forms, slides, docs which I had known about as resources but needed a re-introduction to. The second part of the workshop was about Microsoft Excel which turned out to be an introduction to me. Though before the workshop I had heard about this application, I hadn't ever used it because of the complicated features I would view on my screen. The workshop helped me un-complicate the features and utilize them in a manner such that the process of using them turned out smooth and the outcome was quick and efficient.

While the pandemic has surely caused a change in the usual teaching and learning practices as compared to physical classroom environments, I don't believe that means that they must be abandoned altogether when we go back to in-person learning. Even when the pandemic ends and we return back to our classrooms, I would take forward digital pedagogy into the physical classroom as well. Digital pedagogy isn't limited to online classrooms but it will and should hold a powerful place in our physical classroom as well because of its novel and innovative nature.

## A Reflection on COVID and Our Response

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I have tried not to speak or write about the COVID-19 pandemic till now, for the simple reason that better informed and articulated experts are already advising us. Secondly, except for a few of my students, none of my friends, relatives and colleagues were that interested in listening to me. However, it is almost two years into the plight, chaos and confusion, and certain facets need to be deliberated upon, more so by the people engaged in Public Health discourse for future zoonosis policies.

I am insisting on 'zoonosis' rather than endemic or pandemic as our country needs to learn that several of the current and possible future outbreaks would be of zoonotic origin and everyone - from common people to medical practitioners needs to better understand this fact. In general, doctors and nurses are the most vulnerable in outbreaks caused by resistant pathogen strains or by zoonosis of hitherto unknown origin. It is pertinent that appropriate SOPs and quarantine procedures be immediately developed for initial check up and treatment of any suspected infection pattern anywhere in the country. Protective gowns, gloves and masks should be made both mandatory and readily available to health practitioners (not only doctors and nurses, but also to the waste collectors and receptionists). The apathy of all concerned departments regarding the health insurances of different strata of public healthcare workers should stop. Equally important is to have a steadfast early information and warning system (An AWAC equivalent in civilian terms).

Another necessity is to recognise that in the initial phases of a disease of unknown or recent origin, we would know very little and instead of hasty claims we should restrain ourselves about informing the public. It doesn't hurt to say - at this stage we know very little about the infection process or the accurate treatment, however, this course of treatment/medicine/vaccine could be tried until we get better knowledge. A little humbleness goes a long way for people to accept and abide with health guidelines rather than spurious claims and fanatic orders. Advances in science should be communicated more effectively and lucidly, not as mere facts tabled arrogantly.

It is also true that we have very short memories and we seem not to learn from our past pandemics. Turning over pages from hundred year old newspapers will teach us that nothing has changed in our reaction and response to a pandemic. Most striking is the tapestry of misinformation that shrouds us - the print media has given way to electronic social network sites, but the rumour-mongering remains the same, if not more overpowering. It is important that we earmark the difference between threat perception and rumour and regularly update our people about the threats and the practises that should be followed diligently to avoid any outbreak. With all the brouhaha about the digital age, we should make sure to keep digital sanity and, if needed, a central information bureau can disseminate required information in real time and (translating the same) in multiple languages to make it more accessible even in the distant reaches of our country.

Our federal structure can make things complex, however, we can also utilise it to our advantage in case an outbreak occurs. Instead of competing and proclaiming which state's which policy or model is better, we should try to implement the one showing results to other parts of the country in real time and at the same time have the courage and conviction to stop any model or policy that is found to be ineffective. Our policymakers should at least now realise the need for research, both basic and applied. It is time we understand that research on the biology or infection pattern of a pathogenic organism will go a long way to prepare ourselves for any future threats arising from a different strain or a distant cousin of the organism. After all, we could make the covid vaccines in such a short time as we knew about coronaviruses and have had similar vaccines for other related organisms.

The research will also impart an advantage in negotiating with any biopharma multinationals for drugs and vaccines. Promoting research in our country may result in having our own vaccines or medicines within a decent timespan and reduce the exorbitant cost we have to pay to procure such medicines and vaccines. Time has also come to expose the - 'me first' and 'me most' policies of the so-called developed nations. It is futile to store three-to-five times a vaccine doses per person for certain rich countries if even the healthcare workers of dozens of countries in a case of pandemic do not get the desired vaccine and treatment. Mutation and travel will ensure that these ridiculous policies are going to haunt the rich countries sooner or later - as we are safe only when everyone is safe. Travel has become truly global these days and zoonotic threats have correspondingly multiplied . Our embassies should come up with special adversaries for people travelling to other parts of the world and our customs should impose stricter quarantine policies and implement them diligently.

Talking about safety and security, we should also look for the professions or groups of people who are going to be economically the most susceptible to be strangulated as every pandemic will make certain sections of people and certain sectors of the workforce significantly more vulnerable. Whether it is the small business owners, workers trying to make a living away from home, or our neighbourhood washerperson, the strategy should be to immediately identify and support the needy. While we often try to empathise with people below poverty line, we should not forget it is the middle and lower middle class too who are equally vulnerable in a pandemic situation, and more so, when India is becoming highly unequal. Recognising priority areas in any

outbreak will immensely help in mitigating the same and consulting the subject experts (without bothering much with hierarchy and red-tapism that bog us down) is as much required as finding suitable volunteers.

A lot has been written on digital divide and accessibility of study materials to students during pandemic. However, certain other aspects have escaped detailed deliberation. One such aspect is the digital fatigue both students and teachers have experienced in the past two years of continuous online teaching-learning process. Although some Universities have come up with guidelines and protocols of online teaching, the need for suitable breaks have not been touched upon to the extent neccesary in online pedagogy. Digital fatigue has also revealed that complete transfer to the online mode is not a suitable option, rather, a hybrid mode should be explored in future. Another facet is the paucity of guest/contractual teachers and thus the continuation of classes in emergency situations where several teachers in the same department/faculty have taken ill. Most Colleges/University departments have a tedious and cumbersome process of appointment of guest teachers and it is important to design a strategy to have a pool of teachers who could be easily accommodated without facing many bureaucratic hurdles.

The suddenness of any outbreak is often followed by days of uneasiness, uncertainty and insecurity. Though "mental health" has no doubt now entered the lexicon of well-being, work-stress or competitive exams ensure that we are in a perpetual state of anxiety. Any pandemic will multiply this manifold, and the often unresponsive helplines will not help much. Social support and resilience groups are the need of the hour, and in any emergency these groups can mobilise faster in today's microsocieties. The disaster management teams have by now realised to include outbreaks in their 'response' section and it would not harm the authorities to periodically consult infectious disease researchers and epidemiologists about potential threats.

The longing for a better time often clouds our plans for long-term recovery, both physically and economically, as an individual and as a country. However, the sooner we understand and recognise the loopholes in our pandemic response, the better we will be prepared for the next onslaught. The important question is this - who are the 'we' referred to in this write up ? It is a collective responsibility and everyone needs to understand his/her role in a future pandemic and start acting accordingly. Whether it is a journalist who can put up a fact-checking website, or a teacher who can create modules that may come useful in a lockdown, or the online grocery companies who can chalk out a collaborative plan during emergencies, or the public work divisions who take care of basic needs while rotating and creating a pull of workforce, or even the Government who can designate the experts in a zoonosis outbreak without giving in to the hierarchy or petty politics - a better pandemic response needs all of us and it does not take much time to realise what one can contribute individually or in a milieu apart from looking after our near and dear ones.

(This article is dedicated to the tireless healthcare workforce around the world).

**Some reflections from workshop participants**

Reflection-1

**Ms. Anu Chhakara, Prabhu Dayal Public School, Shalimar Bagh**

The single thing that determines how well a child does in math is ... an outstanding math teacher.
—President Barack Obama (Burt-Murray, Robertson, & Gordy, 2010)

While everyone is talking about the pandemic I shall concentrate on online classes and its impact on teachers and students alike.
Today one can get a foreign degree sitting in their own home, one can apply and get selected for a job in some far-off land… all thanks to online connectivity.

Initially teachers started learning technology because it was forced onto them, and therefore integrating technology with pedagogy was an ongoing challenge.

Ashoka University's workshops on the importance of technology for education, on understanding digital tools and digital pedagogy, and on its mindful usage in the classroom

benefitted so many. Education systems are witnessing a quantitative increase in the usage of technology, along with a qualitative shift in the process of learning and education. Most of the workshops talked about the increasing adaptation technologies in education, which has brought a qualitative change in the teaching learning process. These workshops reflected on the digital tools important in the present-day educational system, which means tools and technologies that are characterized by electronic media, especially computerized technology. Now in the context of digital pedagogical tools that are in use such as e-learning, ICT, education technology etc., the unified role of integration and communications- that is, how one is communicating to the device cannot be overlooked. In examples like medical computers and laptops, mankind is simulating human intelligence using artificial intelligence.

Despite the ever-increasing number of online professional development (OPD) programs, the efficacy of such programs for teachers and students is undebatable. That the teaching fraternity, which now is at ease handling their stuff, is successfully able to mentor students online is all thanks to those who took it upon themselves to train teachers online, be it through an initiative by the government or by other organizations.
My knowledge of computers was limited to using MS Doc, typing questions papers and using Google spreadsheets, with little knowledge of the tools it provided. I had never worked on MS Excel. My approach to this new paradigm was one of enthusiasm. I was optimistic that I shall be better equipped with tools and technology, which would make my handling Science and Mathematics much more efficient.

Reflection-2

**Ms. Alka Singh, Research Scholar, Jamia Millia Islamia, New Delhi**

The workshop on "*Understanding Public Health from An Interdisciplinary Perspective*" underlined the importance of public health, which has increased manifold during the COVID-19 pandemic. Thus, the need of the hour was to introduce educators to the interdisciplinary nature of public health. This is crucial as it will aid curriculum enrichment, and create a student body with holistic understanding of public health. The workshop aimed at training faculty, who in turn can educate students to generate data-based evidence on domain specific areas in public health.

The 5-day workshop was divided into the following segments :

- Introduction to Public health, epidemiology and understanding current health services & systems
- Critical analysis of factors that influence the health of the population
- Public health and education: teaching public health across disciplines
- Impact and applications of technology in public health
- Public health in current scenario: challenges and solutions

The workshop through its segments involved various activities for inculcating in the educators the interdisciplinary nature of public health. Group discussions further allowed the participants

to brainstorm about the pedagogy for health education. The lectures were delivered by eminent professors and educationists who helped us understand the multidisciplinary components of the workshop, such as public health policies, nutrition and biology, infectious biology and sanitation, social and preventive medicine, environmental and community health, epidemiology, public health data generation and management.

In the workshop participants were given various tasks related to topics. All the participants were divided into five groups to give presentations on the topics related to public health and educators like in my group presented on topics related to problems in school education. Quizzes were also conducted to understand the technology in public health and the post-pandemic education system. Speakers stressed on the need to understand the paradigm shift in pedagogy in order to understand the changes required. The key takeaway included the crossover of education and technology to impart health education, such as how mind maps,concept maps, and the combination of the two, can be used for providing the student audio and video stimulus.

The workshop also stressed on the use of AI/ML, which can improve disease detection, mitigation, and elimination.The workshop was successful in underlining the role of 'Effective Education', which envisages bringing real-life problems in neighborhoods as pedagogical tools to teach science and technology, as well as transferable skills such as analytical ability, critical thinking, communication and an understanding of data science.

Reflection-3

**Dr. Aerum Khan,** ***Assistant Professor, Department of Teacher Training & Non-formal Education (IASE), Faculty of Education, Jamia Millia Islamia, New Delhi***

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The workshop on public health was organized by the Delhi Effective Education & Pedagogy Cluster (DEEP-C) which is one of the verticals of Delhi Science and Technology Cluster managed by Delhi Research Implementation and Innovation (DRIIV). The aim of the workshop was to promote advanced knowledge and expertise in science and technology (S&T) for the overall benefit of different cities in India and also ensure effective contribution of Indian research and development towards sustainable development of the nation.

The workshop on "Understanding Public Health from An Interdisciplinary Perspective" stressed upon the importance of public health, which has grown significantly during the COVID-19 pandemic. Therefore, it was required that the educators were introduced to the interdisciplinary nature of public health to impart the necessary skill set in consonance with NEP 2020. Further, it would aid curriculum enrichment and develop holistic understanding of public health amongst the learners.

I got a lot of enrichment from the content covered and the discussions which happened in the workshop. Also, the activities conducted during the program were excellent and to the point. My

overall experience from the workshop was very satisfying and rich. I hope to be part of more such workshops in the future.

Reflection-4

**Dr. Mallika Pathak, Miranda House College, University of Delhi, New Delhi**

I recently attended the workshop ***Effective education for long-term sustainable solutions to the problems of air pollution*****.** The workshop was a mixture of key lectures, case studies and an in-depth analysis of the quality of air in Delhi, with the emphasis on using effective teaching methodology. The talks were delivered by international experts from scientific institutions and public authorities working in the fields of air pollution and pedagogy.

As an educator, it was indeed the most positive experience I had had in a while. It exposed me to the idea of using inquiry-based learning as a teaching strategy for air pollution. Air pollution or pollution in general has been taught to us throughout our school as well as college days. For people living in Delhi the experience has been first hand. But our understanding must still somehow remain only superficial, because otherwise why would we not take it seriously and take steps to address it, starting at the local level? As we progressed through the workshop, I had to face the fact that maybe my students were in the same boat as me. Pollution, in particular air pollution, as taught by science educators sometimes fails to generate motivation and self-regulation within the students. They are just happy to pass the grade rather than be involved in the process of learning and improving the conditions around them.

During the workshop, eminent resource persons from IITs and CSE explained how respiratory and cardiovascular problems arising from air pollution are one of the five top five causes of death worldwide. The resource persons explained how inquiry-based learning can be used to better the understanding of students on how each individual contributes to the increase in air pollution and what steps should be taken to mitigate it. The student's interest in the environment could be encouraged through the use of portable air monitoring systems in the ambient room environment or using data from the Central Pollution Control Board's website.

I realised soon that I should try a different approach to better the learning experience of my students. I understood that students' engagement is increased when learning is experiential in nature. Teaching through experimentation and inquiry activities are really successful because they equip students with the necessary skills to conduct their own studies. To cultivate the culture of taking care of the environment in the student's mind, as an educator, I will encourage students to challenge themselves and create an atmosphere where they learn in a diverse multicultural system from their peers.

The program gave me an opportunity to share ideas with like-minded faculty members from other Delhi institutions. It was an inspiration to see how everyone was already forming ideas in their minds to engage students on the topic of air pollution using statistical data and case studies as suggested by the resource persons. One of the ideas that developed during the discussions was to take the students on field trips to develop linkages and practical appreciation. The experiential

focus on pollution may be the best technique to motivate students to think about air quality, emission-monitoring and management.

I was so immensely inspired that I am already thinking of possibilities for including evidence-based information in teaching about air pollution. My thinking has changed immensely because of this training workshop. I hope to include more experiential learning and less lecturing, with more group work exercises and discussions to increase the understanding of my students. The top three takeaways from the workshop were 'inquiry', 'collaboration' and 'reflection' on air pollution.

Reflection-5

**Dr. Hira Joshi, Department of Physics, Gargi College, University of Delhi**

Learning is a continuous process. Education can be improved with courses, seminars and orientation programs. Special skills have to be developed in education and teachers have to be prepared according to those skills. As skills enhance, the burden on teachers decreases. This is what I felt after attending the DEEP-C workshop on digital tools, which can organize, innovate and manage classroom teaching.

According to Mahatma Gandhi "true education" is relating to the corresponding environment and harmonising things with circumstances. While teachers can best blend the information with the surroundings, digital tools are a boon in connecting teachers with the environment.

The digital tools workshop organised by DEEP-C was well organised, interactive, informative, and full of hands-on experience which unfolded the magic of digital tools in helping the teaching and evaluation process. Here we learnt how to effectively use digital tools in the learning and teaching process.

In this workshop we learnt digital skills through hands-on experience, and thoroughly enjoyed learning them. The various activities I learnt digitally will help me while teaching undergraduate students, in time management, and in maintaining their evaluation records. These skills will help me make online teaching more interactive, in the setting of question papers, the maintenance of records of tests in the form of pi-charts and other charts, so that at a click of a button I can discuss the results with the students.

In the end I can say that digital tools make teachers more efficient and well informed. Teachers can handle data at their convenience more effectively and judiciously.

Reflection-6

**Dr. Renu Baweja, Department of Biochemistry, Shivaji College, University of Delhi**

It was my honour to become a part of the Delhi Effective Education and Pedagogy Cluster (DEEP-C) under the Effective Education vertical of Delhi Science and Technology Cluster (DSTC), during the year 2021. I came to know about this Government of India initiative under DRIIV, DSTC through social media. The idea of creating project-based modules with a focus on Delhi's civic life and then integrating them with the course curriculum was very fascinating. I was nominated to participate in various workshops organized by DEEP-C as a master trainer to learn about new innovative pedagogies in the field of science. I was a member of the organizing committee of the 1st Undergraduate Workshop on "Effective Education on long term sustainable solutions to the problem of Air Pollution". During this five day workshop, I came to know about how a path can be paved in the existing curriculum of undergraduate teaching for dealing with the problems of air pollution. There is an urgent need for analytical thinking both at the level of teachers and students, its applications and the use of digital pedagogies for effective education in every field as teaching with conventional methods would not be appropriate for today's learner. The role of a teacher is not only as an information provider but also a mentor or a guide or a facilitator. Apart from the knowledge gained by the talk of experts in the field of air pollution, I learned about the concept of Research Based Pedagogical Tools (RBPTs), which I was not familiar with before becoming part of this workshop. It was very exciting to know how RBPTs can be used effectively in teaching learning processes at any level. The trainers were in the 'learner's seat' throughout the course so that they would be able to shift gears in creating amazing experiences for their students. The primary goal of RBPTs is to create a learner-centered atmosphere in the classroom by allowing students to engage in research activities, allowing them to enhance their knowledge on a certain topic in an inquiry mode. I applied the concept of the five R approach (Recognize, Require, Refine, Report, Reward) of RBPT during the presentation as a part of the assessment of the participants in the second workshop organized by DEEP-C, which was on "Understanding Public Health from an Interdisciplinary Perspective". The experts of the workshop had given the knowledge of various interesting topics pertaining to public health including the effect of the pandemic on mental health, the role and applications of AL/ML on public health, climate change & human health, health technology, health policy, and other related topics. Apart from RBPTs, I also learnt about **mentimeter**, an interactive presentation tool; **slido app,** a polling platform for live, remote or hybrid meetings; **Kahoot,** an app to generate quizzes to review student knowledge and other related pedagogical tools for effective online teaching. The best part about these workshops was that they not only helped a learner/teacher to grow as an individual but also gave them a chance to work as a team. The participants of the workshop were expected to work in a team. The team may comprise of the learners of different academic backgrounds, each being specialized in their respective field. Each team of 4-6 teachers from different colleges/institutions were supposed to design a research problem for undergraduate students on a topic relevant to the workshop using the pedagogical tools taught and then present their work towards the end of the workshop. This was followed by the feedback responses of the experts and discussions among the participants for the effective execution of the project.

Overall, these workshops have helped generate curiosity about the various verticals of DSTC. Moreover, the participants have also learned about the existing problems related to different verticals of DSTC and tried to design projects integrated with the respective course curriculum.

Reflection-7

**Dr. Neha Sharma, Keshav Mahavidyalaya, University of Delhi**

I am one of the few selected for the two workshops conducted by the Delhi Effective Education and Pedagogy Cluster, Ashoka University, under the Pandit Madan Mohan Malaviya National Mission on Teachers and Teaching (PMMMNMTT), on "Effective education for long-term Sustainable Solutions to the Problems of Air Pollution", held from 2nd -6th August 2021 and "Undergraduate Teacher's Training Workshop on Understanding Public Health from an Interdisciplinary Perspective" from 07th October 2021 to 1th October 2021.

I participated in the capacity of an organizer. As a part of the team, I had the privilege of working with a very seasoned team of intellectuals from different streams with a very wide spectrum of knowledge and experience. We all worked under the able guidance of Professor Hemalatha Reddy, former Principal, Sri Venkateshwara College, University of Delhi and Prof L.S. Shashidhara, IISER Pune. The team was always involved in evolving very innovative ideas so as to make best use of the various open-source software as pedagogy tools, to motivate the participating teachers. The modules for both workshops were designed such that the sessions were interactive, and perspectives from all realms were covered in the current times. The invited speakers were masters of their respective trades and very well-versed. They started with giving examples of the current situation in Delhi and showed how the problems can be showcased or solved by different approaches. Participants were actively involved at all levels, so that they had ownership for the task assigned in the workshops. All participants were assigned pre-workshop tasks based on the theme of the workshop. Everybody participating could see the change in the way a problem was dealt with. The comparisons were made between pre- and post-workshop pedagogy approaches by the help of very well-defined quizzes, which were open-ended to give full freedom to the participating teachers. At the end of both the workshops, reviews like 'Organize more such workshops', "it changed the perspective' 'there is lot more than chalk and duster', 'flipped classrooms' were received.

I feel very blessed to have worked with such a motivating team and Advisors, who were always pressing you very positively towards the successful execution of the task.

**1st Webinar cum Panel Discussion**

• DEEP-C organised the first webinar & Panel Discussion titled "Reinventing Education System for Futuristic Teaching Learning" on 15th October, 2021 (4.00pm-06.00pm.) in virtual mode towards effective implementation of NEP, 2020.

Speaker of the day was Dr. Shakila T. Shamsu, Formerly Officer on Special Duty (New Education Policy), Department of Higher Education, Ministry of Education, Government of India. She talked about NEP, 2020,its objectives and how this educational reform is aligned with sustainable goals of the UN. She further put forward how the policy is not merely transforming education but also trying to change the livelihood of the people/planet by focussing on issues like air pollution, hunger, malnutrition, and poverty which are thought to be significant factors for societal development.

Panelists were Prof. Hema Latha Reddy, Advisory Board Member (DEEP-C), Former Principal (Sri Venkateshwara College, University of Delhi); Dr. Pradeep Kumar Choudhary, Assistant Professor of Economics, JNU (Vice-President, International Longevity Economics (EIDLL) Network, France, China-India Visiting Scholar Fellow (2021-2022), Ashoka University; and Prof. Jyoti Sharma, CIC Delhi University, Joint Director, Institute of Life -Long Learning, Delhi University. All the panelists are Advisory Board Members of DEEP-C.

Major points of the discussion were about how to make teachers work enthusiastically in schools and colleges, making MOOC's more interactive and contextual, implementing multidisciplinary or interdisciplinary approaches through professional development programs/ courses for teachers, and planning inclusive and innovative pedagogical approaches for better teaching-learning. Questions were also answered related to the value of teachers in terms of salaries, freedom to experiment, growth benefits etc.

**2nd Panel Discussion**

Covid-19 pandemic has affected education drastically and threatens to wipe out the progress made so far especially for poverty and gender equality. Disruptions to education systems over the past 2 years have already driven substantial losses and inequalities in learning. The question of gender disparity is not only about the access to education, but also about opportunities for achievement & employment, and indeed about the way gender itself is addressed or not addressed by education at all levels.

The 2nd Panel discussion was organised by DEEP-C on 11th March, 2022 from 4.00pm-6.00pm. The topic for panel discussion was "**Where are the Women and Girls?** Gender Disparity in Education"**.**

Panelists included Professor Ravinder Kaur, Sociology and Social Anthropology, IIT Delhi, who talked about the gross enrollment in higher education, and gender parity across social categories and disciplines. Prof Kaur gave a picture of the top programmes in higher education such as B.A, M.A and B.Ed, which are the top choices for females and where they outnumber males. She further specified that according to the turn out figures at the undergraduate, MPhil, postgraduate levels, more women pass out from college than men.

The second speaker for the day was Dr. Ramakrishna Ramaswamy, Visiting Professor, Department of Chemistry at IIT-Delhi, who spoke about how the gender imbalance in the scientific workforce has been a serious issue. Through available literature, he showed poor representation of trained scientific women in higher education and how more women numbers are rising up in fellowship and internship programmes. He talked about how it is the need of the hour to have women at higher levels to reduce the disparity.

The next speaker was Dr. Annie Koshi, Principal, St. Mary's School, Safdarjung Enclave, New Delhi, who talked about the number of girls at school and how they escaped during the pandemic, and how the question of gender is important for society but is also pertinent for the economic trajectory.

Prof. Dr. Farida Abdulla Khan, Retired Professor, Department of Educational Studies, Jamia Millia Islamia, Delhi talked about how Covid had an impact on marginalised groups and ASHA workers through some research studies, and about how it is not sufficient to know about the school but also at home and society at large for better understanding, and that face to face teaching is more important for overall development.

The final talk of the day was given by Dr. Anandini Dar, Assistant Professor, School of Education Studies, Dr. B. R. Ambedkar University, Delhi. Dr. Dar spoke on the recent work done on growing up as a migrant; and girls experiences of and challenges in schooling in Delhi. She talked about how the need of the hour is to reformulate the special dimension of education in schooling that will lead to the solutions to retention particularly for girls.

**Glimpses from the Discussion**