# REPORT ON

# 2-DAY ONLINE WORKSHOP ON VIRTUAL LABS

17-18 December 2020

***Organised by***

**Commonwealth Educational Media Centre for Asia (CEMCA), New Delhi**


***Report Submitted by***

**Mr. Saneesh P F**
**Project Manager**
**Virtual Labs**
**Amrita Vishwa Vidyapeetham**


# Introduction

Virtual Labs is an initiative of the Ministry of Human Resource and Development, Govt. of India under the National Mission on Education through Information and Communications Technology (NME-ICT). This initiative provides an opportunity for all students to use virtual labs free of cost. The aim to provide high quality remote laboratory access in Science and Engineering disciplines for students and teachers of the country and is applicable to undergraduate (B.Sc., B.Tech, B.E.) and post-graduate (M.Sc., M.Tech, M.E.) students including Physical Sciences, Biological Sciences, Chemical Sciences, Computer Science and Electronics and Mechanical Engineering. Virtual Labs are being developed by consortia of 12 institutes which include Amrita Vishwa Vidyapeetham, IIT Delhi, IIT Bombay, IIT Kanpur, IIT Kharagpur, IIT Madras, IIT Roorkee, IIT Guwahati, IIIT Hyderabad, Dayalbagh Educational Institute, NIT Surathkal and College of Engineering, Pune.

Main website: https://www.vlab.co.in/
University website: http://vlab.amrita.edu/

Virtual Labs are new immersive e-learning environments that provide a media-rich, interactive user interface that teachers can use to supplement their curriculum. These labs are located on an open webpage that can be accessed by anyone through a web browser, on any Internet-connected computer in the world. A variety of laboratory experiments can be conducted virtually using animation, simulation or remotely triggered hardware. Laboratory experiments are modeled very close to real-life experiments and when used as a learning tool by students it allows them to learn the material more efficiently and can make doing the practical experiments easier.

One of the challenges in science and engineering education in our country is that access to costly lab equipment is constrained by lack of resources and geographical distances. Virtual Labs can provide an alternative to traditional hands-on labs where labs are not present or augment existing access to labs and experiments. Thus, Virtual Labs can extend the use of scarce or costly equipment.

The workshop offered an opportunity for all faculty members involved in the education of physics, chemistry, biological sciences, computer science and mechanical engineering to learn more about Virtual Labs.

# Aim

The aim is to provide a complete Learning Management System for laboratory education where the teaching and learning experience is enriched through simulations, additional web resources, video lectures, animated demonstrations, and tools for self-evaluation quizzes.

# Objective

- Creating awareness about Virtual Lab project.
- Using Virtual Labs for performing laboratory experimentations.
- Integrating Virtual labs into teaching and learning practices.

# Invitation

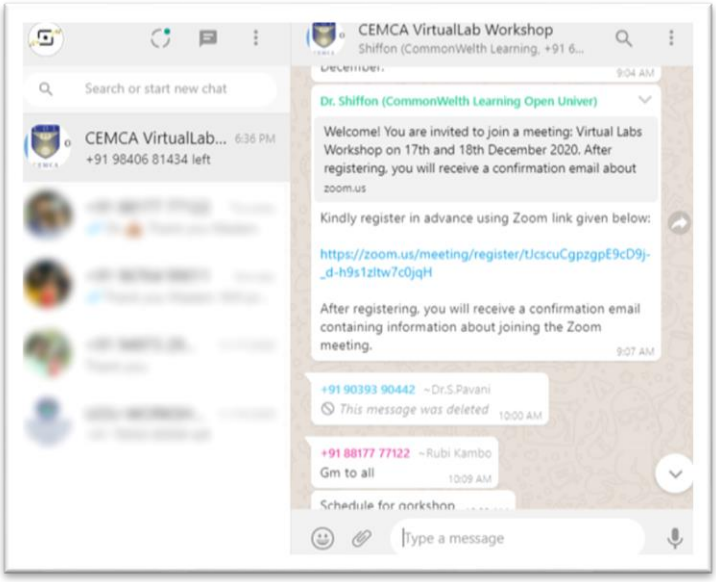
CEMCA, New Delhi invited Amrita Virtual Labs to conduct a two-day online workshop on 17$^{th}$ and 18$^{th}$ December 2020 for the faculty members of Open Universities in India.

# Participants

Seventy-one participants from various Open Universities in India attended the online workshop. List of participants is placed in Appendix 1.

# Methodology

The workshop was conducted online through the virtual platform ZOOM. The methodology used was live demonstration of Virtual Lab experiments from university website (vlab.amrita.edu) and main virtual lab website (vlab.co.in) followed by hands-on practice by participants using the assignment questions provided by the resource person. The organizing team shared a WhatsApp group to interact asynchronously, share information, answer queries and submit feedback.




*WhatsApp Group screen shot*

**Dates:** The workshop was held on December 17th and 18th 2020 from 11:00 AM to 12:30 PM

**Venue:** The workshop was conducted online through the virtual platform ZOOM.

**Virtual Labs Workshop on 17th and 18th December 2020 Confirmation**

CEMCAZoom@col.org <no-reply@zoom.us>
Tue 12/15/2020 5:27 PM
**To:** Saneesh P F <saneeshpf@am.amrita.edu>

Hi Saneesh P F,

Thank you for registering for "Virtual Labs Workshop on 17th and 18th December 2020".

Please submit any questions to: CEMCAZoom@col.org

Date Time: Dec 17, 2020 11:00 AM India
Every day, 2 occurrence(s)
Dec 17, 2020 11:00 AM
Dec 18, 2020 11:00 AM
Please download and import the following iCalendar (.ics) files to your calendar system.
Daily: https://zoom.us/meeting/attendee/tJcscuCgpzgpE9cD9j-_d-h9s1zltw7c0jqH/ics?user_id=tWY5wg8XRcWN29j1GDF5EQ

Join from PC, Mac, Linux, iOS or Android: Click Here to Join
Passcode: 923803
Note: This link should not be shared with others; it is unique to you.
Add to Calendar Add to Google Calendar Add to Yahoo Calendar

Or iPhone one-tap
US: +13017158592,,93159893393# or +13126266799,,93159893393#
Or Telephone:
Dial(for higher quality, dial a number based on your current location):
US: +1 301 715 8592 or +1 312 626 6799 or +1 346 248 7799 or +1 669 900 6833 or +1 929 205 6099 or +1 253 215 8782 or 888 475 4499 (Toll Free) or 833 548 0276 (Toll Free) or 833 548 0282 (Toll Free) or 877 853 5257 (Toll Free)
Meeting ID: 931 5989 3393
International numbers available: https://zoom.us/u/aiOVAqS1L

# Workshop Schedule

| Day 1: December 17th 2020 (Thursday) | | | |
|---|---|---|---|
| **Time** | **Activity Session** | **Key persons** | **Outcome** |
| 11:00AM – 11:15AM | Opening session | Prof. Madhu Parhar<br>Director, CEMCA | |
| 11:15AM – 11:25AM | Introduction to Virtual Labs | Mr. Saneesh P F<br>Project Manager<br>VALUE Virtual Labs<br>Amrita Vishwa Vidyapeetham | Participants learnt about virtual lab project and activities |
| 11:25AM – 11:40AM | Virtual Lab video | | |
| 11:40AM – 12:10PM | Virtual Lab experiment demonstration | | Participants learnt how to do experiments using virtual labs |
| 12:10PM – 12:25PM | Q&A session | | Doubts clarified through interaction |
| 12:25PM – 12:30PM | Closing session | Dr. Shiffon Chatterjee<br>Senior Programme Officer<br>CEMCA | |
| **Day 2: December 18th 2020 (Friday)** | | | |
| **Time** | **Activity Session** | **Key persons** | |
| 11:00AM – 11:05AM | Opening session | Dr. Shiffon Chatterjee | |
| 11:05AM – 11:25AM | Invited talk | Prof. Venkatesh Choppella,<br>Principal Investigator, Virtual Labs, IIIT Hyderabad | |
| 11:25AM – 11:35AM | Significant impact of virtual labs | Mr. Saneesh P F<br>Project Manager<br>VALUE Virtual Labs<br>Amrita Vishwa Vidyapeetham | Research findings on Virtual Labs shared |
| 11:35AM – 11:45AM | Innovative Teaching | | Participants learnt how to transform teaching using Virtual Labs |
| 11:45AM – 12:00PM | Virtual Lab's Learning Management System (LMS Module) | | Participants learnt how to navigate and use LMS module |
| 12:00PM – 12:25PM | Virtual Lab experiment demonstration | | Participants learnt how to do virtual lab experimentation |
| 12:25PM – 12:35PM | Q&A Session and closing | | Doubts clarified through interaction |

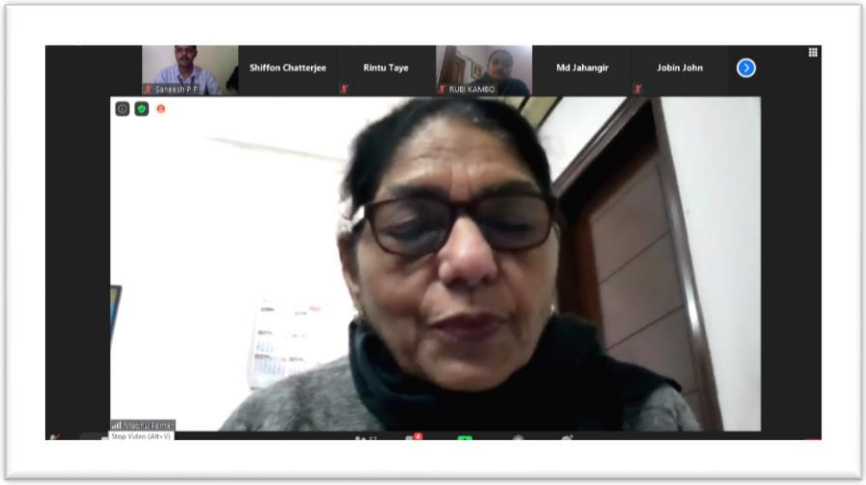
## Day 1 - Inauguration: December 17th 2020

The inauguration was graced by the presence of Prof. Madhu Parhar, Director, CEMCA; Dr. Shiffon Chatterjee, Senior Program Officer, CEMCA; and Mr. Saneesh P F, Project Manager, Amrita Virtual Labs, Amrita Vishwa Vidyapeetham.

Prof. Madhu Parhar welcomed all the participants and gave an overview of the program. She mentioned the need for virtual labs so that all students have equal access to quality practical and hands on experiment-based leaning. The need to bring virtual labs to Open University students was emphasized. Prof. Parhar referred to how the National Education Policy 2020 recommends Virtual Labs as one of the key initiatives, given the emerging importance of using technology at all levels of teaching and learning. Prof. Madhu Parhar mentioned how even before the current pandemic situation students faced difficulties in conducting experiments due to lack of equipment and

monitoring. During the pandemic, study centers were closed, and students were not able to conduct the experiments. Prof. Parhar stressed that laboratories are very important part of learning, so learners need to be supported in this regard.

Mr. Saneesh P F served as a resource person for the workshop. He demonstrated various experiments from Biotechnology & Biomedical Engineering, Physical Sciences, Chemical Sciences and Computer Sciences. He discussed ways to transform teaching using virtual labs and shared research findings regarding how virtual labs are effective for students and faculty members.




*Prof. Madhu Parhar delivering the inaugural address*

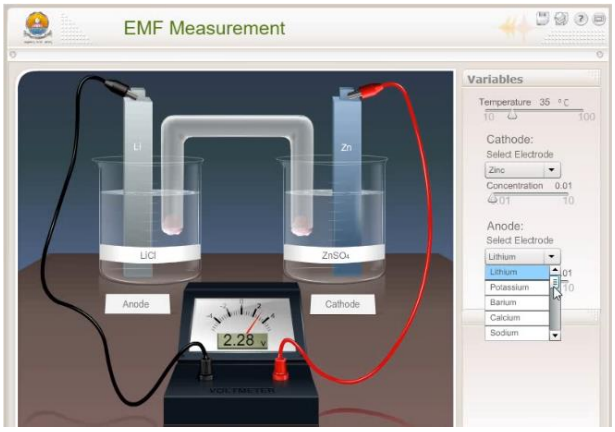
## Session details from 11:15AM to 12:20PM

*Introduction about the project:* Mr. Saneesh presented the project background, development phase and implementation phase of the virtual labs. He demonstrated the following experiments:


- Blood grouping experiment (Biotechnology)
- EMF measurement (Chemistry)
- Parallel LCR circuit (Physics)
- Tangent Galvanometer (Physics)
- Problem solving labs (Computer Science).

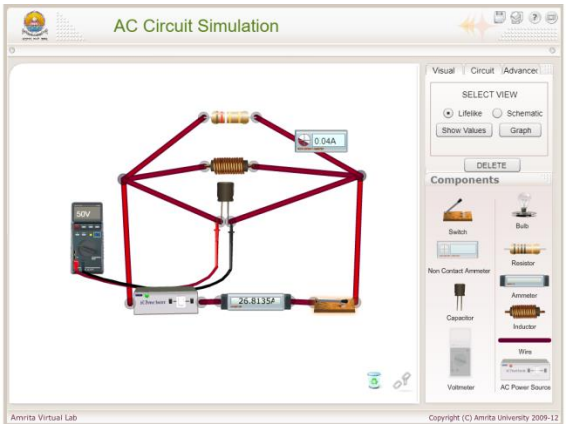
## Virtual Lab Experiment Demonstration


*Blood grouping*

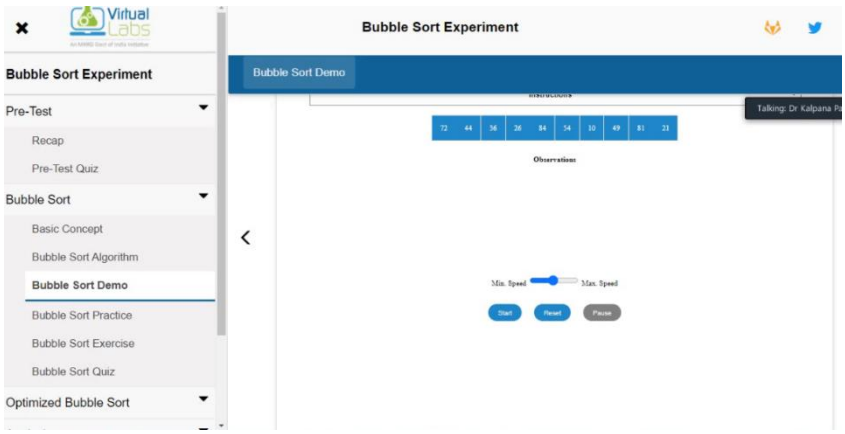



*EMF measurement*


*Tangent Galvanometer*




*Parallel LCR Circuit*




*Bubble sorting experiment (Computer science)*

## Assignments for Day 1

For practicing virtual lab experimentation, a set of assignments were provided to the participants.

## Physical Sciences

**Problem 1**: Study of Variation of Specific Heat of Cardboard with Temperature
Link: http://vlab.amrita.edu/index.php?sub=1&brch=194&sim=353&cnt=1

**Problem 2:**Determination of Stefan- Boltzmann constant σ
Link: http://vlab.amrita.edu/index.php?sub=1&brch=194&sim=548&cnt=1

**Problem 3**: Ultrasonic Velocity in Liquids Ultrasonic / Interferometer Method
Link: http://vlab.amrita.edu/index.php?sub=1&brch=201&sim=803&cnt=1

**Problem 4**: Determination of Numerical Aperture
Link: http://vlab.amrita.edu/index.php?sub=1&brch=189&sim=343&cnt=1

## Chemical Sciences

**Problem 1**: Find out the unknown concentration of the sample – Rose Bengal.
Link: http://vlab.amrita.edu/index.php?sub=2&brch=190&sim=338&cnt=1

**Problem 2:** Determine the absolute viscosity of organic liquids.
Link: http://vlab.amrita.edu/index.php?sub=2&brch=190&sim=339&cnt=1

**Problem 3**: Determine chemical parameters such as hardness, alkalinity, and chemical oxygen demand COD) of water samples.
Link: http://vlab.amrita.edu/index.php?sub=2&brch=193&sim=1548&cnt=1

## Biotechnology and Biomedical Engineering

**Problem 1**: Differentiate between the two major categories of bacteria: Gram positive and Gram negative.
Link:http://vlab.amrita.edu/index.php?sub=3&brch=73&sim=208&cnt=1

**Problem 2:** What are the requirements for establishing tissue culture laboratory?.
Link:http://vlab.amrita.edu/index.php?sub=3&brch=187&sim=1100&cnt=1

**Problem 3**: Two parents with blood types A and O have a child who has type O blood. What is the probability that their next child will be type A?
Link: http://vlab.amrita.edu/index.php?sub=3&brch=69&sim=192&cnt=1

## Computer Science

**Problem 1**: How many number of swaps needed to sort the numbers 27, 61, 82, 64, 27, 62 in non-decreasing order, using Bubble Sort?

Link:https://ds1-iiith.vlabs.ac.in/exp/bubble-sort/exp.html#Basic%20Concept

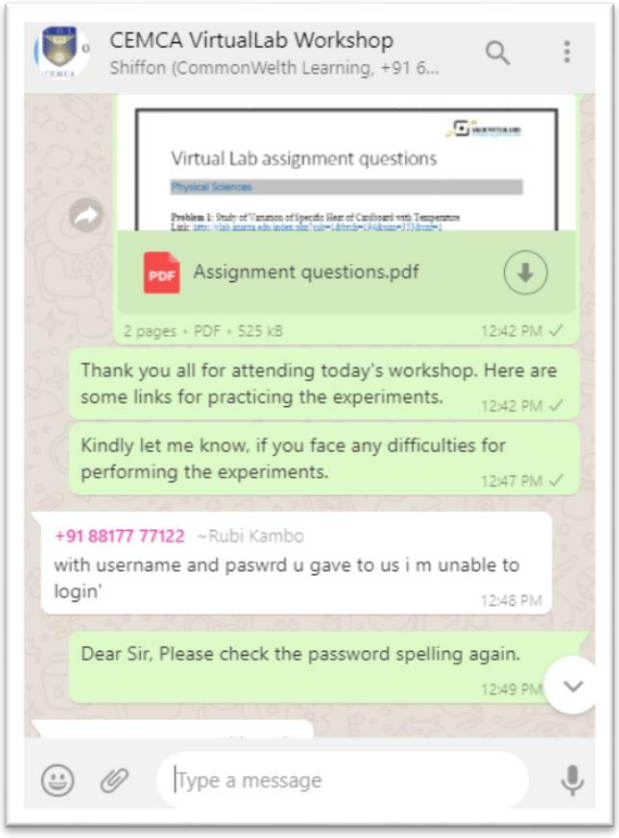
**Problem 2**: Which tag is used for largest heading?

Link: https://html-iitd.vlabs.ac.in/basics-of-html/exp/introduction-to-html/simulation.html

**Problem 3**: Matrix Multiplication

Link: http://cse02-iiith.vlabs.ac.in/exp4/simulation/2-D/index.html

Link: http://cse02-iiith.vlabs.ac.in/

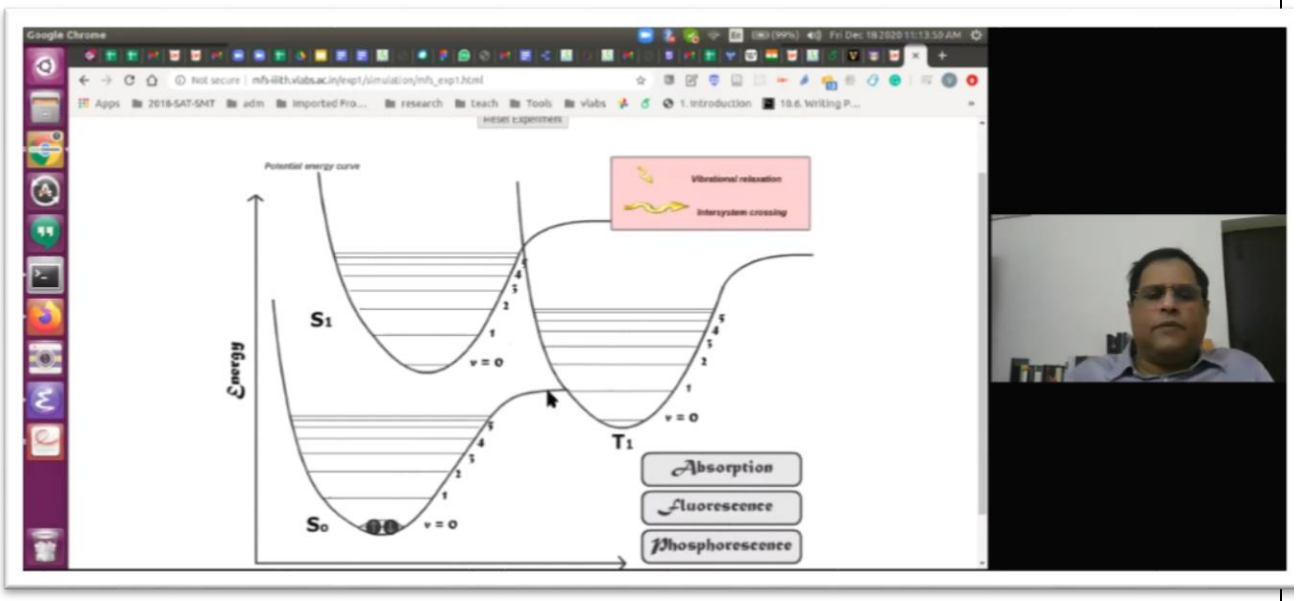



*Assignment shared in the WhatsApp group*

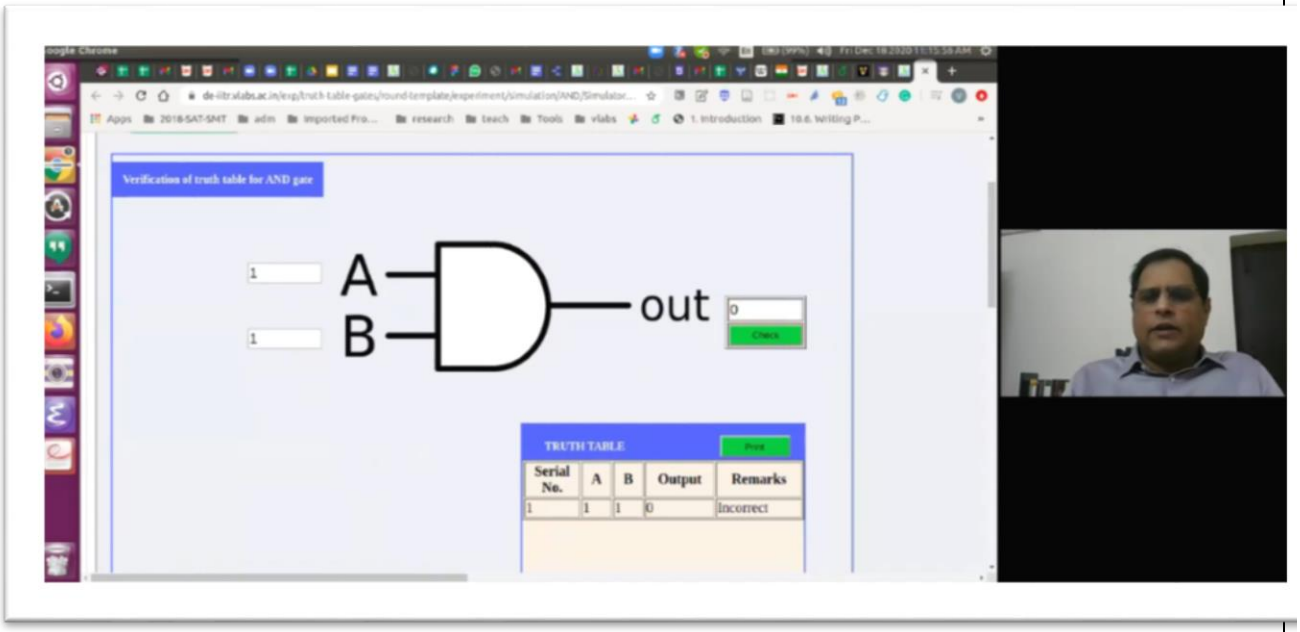
## Day 2 - December 18th 2020

Dr. Shiffon Chatterjee welcomed the dignitaries during the second day of the workshop. Prof. Venkatesh Choppella, Principal Investigator, Virtual Labs, IIIT Hyderabad delivered a talk on virtual labs. He gave a perspective of virtual labs based on the statistics of India's education sector, highlighting the lack of adequate lab facilities. Prof. Choppella shared usage statistics of virtual labs since January 1st, 2020 till date which is 3.35 million users. He discussed how virtual labs could support community-based learning. Prof. Choppella demonstrated experiments from vlab.co.in including molecular fluorescence spectroscopy, digital electronics, and bubble sorting.

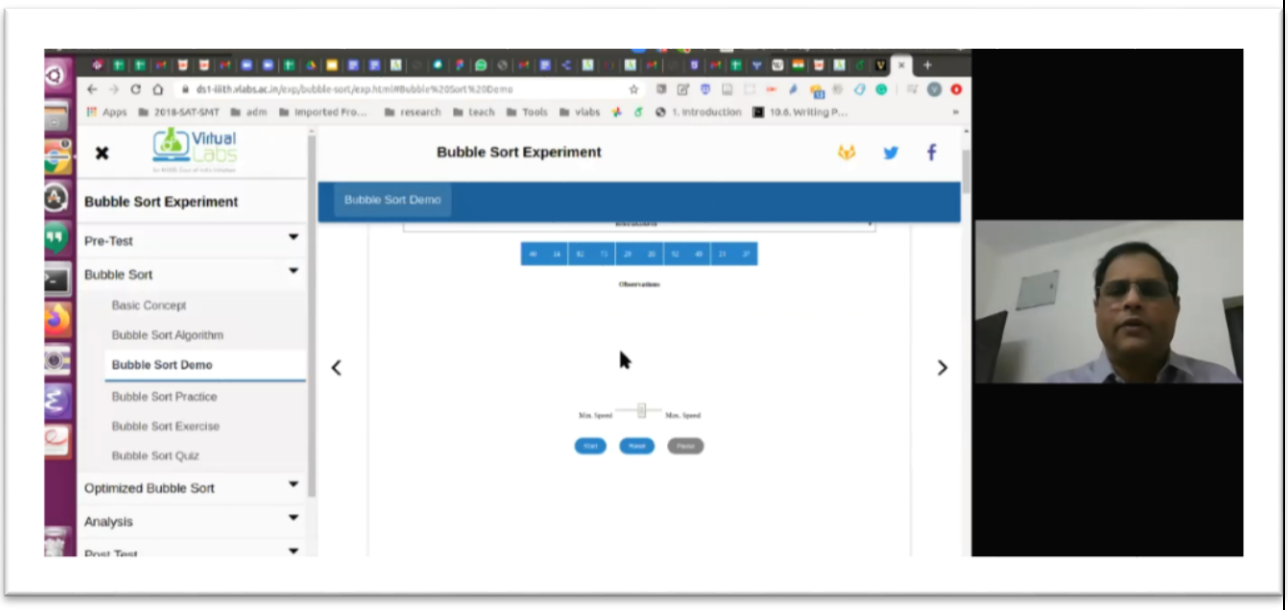
Prof. Venkatesh Choppella demonstrating experiments




*Fluorescence spectroscopy experiment*




*Digital electronics, AND Gate experiment*




*Bubble sorting experiment*

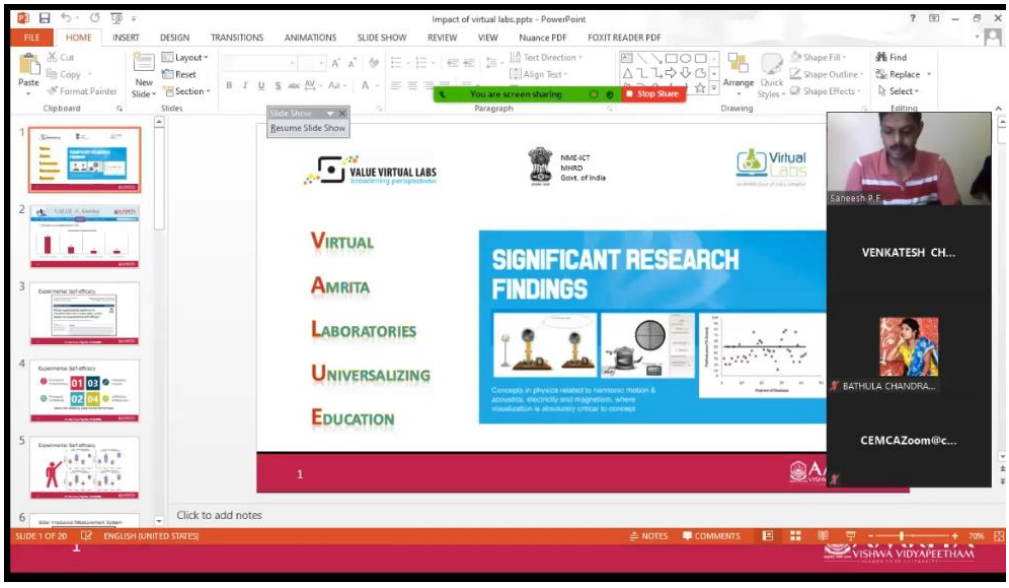
## Innovative teaching using virtual labs

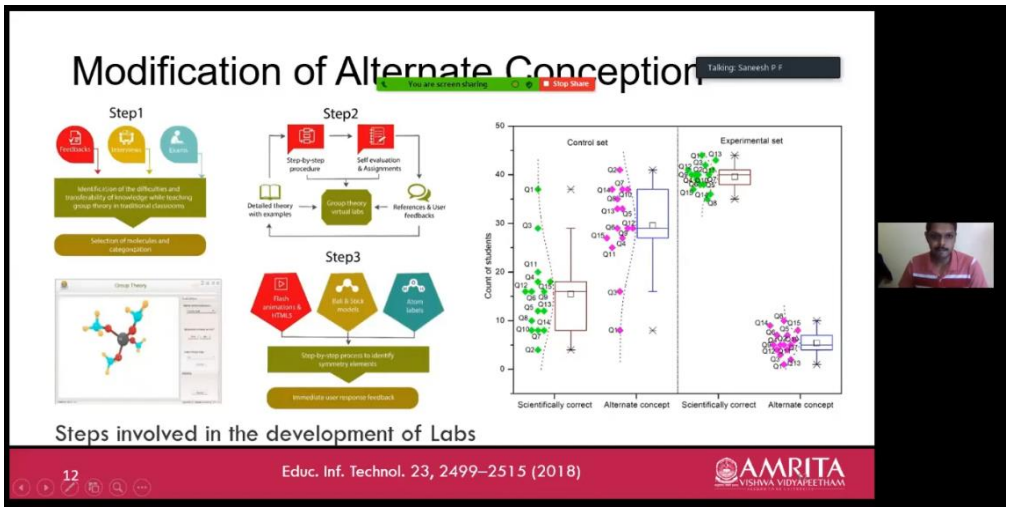
Mr. Saneesh discussed innovative teaching using virtual labs. He shared various methods to practice virtual labs as part of curriculum and how to engage students in the laboratory learning exercises. He also presented learning techniques (e.g. active and cooperative learning, real-world learning, brainstorming sessions, etc.) that can be incorporated with virtual labs for enhancing students' interactivity with the platform.

## Significant impact of virtual labs - Research studies

Amrita Virtual Lab team has conducted various research works to identify the impact of virtual labs among students and institutions. Mr. Saneesh shared some of the research findings with the participants to demonstrate the significance of virtual labs in college level education. He presented the following research articles:

- Kolil, V. K., Muthupalani, S., & Achuthan, K. (2020). Virtual experimental platforms in chemistry laboratory education and its impact on experimental self-efficacy. International Journal of Educational Technology in Higher Education, 17(1), 1-22.
- Achuthan, K., Kolil, V. K., & Diwakar, S. (2018). Using virtual laboratories in chemistry classrooms as interactive tools towards modifying alternate conceptions in molecular symmetry. Education and Information Technologies, 23(6), 2499-2515.
- Umesh, M., Shankar, B., Achuthan, K., & Francis, S. P. (2018, July). Battery Capacity Computation Using Peukert's Equation in a Virtual Environment. In 2018 IEEE 18th International Conference on Advanced Learning Technologies (ICALT) (pp. 403-404). IEEE.
- Achuthan, Krishnashree, Sayoojyam Brahmanandan, and Lakshmi S. Bose. "Cognitive Load Management in Multimedia Enhanced Interactive Virtual Laboratories." Advances in Intelligent Informatics. Springer, Cham, 2015. 143-155.
- Achuthan, Krishnashree, et al. "Improving perception of invisible phenomena in undergraduate physics education using ICT." 2014 2nd International Conference on Information and Communication Technology (ICoICT), IEEE, 2014.

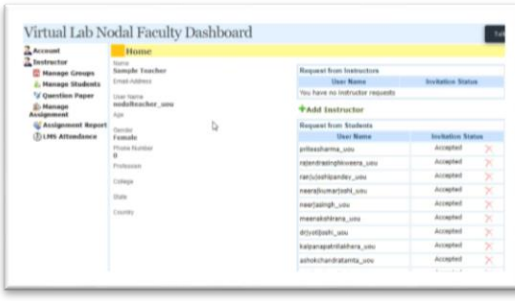





*Mr. Saneesh P. F. presenting the research impact*

## Learning Management System (LMS Module)

The Virtual Lab platform provides a Learning Management System (LMS) for the faculty members to conduct online assessment and manage their students. LMS modules enable faculty members to create different group of students, create online questionnaire, assign the questionnaire to a specific group of students and also allows results to exported. Unique user IDs for accessing LMS are distributed to all the participants and Mr. Saneesh showed how to use the LMS for conducting online assessment.

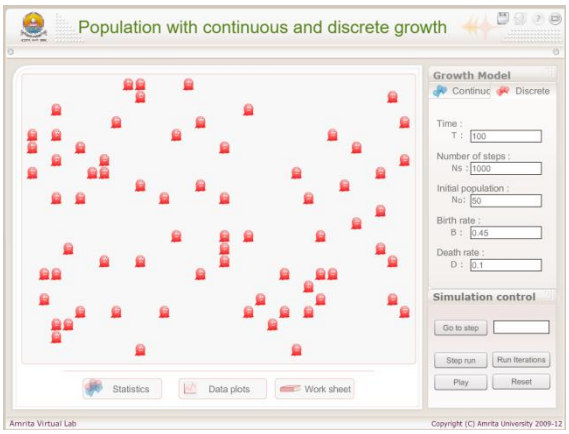



*Faculty dash board of LMS*

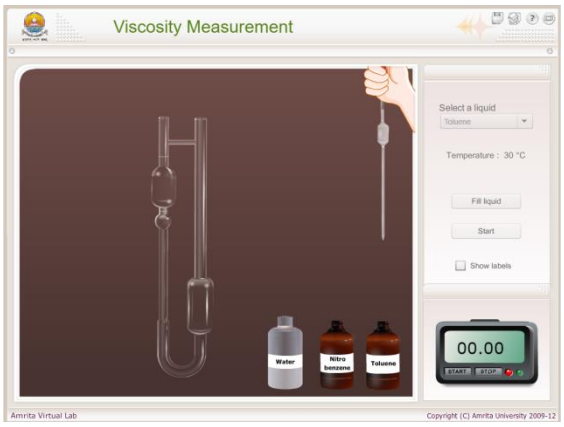
A number of experiments were demonstrated such as Gram Stain Technique, Population with Continuous and Discrete Growth, Determination of Viscosity of Organic Solvents, Spectrometer experiment, and Computer Science Programming Lab. This was followed by an interactive question and answer session. Faculty members showed appreciation towards CEMCA and Amrita Vishwa Vidyapeetham for delivering the information regarding virtual labs. During Q&A session, participants cleared their doubts regarding virtual lab nodal center program and possibility of including more experiments in future. The sessions were concluded with vote of thanks by Dr. Shiffon Chatterjee.

## Virtual Lab Experiment Demonstration

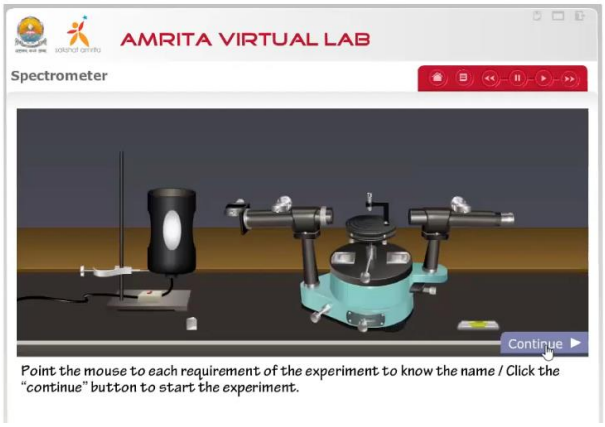

*Gram Stain Technique*



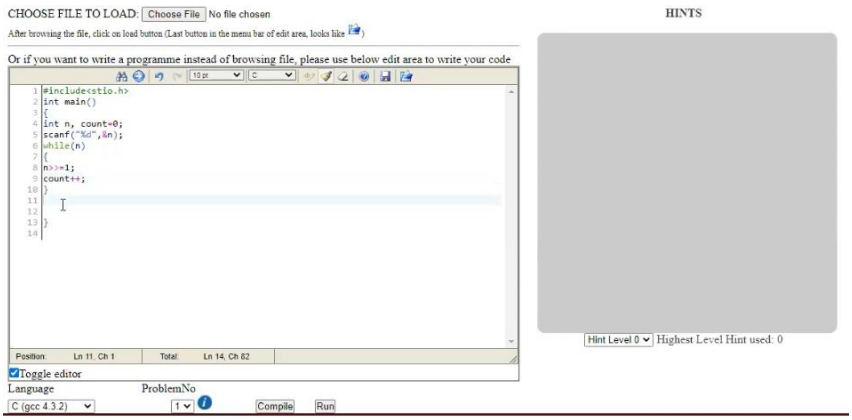

*Population with Continuous and Discrete Growth*




*Determination of viscosity of organic solvents*



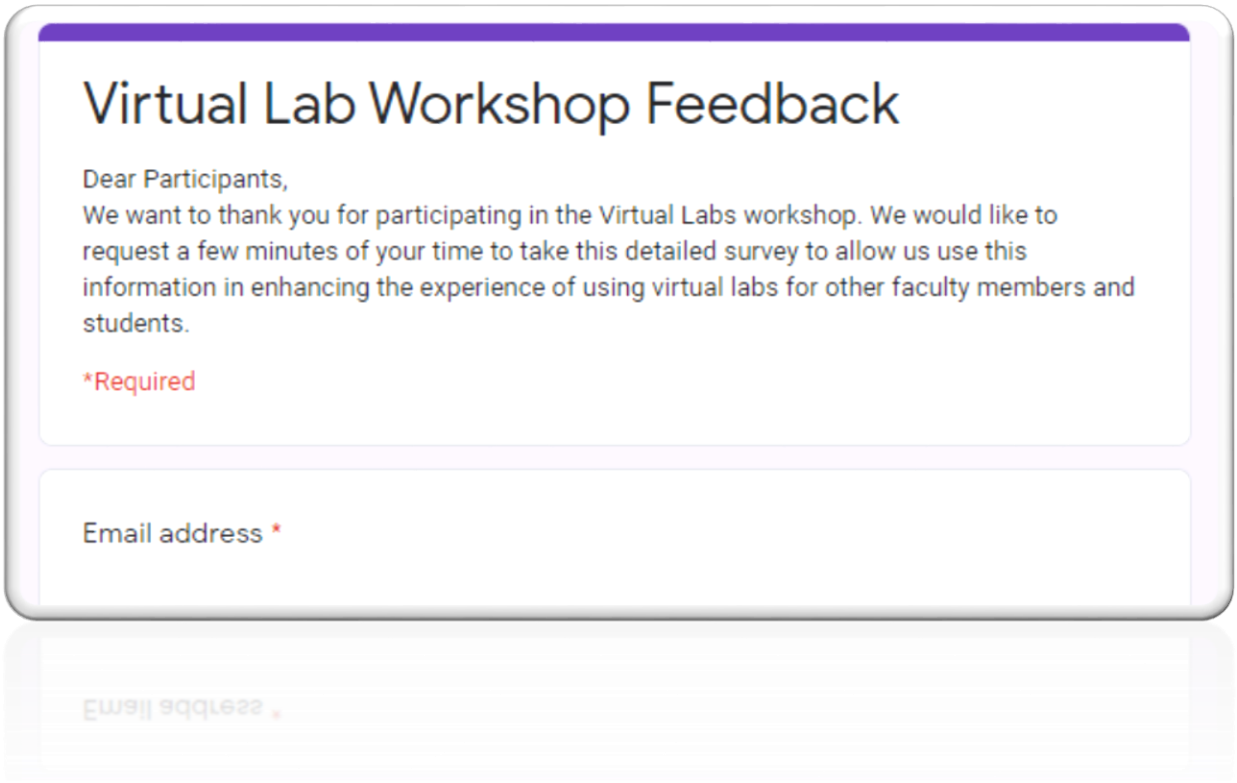

*Spectrometer experiment*




*Computer science programming lab*

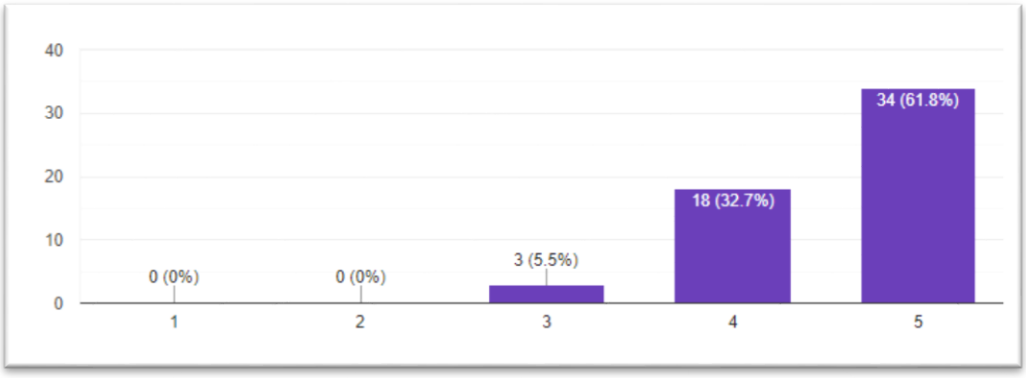
## Feedback of the workshop

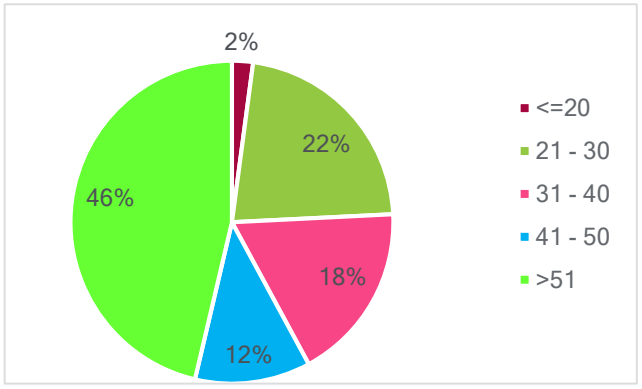
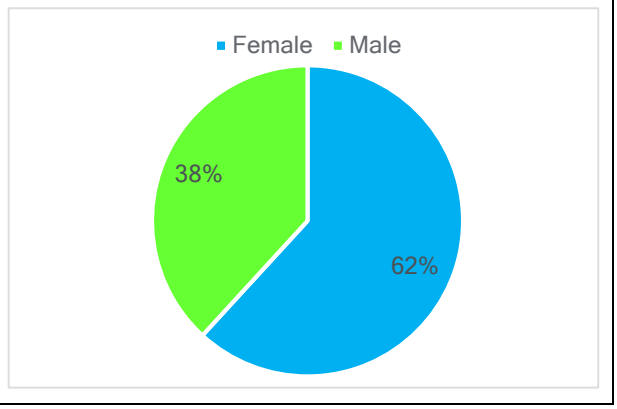
Participants were requested to fill up the feedback designed using Google form. Feedback link was shared via WhatsApp group and Zoom chat box at the end of the session. Feedback is used to adjust and improve current and future actions and behaviors.




**How would you rate the workshop?**

For rating the workshop, participants could choose from 1 – 5 (1 represents poor and 5 represents excellent). 61.8% of the participants rated the workshop as excellent, 32.7% of participant rated as 4 out of 5 and 5.5% of the participant rated as 3 out of 5.



| Age group of the participants | Gender |
|---|---|
|  |  |

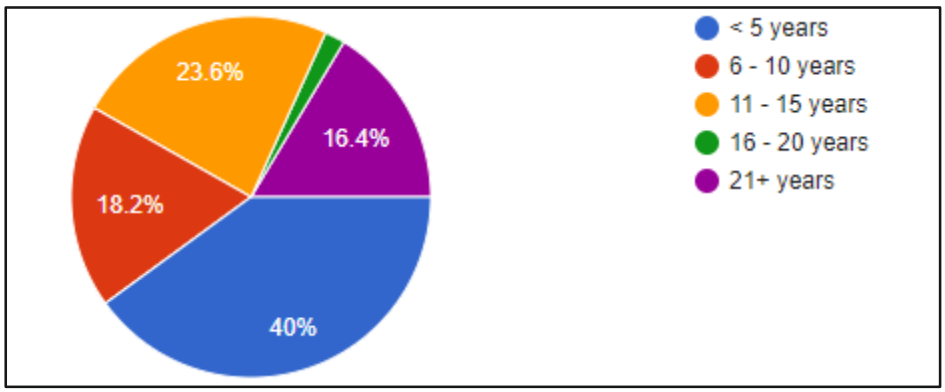




46% of the participants were in the age range above 50 years. 62% of the participants were female and 38% of the participants were male candidates.

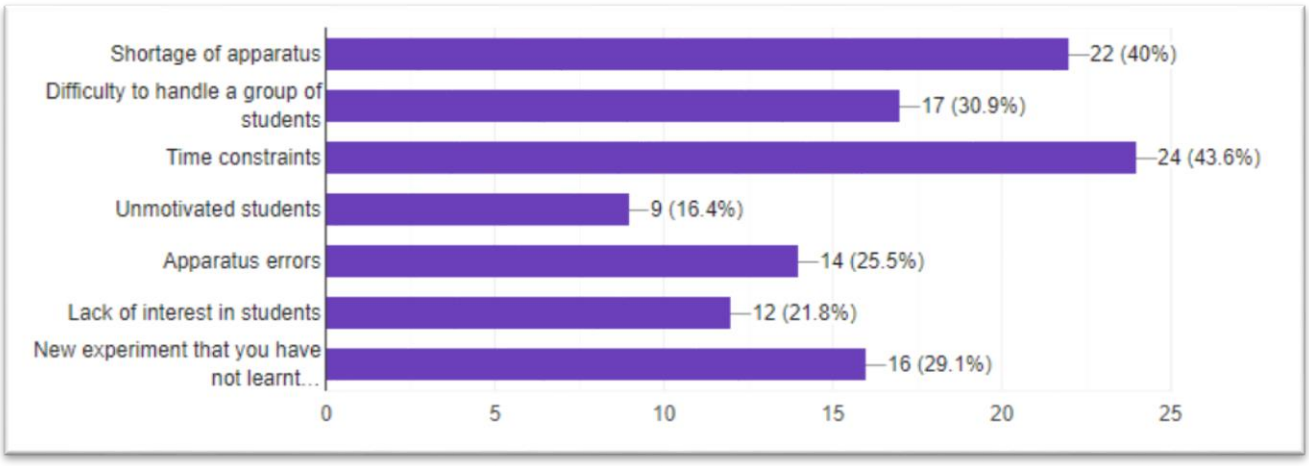
**Years of experience**

The range of experience of the participants was varied. 16.4% of the participants had more than 21 years of experience whereas majority of the participants (40%) had less than 5 years of experience. The distribution of the experience of the participants is given in the below graph. This mixed group shows that faculty members with different levels of experience were interested to learn how to use virtual labs for the benefits of the students.



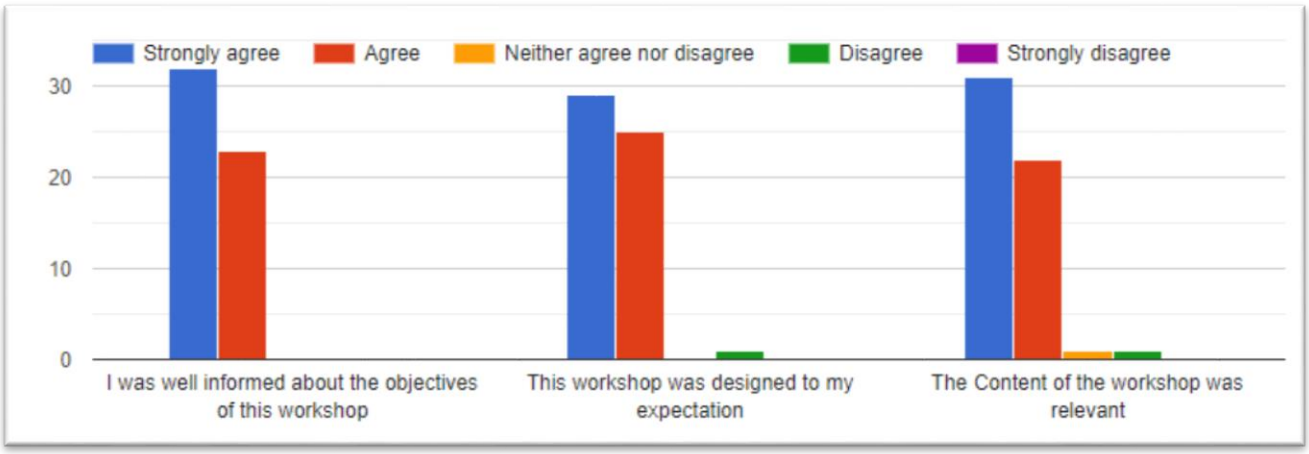

**What are the challenges that you are facing in the laboratory teaching?**

Multiple choice options were provided to the participants to indicate their opinion.



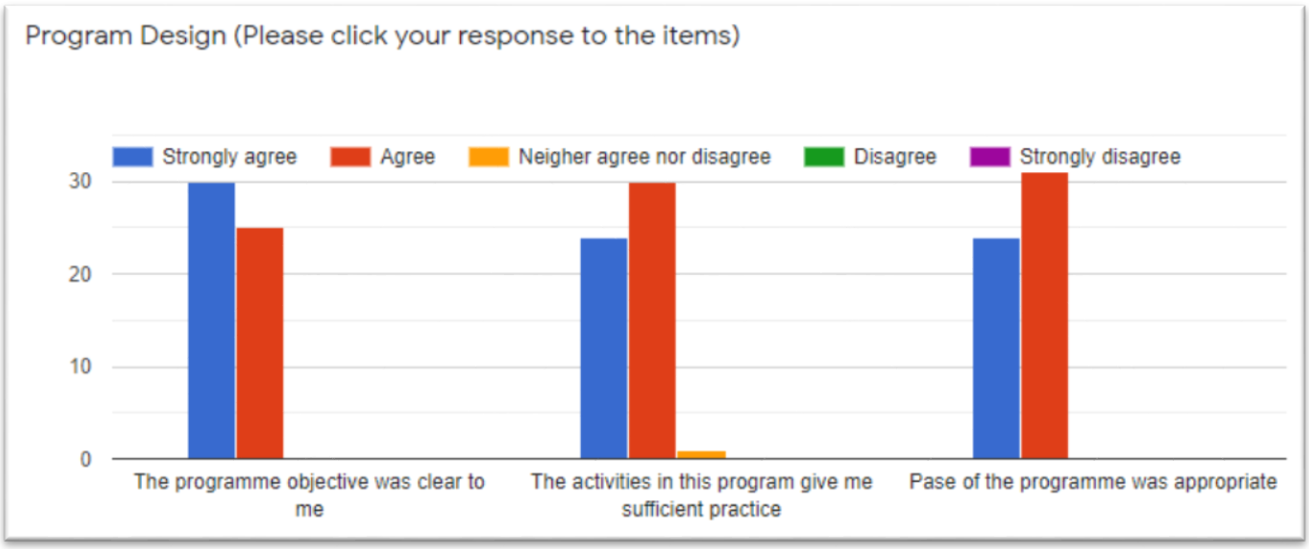
The common challenges faced by the faculty member during laboratory teaching were analyzed. 40% of the participants responded that there is a shortage of apparatus in the traditional laboratory. 30% of the participants faced difficulty in handling groups of students. 43% of the participant faced time constrains in the physical lab session. 16.4% of the participants responded that unmotivated students also pose a major challenge in conducting the laboratory sessions. 25.5% responses said that the apparatus error makes it difficult to complete the experimentation. 29.1% of the participants faced difficulty in teaching new experiments to the students, because teachers had to learn the experiment properly before conducting the laboratory session.

**Program Content**



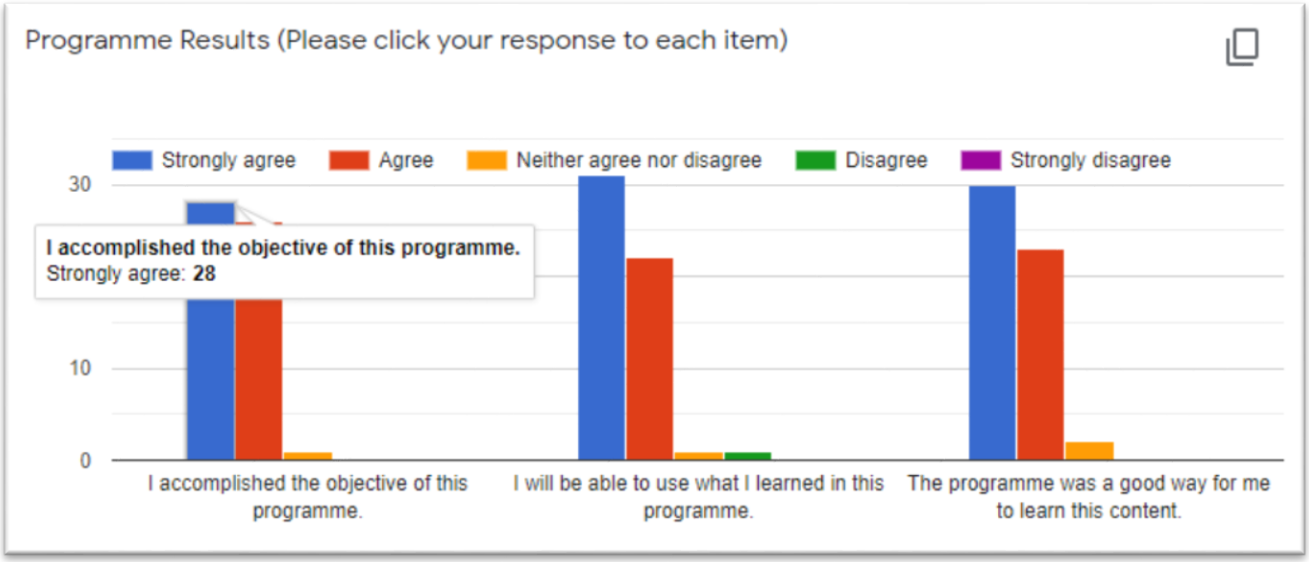

Most of the participants felt that they were informed about the objectives and found the count relevant and designed as per their expectations. Two of the faculty members expressed their disagreement regarding relevance of workshop content. This should be explored to strengthen the workshop further.

**Program Design**



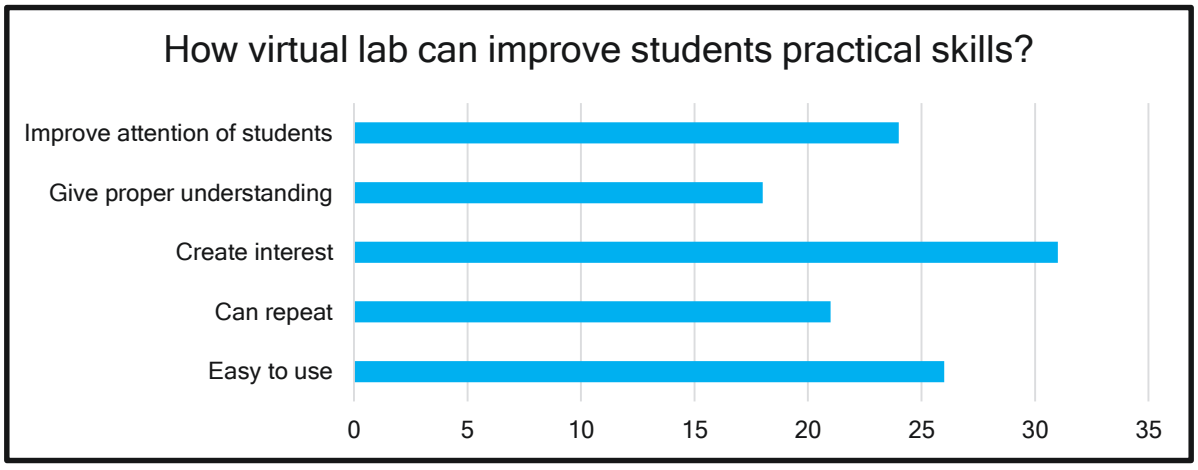

In the chart above represents the response regarding program design. Most of participants replied in affirmative as is evident in chart above.

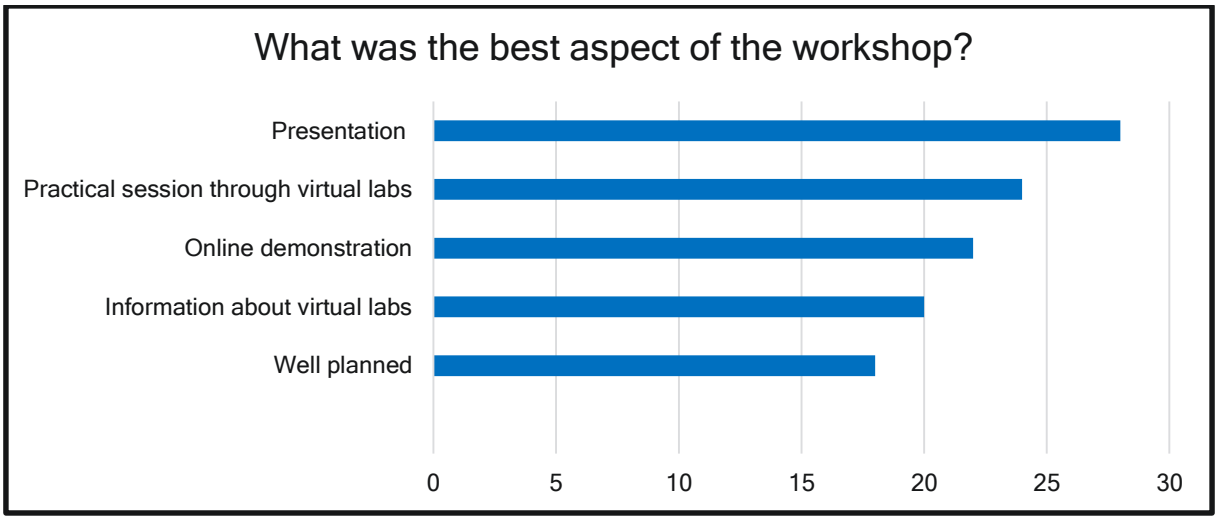
**Program Results**

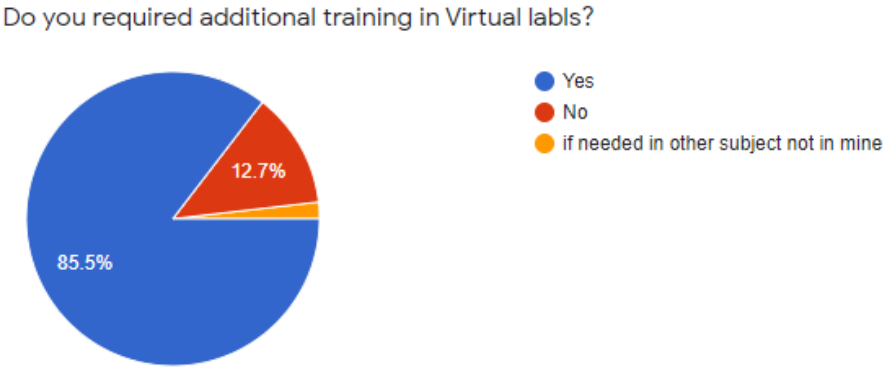



It is very important to know what the participants perceived regarding the attainment of the objectives and how they would use the knowledge gained during the workshop. The above graph shows that most of the participants were satisfied on these points. For participants who did not express confidence in their ability to use what they learnt during this workshop, some effort may be taken to explore the difficulty and solve it.

There were several questions asked to the participants to know their opinion. Their responses are represented in the following graphs.






## Suggestions from the participants

- Require more time to practice the virtual labs
- More number of experiments based on the syllabus would be very useful
- More training sessions required for each discipline

# Appendices

Appendix 1: List of participants

| Sl. No. | Name | Designation | Department | Institution |
|---|---|---|---|---|
| 1 | M. A. Jahangir | Assistant Professor | Computer Science | Naliniprabha Deoprasad Roy College, Bilaspur CG |
| 2 | Vinod Kumar Gupta | Assistant Professor | Zoology | C M Dubey Post Graduate College Bilaspur CG |
| 3 | Puja Patra | Student | B.Ed | Vidyasagar University |
| 4 | Vinit Nayar | Assistant Professor | Department of Physics | C M Dubey Post Graduate College Bilaspur CG |

| | | | | |
|---|---|---|---|---|
| 5 | Dr. Asit Nandy Bhattacharya | Assistant Professor | Zoology | Raja Peary Mohan College |
| 6 | Rintu Taye | Academic Counsellor | Education | Sonari College KKHSOU Study Center |
| 7 | Dr. Sarada Prasad Mohanty | Lecturer | Applied Chemistry | College of Engineering & Technology, Bhubaneswar. Odisha |
| 8 | Dr. Chitra Devi | Assistant Professor | Education | Debraj Roy College, Golaghat, Assam |
| 9 | Bharati Nivrutti Kolhe | Academic Coordinator | Science and Technology | Yashwantrao Chavan Maharashtra Open University, Nashik |
| 10 | Dr.R.Pragadheeswari | Assistant Professor | Apparel and Fashion Design | Tamil Nadu Open university |
| 11 | Dr. R. Kalaiarasi | Assistant Professor | Computer Science | Tamil Nadu Open University |
| 12 | Sweta Dipakraj Kapade | Academic Coordinator | Physics | Yashwantrao Chavan Maharashtra Open University, Nashik |
| 13 | Shweta Mahendra More | Academic coordinator (Environmental Science) | School of Science and Technology | Yashwantrao Chavan Maharashtra Open University, Nashik |
| 14 | Dr.Kalpana Raikwar | Assistant Professor | Chemistry | Govt.P.G.College,Guna |
| 15 | Dr. Vibha Goyal | Assistant Professor | Chemistry | C.M.Dubey P G College Bilaspur |
| 16 | Smriti Pandey | Assistant Professor | Microbiology | C.M.Dubey P.G.College Bilaspur |
| 17 | Dr. Subha Gaurab Roy | Assistant Professor | Physics | S. S. College, Hailakandi |
| 18 | Dr. Renu Nayar | Assistant Professor | Chemistry | D P Vipra College Bilaspur Chhattisgarh |
| 19 | Prasun Sar | Teacher | Physics | Sagrai Sukanta Vidyapith |
| 20 | Tusar Kanti Manna | Student | Computer Science | Netaji Subhash Engineering College |
| 21 | Dr.Tripti Biswas | Assistant professor | Psychology | Rajeev Gandhi Govt. P.G. College, Ambikapur |
| 22 | Sayan Pal | Student | Physics | Ramakrishna Mission Residential College, Narendrapur, Kolkata |
| 23 | Dr. Shilpi Shrivastava | Professor | Chemistry | Kalinga University Naya Raipur Chhattisgarh |
| 24 | Aloke Verma | Assistant professor | Physics | Kalinga University |
| 25 | Gaurav Verma | Lecturer | Mathematics | DoE Chhattisgarh |
| 26 | Vivek Mishra | Teacher | Physics | Rajkumar College Raipur |
| 27 | Jobin John | Software developer | Computer Science | Shri Rawatpura Sarkar University |

| | | | | |
|---|---|---|---|---|
| 28 | Ashutosh Nirbhavane | Academic coordinator | School of Science and Technology | Yashwantrao Chavan Maharashtra Open University, Nashik |
| 29 | Dr.S.Pavani | Assistant professor | Computer Science | C.M.Dubey P G College , Bilaspur |
| 30 | Tamil selvan R M | Assistant Professor of Special Education | School of Special Education and Rehabilitation | Tamil Nadu Open University |
| 31 | Minakshi Babusing Kadel | Academic coordinator of Botany | School of architecture, science and technology | Yashwantrao Chavan Maharashtra Open University, Nashik |
| 32 | Dr. Manoranjan Chakraborty | Assistant Professor | Botany | Bankura Christian College |
| 33 | Kiran Sharma | Lecturer | Pharmaceutics | Government Pharmacy College, Sajong |
| 34 | Mr. Shubham Rameshwar Bhongle | Academic Coordinator | School of Health Science | Yashwantrao Chavan Maharashtra Open University, Nashik |
| 35 | Anish Pradhan | Lecturer | Pharmaceutical chemistry | Government Pharmacy College Sajong |
| 36 | Rubi Kambo | Assistant Professor | Computer Science and Information Technology | Ravishankar Shukla University, Raipur |
| 37 | Monali Ravindra Borade | Academic coordinator | School of Computer Science | Yashwantrao Chavan Maharashtra Open University, Nashik |
| 38 | Manoj Kumar Gelda | Associate Professor | Business Management | Nishitha Degree College |
| 39 | Anuradha panda | Lecturer | Physics | GRJD science college, malkangiri, odisha |
| 40 | R. Chandana | Lecturer | Physics | Nishitha Degree College |
| 41 | Kyatham Prasanna Rani | Lecturer | Physics | Nishitha degree college |
| 42 | Dr. Pooja Juyal | Academic Consultant | Botany | Uttarakhand Open University |
| 43 | Kirtika Padalia | Academic Consultant | Botany | Uttarakhand Open University |
| 44 | B Rekha | Assistant professor | Mathematics | Nishitha Degree College |
| 45 | Dr. Mukta Joshi | Academic consultant | Zoology | Uttarakhand Open University, Haldwani |
| 46 | Dr. Prabha Dhondiyal | Academic consultant | Department of Botany | Uttarakhand Open University |
| 47 | Prayas Pralubdha Ray | Student | Physics | Kalinga University |
| 48 | M.Vijaya Lakshmi | Assistant professor | Science | CTE, Raipur,C.G. |

| | | | | |
|---|---|---|---|---|
| 49 | Bathula Chandrakala | Assistant Professor | Electronics | Nishitha Degree College |
| 50 | Bichkunda Vinisha | Librarian | Dept. of Library | Nishitha Degree College |
| 51 | Dr. Udayana | Executive Officer | Academic | National Institute of Open Schooling |
| 52 | Mrs. Neela Chaudhary | Lecturer | Education | IASE Bilaspur Chhattisgarh |
| 53 | Manisha Singh | Assistant Professor | Biological Science | SAGE University Indore |
| 54 | Harivansh Markam | Student | Computer Science | Rawatpura sharkar |
| 55 | Sumananjali Bariha | Lecturer | Education | Govt.Higher Secondary School Ramnagar Basti Raipur |
| 56 | Dr. Sampat Prasad Rawat | Assistant Professor | Department of Chemistry | Govt. Vivekanand P. G. College Maihar |
| 57 | Dr. K.S. Ramakrishnan l | Assistant Professor | School of Education | Tamil Nadu Open University, Chennai |
| 58 | Dr.K.S.Premila | Associate Professor | School of Education | Tamil Nadu Open University |
| 59 | Dr Sunanda Arun More | Associate Professor | Science and Technology | Yashwantrao Chavan Maharashtra Open University, Nashik |
| 60 | J Ravikumar | Lecturer | Mathematics | Nishitha Degree College |
| 61 | Pund Amol Rajendra | Academic coordinator | Science and Technology | Yashwantrao Chavan Maharashtra Open University, Nashik |
| 62 | Enosh Patro | Student | Physics | Govt. Kaktiya P. G. College, Jagdalpur (Bastar university) |
| 63 | Dr. Pushpa Singh | Assistant Professor | Zoology | Govt. Vivekanand P.G. College Maihar |
| 64 | Shraddha Choudhary | Ph.d scholar | Chemistry | Apsu Rewa District Satna (MP) |
| 65 | Shailkumari singh | Research Scholar | Chemistry | Apsu Rewa District Satna (MP) |
| 66 | Mohammad Areefa begum | Lecturer | Physics | Nishitha Degree College |
| 67 | Vikas Gedam | Lecturer | Education | Govt HSS Ramnagar Basti Raipur |
| 68 | Neelam Gupta | Course Coordinator, EVS | Academic | National Institute of Open Schooling |
| 69 | Akshay P R | Student | M.Sc. Physics | Kalinga University |
| 70 | Manisha Priyadarshini Biswal | Student | M.Sc. Physics | Kalinga University |
| 71 | Riteshi Priyadarshini Barik | Student | Physics | Kalinga University |