



REPORT ON

2-DAY VIRTUAL LABS WORKSHOP

9-10 November 2020

Organized by

**School of Computer Science & IT,
Uttarakhand Open University**

In collaboration with

**Commonwealth Educational Media Centre for Asia,
New Delhi**

Report Submitted
by

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



2-DAY WORKSHOP ON VIRTUAL LABS

9-10 Nov., 2020

Uttarakhand Open University, Haldwani

The focus of this workshop is on creating awareness about Virtual Labs for internet-based remote experimentation and enabling faculty to use Virtual Labs and to integrate them effectively in teaching practice.

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Introduction

Virtual lab 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 is 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 Vidhyapeetham, IIT Delhi, IIT Bombay, IIT Kanpur, IIT Kharagpur, IIT Madras, IIT Roorkee, IIT Guwahati, IIIT Hyderabad, Dayalbagh University, NIT Suratkal and College of Engineering, Pune.

Main website: <https://www.vlab.co.in/>

University website: <http://vlab.amrita.edu/>

Virtual Lab is a new immersive e-learning tool that provides a media-rich, interactive user interface that teachers can use to supplement their curriculum. Virtual 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.

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.
- Use Virtual Labs for performing laboratory experimentations.
- Integrate Virtual labs into teaching and learning practices.

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.

Key Persons for the Workshop



CHIEF PATRON

Prof. O.P.S. Negi
Hon'ble Vice Chancellor,
Uttarakhand Open University



CONVENER

Prof. Durgesh Pant
Director- School of CS & IT, UOU



KEYNOTE ADDRESS

Dr. Krishnashree Achuthan
Principal Investigator
VALUE Virtual Labs
Amrita Vishwa Vidyapeetham



ADVISOR

Prof. Madhu Parhar
Director- CEMCA New Delhi



ORGANIZING SECRETARY

Dr. Jeetendra Pande
Assistant Professor- Comp. Sc,
Uttarakhand Open University



RESOURCE PERSON

Mr. Saneesh P F
Project Manager,
VALUE Virtual Labs
Amrita Vishwa Vidyapeetham,
Kollam



ORGANIZING SECRETARY

Dr. Shiffon Chatterjee
Sr. Program Officer, CEMCA

Invitation

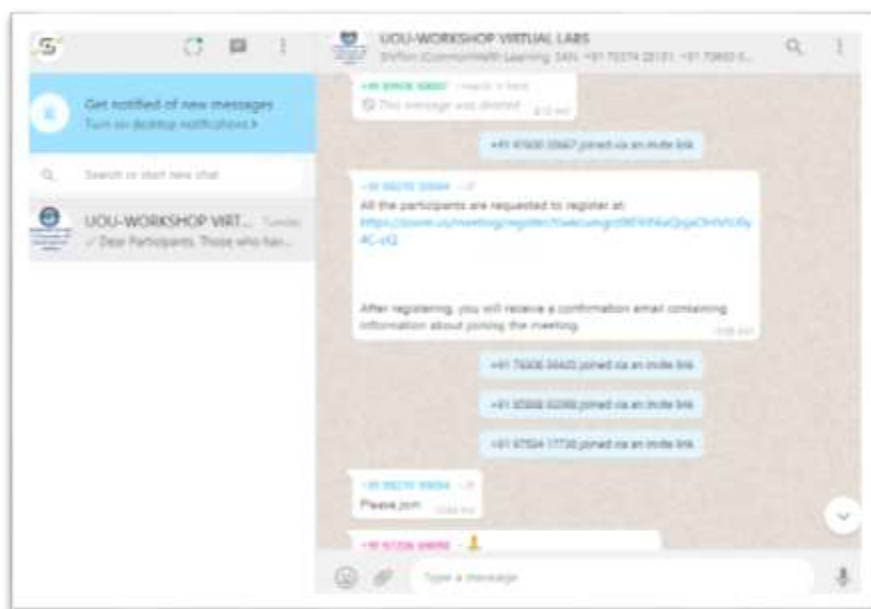
CEMCA, New Delhi invited Amrita Virtual Labs to conduct two day online workshop on 9th and 10th November 2020 for Uttarakhand Open University faculty members.

Participants

Sixty-two participants from Uttarakhand Open University 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 for two days - November 9th and 10th 2020 from 1100AM to 1:00PM

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

WORKSHOP ON VIRTUAL LABS at UOU Confirmation

CEMCAZoom@col.org <no-reply@zoom.us>

Thu 11/5/2020 2:40 PM

To: Saneesh P F <saneeshpf@am.amrita.edu>

Hi Saneesh P F,

Thank you for registering for "WORKSHOP ON VIRTUAL LABS at UOU".

Please submit any questions to: CEMCAZoom@col.org

Date Time: Nov 9, 2020 11:00 AM Mumbai, Kolkata, New Delhi

Every day, until Nov 10, 2020, 2 occurrence(s)

Nov 9, 2020 11:00 AM

Nov 10, 2020 11:00 AM

Please download and import the following iCalendar (.ics) files to your calendar system.

Daily: https://zoom.us/meeting/attendee/Uwkcumgrz0tE9Jfi6xQojaOHIVtU0y4C-oQ/ics?user_id=ZBGN-hVyR_K1aw15mUEWcgJoin from PC, Mac, Linux, iOS or Android: [Click Here to Join](#)

Passcode: 934687

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: +16699006833,98950816796# or +19292056099,98950816796#

Or Telephone:

Dial(for higher quality, dial a number based on your current location):

US: +1 669 900 6833 or +1 929 205 6099 or +1 253 215 8782 or +1 301 715 8592 or +1 312 626 6799 or +1 346 248 7799 or 833 548 0276 (Toll Free) or 833 548 0282 (Toll Free) or 877 853 5257 (Toll Free) or 888 475 4499 (Toll Free)

Meeting ID: 989 5081 6796

International numbers available: <https://zoom.us/u/aGX5cLNwc>

Workshop Schedule

Day 1: November 9 th 2020 (Monday)			
Time	Activity Session	Key persons	Outcome
11:00AM – 11:45AM	Inaugural function	Prof. O. P. S Negi Prof. Madhu Parhar Prof. Durgesh Pant Dr. Krishnashree Achuthan Dr. Jeetendra Pande	
11:45AM – 12:15PM	Introduction to Virtual Labs	Mr. Saneesh P F	Know about virtual lab project
12:15PM – 12:30PM	Virtual Lab video		Know about virtual labs
12:30PM – 01:00PM	Virtual Lab experiment demonstration	Mr. Saneesh P F	Learn how to do virtual lab experimentation
01:00PM – 1:05PM	Q&A session		
Day 2: November 10 th 2020 (Tuesday)			
Time	Activity Session		
11AM – 11:15AM	Introduction to Virtual Labs	Mr. Saneesh P F	Know about Virtual lab project
11:15AM - 11:20AM	Virtual Lab user experience	Dr. Zeena S Pillai	
11:20AM – 11:25AM	Virtual Lab user experience	Dr. Sreelatha K S	
11:25AM – 11:45AM	Innovative Teaching	Mr. Saneesh P F	How to transform teaching using Virtual Labs
11:45AM – 12:00PM	Significant impact of virtual labs	Mr. Saneesh P F	Learn about virtual

			lab research findings
12:00Pm – 12:20PM	Virtual Lab's Learning Management System (LMS Module)	Mr. Saneesh P F	Learn to use LMS module
12:20PM – 12:50PM	Virtual Lab experiment demonstration	Mr. Saneesh P F	Learn how to do virtual lab experimentation
12:50PM – 1:00PM	Q&A Session		
1:00PM – 1:10PM	Closing		

Day 1 - November 9th 2020

Inauguration was graced by the presence of Prof. Om Prakash Singh Negi, Hon'ble Vice Chancellor, Uttarakhand Open University (UOU); Prof. Madhu Parhar, Director, CEMCA; Prof. Durgesh Pant, Director School of CS and IT, UOU; and Dr. Krishnashree Achuthan, Dean of PG program, PI of Virtual Labs, Amrita Vishwa Vidyapeetham.

Prof. Madhu Prahar welcomed all the participants and gave an overview of the program. She mentioned the need for creating 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. Durgesh Pant delivered the inaugural address. He said that UOU has partnered with Amrita University for using A-View platform and conducted several workshops through the platform. He mentioned that this is online education 2.0 and encouraged all the faculty members to go ahead with this learning environment.

Dr. Krishnashree Achuthan delivered the keynote address. She mentioned about the gaps in the laboratory education and encouraged the faculty members to utilize the facility to motivate students. Prof. O. P. S Negi delivered the presidential address. He mentioned the importance of online education in India especially in COVID-19 situation. Dr. Negi pointed out the situation faced by the Open University where the practical sessions are very difficult to conduct resulting in lack of exposure of students in conducting laboratory experiments. He expressed the view that using virtual labs students will get knowledge about experiments and apparatus handling. Dr. Jeetendra Pande, School of CS and IT, UOU delivered vote of thanks to all the dignitaries as well as the participants.

Mr. Saneesh P F served as a resource person of the workshop. He demonstrated various experiments from Biotechnology & biomedical engineering, Physical sciences, Chemical sciences and also from computer sciences disciplines. He delivered talk on how to transform the teaching using virtual labs and shared few research findings regarding how virtual labs are effective for students and faculty members.

ANCHOR AND HOST BY**Dr. Shiffon Chatterjee, CEMCA, New Delhi.****ADDRESS BY****Professor Madhu Prahar, Director, CEMCA, New Delhi.****ADDRESS BY****Professor Durgesh Pant, Director School of CS & IT, UOU.****KEYNOTE ADDRESS BY****Dr. Krishnashree Achuthan, Amrita Vishwa Vidyapeetham****PRESIDENTIAL ADDRESS****Professor Om Prakash Singh Negi,****Hon'ble Vice Chancellor, Uttarakhand Open University, Haldwani, Nainital.****VOTE OF THANKS****Dr. Jeetendra Pande, Uttarakhand Open University, Haldwani, Nainital.***Prof. MadhuPrahar delivering inaugural address**Prof. O P S Negi delivering presidential address*



Dr. Krishnashree Achuthan delivering Keynote address



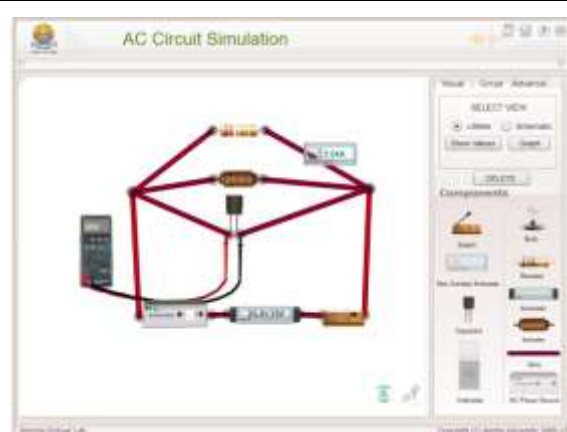
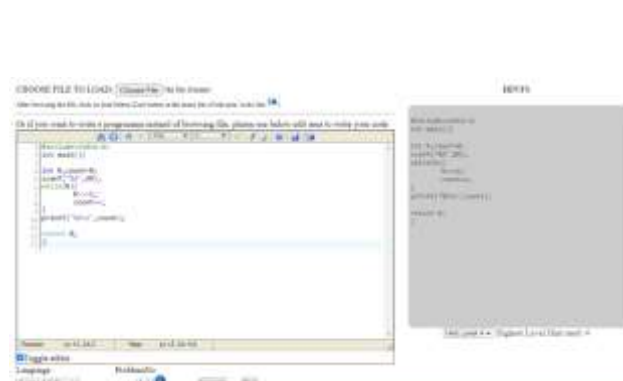
Dr. Jeetendra Pande delivering vote of thanks

Session details from 11:45AM to 1PM

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 (from Biotechnology), Spectrophotometer (from Chemistry), Determination of viscosity of organic solvents (from Chemistry), Parallel LCR circuit (from Physics), Tangent Galvanometer (from Physics), and Problem solving labs (from computer science).



Virtual Lab Experiment demonstration

*Blood grouping**Spectrophotometer**Determination of viscosity of organic solvents**Parallel LCR Circuit**Tangent Galvanometer**Problem solving lab*

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 / Interfero Meter 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>

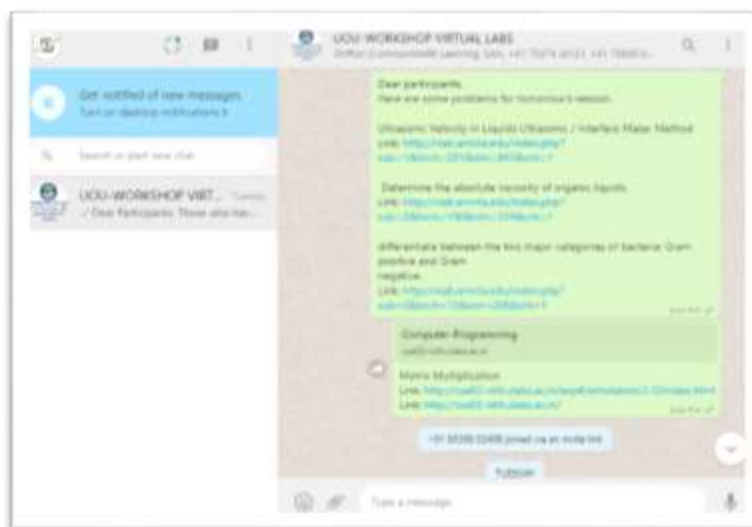
Problem 2: Which tag is used for largest heading?

Link: <https://html-iiitd.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 - November 10th 2020

Dr. Shiffon Chatterjee welcomed the dignitaries during the second day of the workshop. Dr. Madhu Parhar delivered the welcome address. After the welcome address, Mr. Saneesh presented a recapitulation of the virtual labs concept. Dr. Zeena S Pillai, Associate Professor, Department of Chemistry, Amrita Vishwa Vidyapeetham and Dr. Sreelatha K S, Assistant Professor, Govt. Polytechnic College, Kerala shared user experiences with participants regarding how virtual labs help to effectively engage students in laboratory experimentation.



Dr. Zeena S Pillai delivering user experience of Virtual Labs as a teacher



Dr. Sreelatha K S delivering user experience of Virtual Labs as a teacher

Innovative teaching using virtual labs

Mr. Saneesh delivered talk on 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 introduced 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 share 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, SayoojyamBrahmanandan, 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.

Learning Management System (LMS Module)

Virtual Lab platform provides an additional tool in the form of a Learning Management System (LMS) for the faculty members to conduct online assessment and manage their students. LMS modules enables faculty members to create different group of students, create online questionnaire, assign the questionnaire to a specific group of students and also allows to export the results. During workshop, Mr. Saneesh demonstrated how to use the LMS for conducting online assessment.



Faculty dash board of LMS

LMS Module demonstration

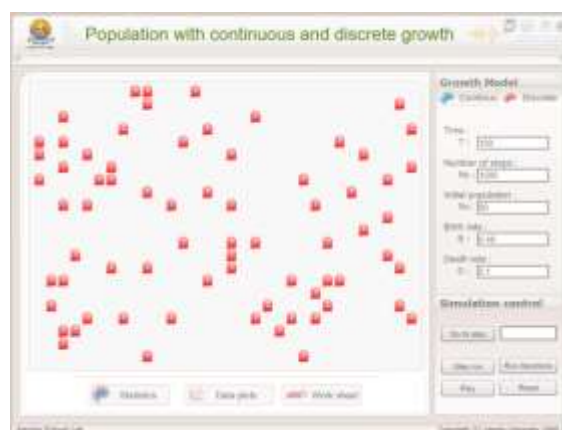
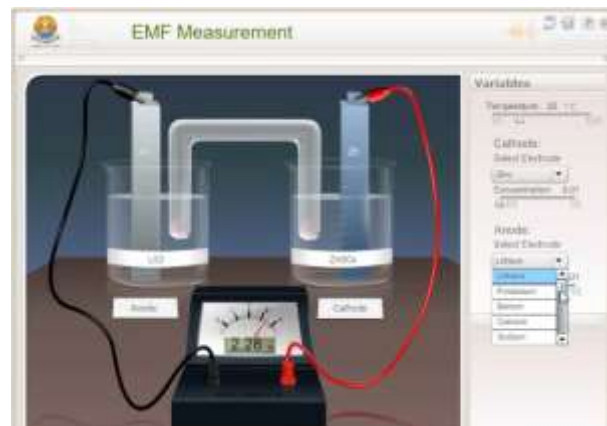


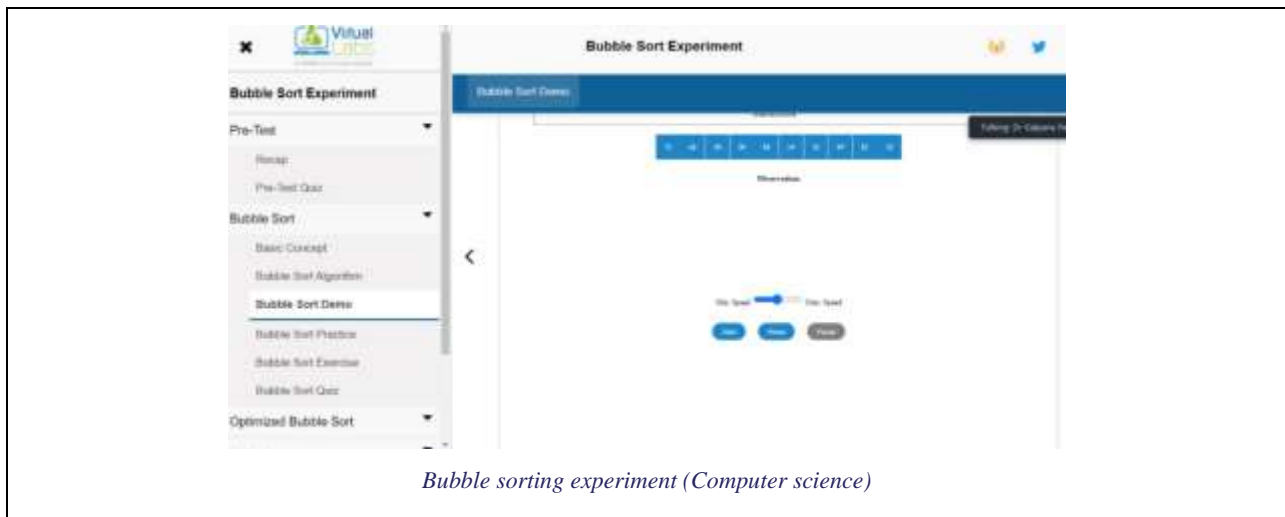
Creating questionnaire using LMS module



Managing assignment

Virtual Lab Experiment demonstrator

*Gram Stain Technique**Population with Continuous and Discrete Growth**Determination of viscosity of organic solvents**EMF measurement**Millikan's oil drop experiment**Ultrasonic Interferometer*

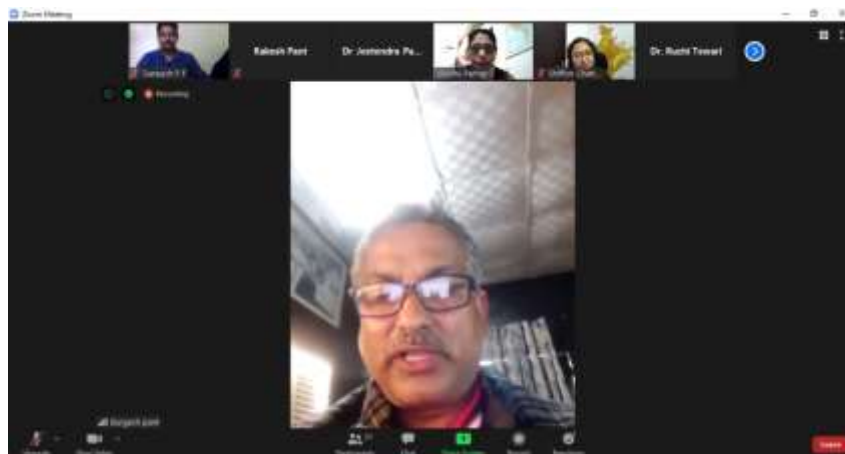


Valedictory session from 1:00PM – 1:15PM

The concluding and the valedictory session were graced by the presence of Prof. Madhu Parhar; Director CEMCA and workshop advisor; Prof. Durgesh Pant, convener, Director, School of CS & IT, UOU; Dr. Jeetendra Pande, Assistant professor, CS, UOU and organizing secretary; Dr. Shiffon Chatterjee, Senior Programme Officer, CEMCA and organizing secretary. Prof. Madhu Parhar appraised Prof. O. P. S Negi, Vice Chancellor of RGU, regarding the workshop proceedings of the past two days. She shared the role of CEMCA in education and skill development. She appreciated the resource person from Virtual Lab team for conducting two day workshop for the Uttarakhand Open University faculty members. She motivated the university faculty members to use virtual labs for regular sessions along with curriculum.



Closing remarks by Prof. Madhu Parhar



Vote of thanks by Prof. Durgesh Pant

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.

Amrita Virtual Labs Workshop - Faculty Survey

Dear Colleagues & Friends,
We want to thank you for participating in the Virtual Labs workshop. We would like to request a few minutes of your time to take this detailed survey to allow us use this information in enhancing the experience of using virtual labs for other faculties and students.

* Required

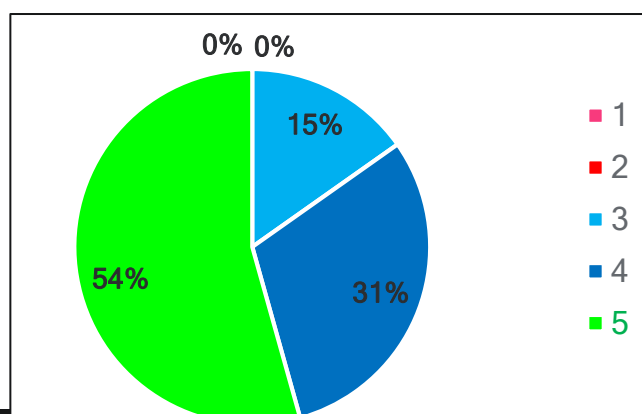
Email address *

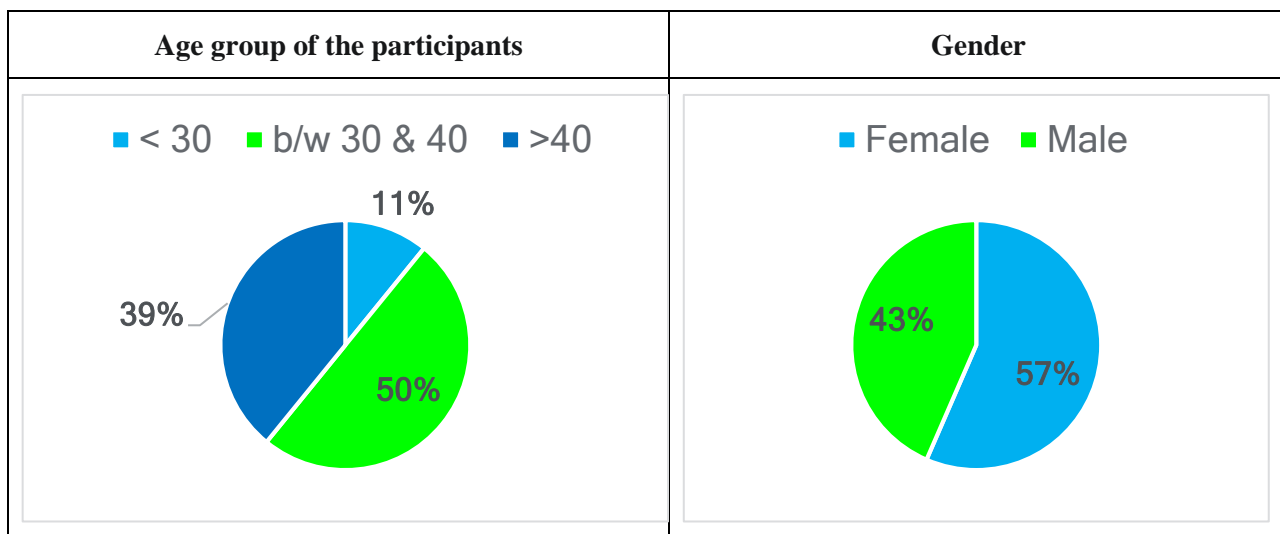
Your email

Full Name *

How would you rate the workshop?

For rating the workshop, participants could choose from 1 – 5 (1 represents poor and 5 represents excellent). 54% of the participants rated the workshop as excellent, 31% of participant's rated as 4 out of 5 and 15% of the participant's rated as 3 out of 5.

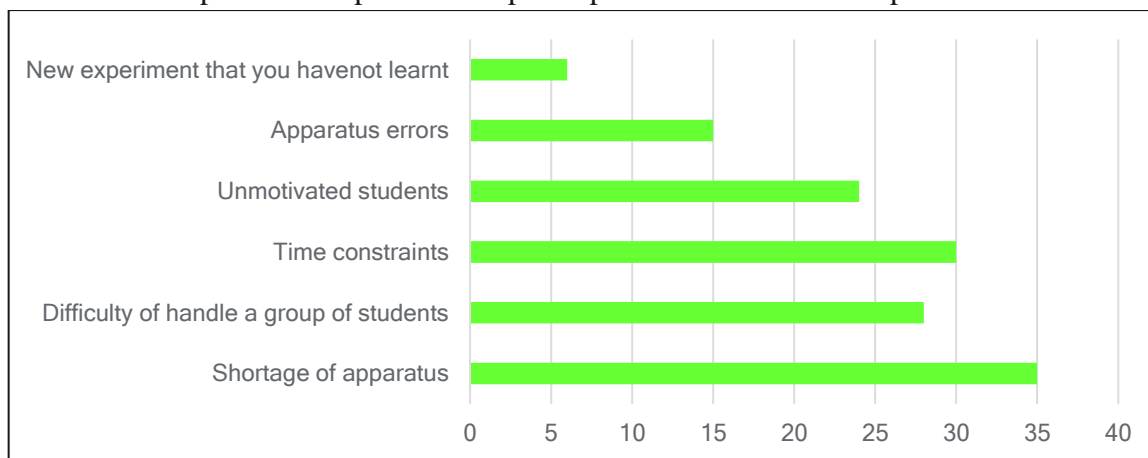




Majority of the participants were in the age range between 30 to 40 years. 43% of the participants were female and 57% of the participants were male candidates.

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

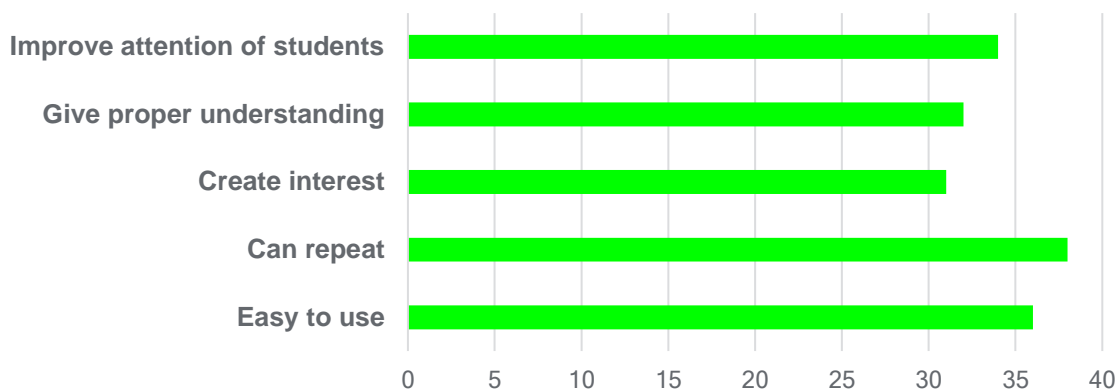
Provided multiple choice option to the participants to indicate their opinion.



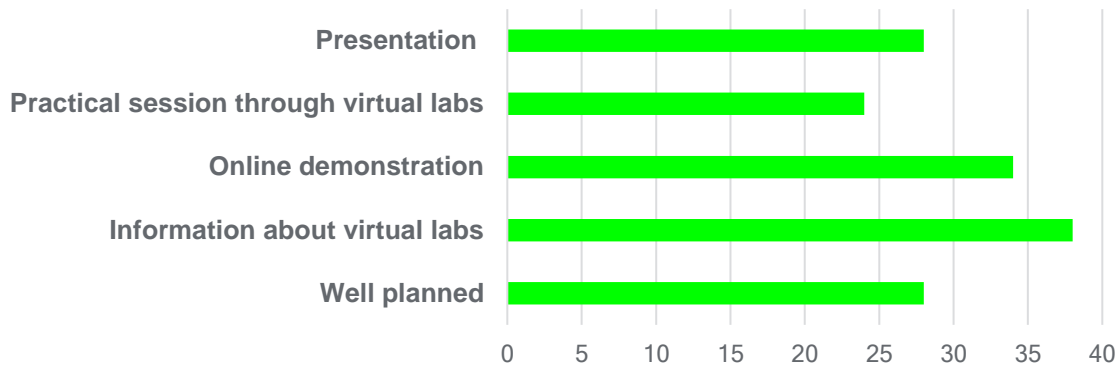
The common challenges faced by faculty members during laboratory teaching were analysed. 79% of the participants responded that there is a shortage of apparatus in the traditional laboratory. 61% of the participants faced difficulty in handling groups of students. 68% of the participant face time constrains in the physical lab session. 54% of the participants responded that unmotivated students also pose a major challenge in conducting the laboratory sessions. 34% responses said that the apparatus error makes it difficult to complete the experimentation. 13% of the participants faced difficulty in teaching new experiments to the students, because teachers have to learn the experiment properly before conducting the laboratory session.

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

How virtual lab can improve students practical skills?

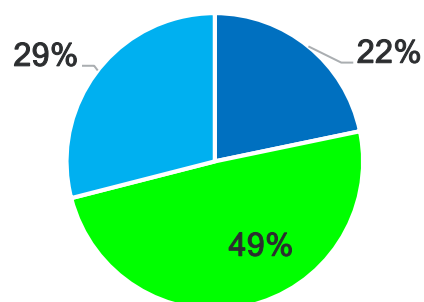


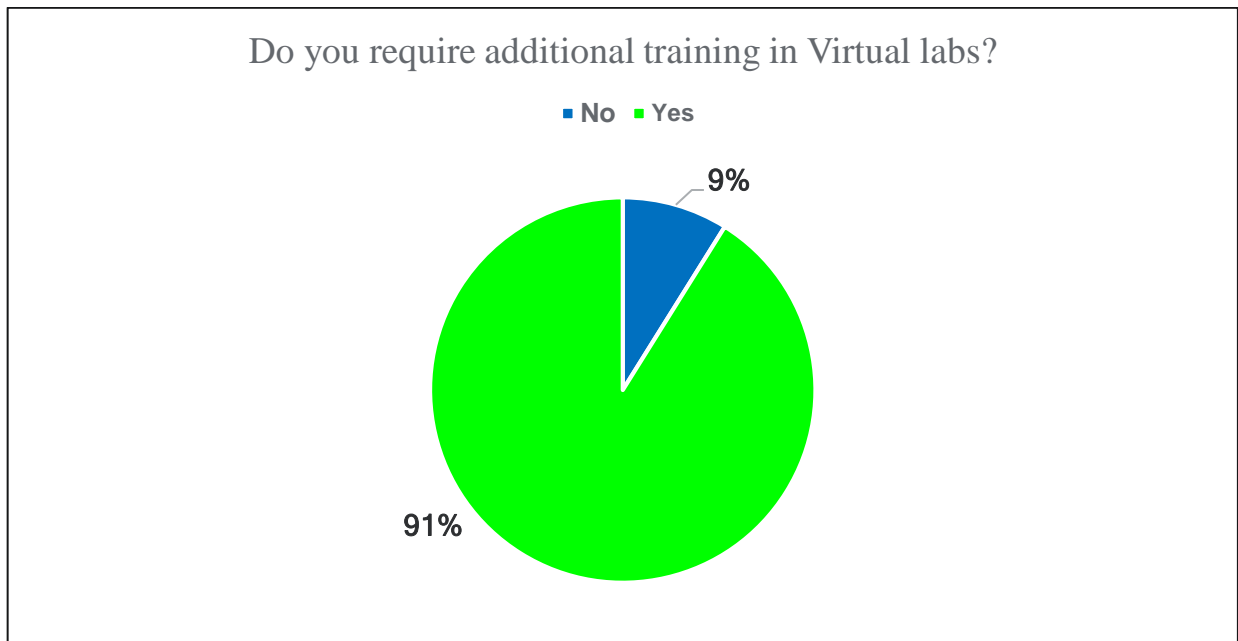
What was the best aspect of the workshop?



What aspect of the workshop needs improvement?

■ More practical need to include
 ■ More time
 ■ More sessions





Suggestions from the participants

- Require more time to practice the virtual labs
- More number of experiment 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	Institution	Email	Mobile Number
1	Pritee Sharma	Academic Consultant	UOU	psharma@uou.ac.in	8318628810
2	Rajendra Singh Kweera	Academic Consultant	UOU	rkweera@uou.ac.in	9837326427
3	Dr. Ranju Joshi Pandey	Academic Consultant	UOU	rjpandey@uou.ac.in	9368730769
4	Dr. Neeraj Kumar Joshi	Academic Associate	UOU	nkjoshi@uou.ac.in	7830636435
5	Neerja Singh	Assistant Professor	UOU	neerjasingh@uou.ac.in	9927145246
6	Dr. Meenakshi Rana	Academic Consultant	UOU	mrana@uou.ac.in	9718728654
7	Dr. Jyoti Joshi	Academic Consultant	UOU	drjjoshi271@gmail.com	8979436816
8	Kalpana Patni Lakhera	Assistant Professor	UOU	klakhera@uou.ac.in	9412996449
9	Ashok Chandra Tamta	Academic Consultant	UOU	ashoktamta@uou.ac.in	9536802409
10	Dr. Prabha Dhondiyal	Academic Consultant	UOU	pdhondiyal@uou.ac.in	9412969584
11	Dr. Rajesh Mathpal	Academic Consultant	UOU	rmathpal@uou.ac.in	9758417736
12	Jagmohan Pargien	Academic Consultant	UOU	jpargien@uou.ac.in	8899293421
13	Dr. Pradeep Kumar Pant	Academic Consultant	UOU	pkpant@uou.ac.in	9456545775
14	Dr. Kirtika Padalia	Academic Consultant	UOU	kpadalia@uou.ac.in	9456322128
15	Dr. Mukta Joshi	Academic Consultant	UOU	muktajoshi@uou.ac.in	9634551084
16	Pooja Juyal	Academic Consultant	UOU	pjuyal@uou.ac.in	9675063263
17	Dr. Shivangi Upadhyay	Academic Consultant	UOU	supadhyay@uou.ac.in	8586892098
18	Dr. Kamlesh Bisht	Academic Consultant	UOU	kamleshbisht@uou.ac.in	8279829875
19	Dr. Ruchi Tewari	Academic Consultant	UOU	rtewari@uou.ac.in	8171754094
20	Dr. Namita Verma	Academic Consultant	UOU	nverma@uou.ac.in	9756629859
21	Dr. Shyam Kunjwal	Academic Consultant	UOU	skunjwal@uou.ac.in	9410183247
22	Balam Singh Dafauti	Academic Consultant	UOU	bdafouti@uou.ac.in	9720669090
23	Dr. Jeetendra Pande	Assistant Professor	UOU	jpande@uou.ac.in	9927050094
24	Neeta Deolia	Academic Consultant	UOU	ndeoliauou.ac.in	9759270207
25	Dr. Bhanu Prakash Joshi	Assistant Professor	UOU	bhanujoshi@uou.ac.in	9411163102
26	Dr. Shalini Singhg	Assistant Professor	UOU	shalinisingh@uou.ac.in	9917150681
27	Deepankur Joshi	Coordinator School Of Law	UOU	deepankurjoshi@uou.ac.in	8979034323
28	Mukesh Sharma	Examination Controller	OIMT Rishikesh	mukesh8932@gmail.com	9411738932

29	Abhishek Kalra	Assistant Professor	Omkaranada institute of Management and technology	kalraoimt@gmail.com	9319006898
30	Ps Parihar	Administrative Officer	UOU	psparihar@uou.ac.in	9837512236
31	Dinesh Joshi	Assistant Professor	Government Degree College , Kanda, Bageshwar	dineshjoshi356@gmail.com	8755086027
32	Dr. Charu C. Pant	Academic Consultant	UOU	pantcharu25@gmail.com	9997216611
33	Mrs. Pritee Pant	Assistant Professor	Govt. Pg College, Gopeshwar, Chamoli	pritypant22@gmail.com	9756164627
34	Dr Vinod Kumar Sah	Assistant Professor	Govevernment Degree College, Kanda,(Bageshwar)	drvinodanthro@gmail.com	9012881729
35	Nitesh Singh	Lab Assistant	Govt.Pg.College New Tehri	iamniteshsinghsajwan.ntt@gmail.com	8171196875
36	Chandra Prakash Singh	Research Scholars	Kumaun University Nainital	cpbisht100@gmail.com	9675443001
37	Meenu Pathak	Faculty	Dr.R.S.Tolia Uttarakhand Academy Of Administration	manipathak5@gmail.com	9917144495
38	Mohd	Student	Aligarh Muslim University	mohdhilal249@gmail.com	9045461835
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