



A PRACTICAL APPROACH TO ACCESS AND USE OF ONLINE LABORATORY IN SCHOOLING SCIENCE EDUCATION

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ABSTRACT

This paper is developed to describe the substitutable approach of science manual laboratories to online laboratories for the secondary and senior secondary stages. Lack of resources, precautions of handling hazardous chemicals and costly apparatus, environmental conditions, and traditional procedures of experiments and activities creates hindrances on the way of teaching and learning of science concepts. In such a situation, the use of 'Online Laboratory' works efficiently amid the different barriers of science learning. OLabs will enable students to conduct experiments more flexibly and interactively for both online and offline mode. Hence the objective of the present study is to discuss and describe the access and use of Online laboratory and effect on the teaching-learning processes of science practicals. This study uses a descriptive cum exploratory method and is based on 'Olabs' sources. This study helps to acquired knowledge for different stakeholders (teacher educator, teacher, students and parents.) and understanding online scientific processes and practice.

KEYWORDS: Online Laboratory, Simulation, Olabs, CDAC.

INTRODUCTION:

Secondary and Senior secondary education is an important phase to decide the career discipline for higher education and all-around environment of human life. Science education is one of the core disciplines to understand and learn about the theories, laws, physical & chemical properties and characteristics of life. National policy on Information Communication and Technology- (2012) focused on education qualitative and inclusiveness on all aspects of science education in more depth in teaching and learning order to uplift and transform the scope of classrooms to e-classrooms, rich in audio-video, demonstrations and access to internet including mass group. As of results, well established and equipped laboratories are required to verified and perform through experiments and activities. Presently, theoretical parts were more taught during science lectures than the practical or laboratory experiments, which is needed to focus on equal weighting. Therefore, in the absence of physical laboratories, a boon step had been taken by the Government of India for equity and equal opportunity to perform and integrate science and technology interactively. To help the students and understand the complex science concepts and build scientific temper among secondary and senior secondary stage, a new gateway 'Olabs' developed by Amrita CREATE (Centre of Research in Advanced Technologies for Education) in association with CDAC (Centre for Development of Advanced Computing) grant from the Department of IT, Government of India. It is based on the premise that lab experiments can be taught over the Net or computer-based cost-effectively and efficiently and bridges the digital divide and geographical distances.

Olabs:

Olabs are the online Laboratory in which lab experiments are conducted using the Internet on website www.olabs.edu.in. It also available in offline based that can be easily installed and run on computer. The content aligned to NCERT /CBSE and State Board Syllabus in Laboratory dependent subjects such as physics, Biology and Chemistry. Olabs provide various tabs to access and use of science learning material as follows as:

Theory:

Students can learn theory for class IX- XIIth based on Physics, Chemistry, and Biology experiments in the separate section that aims to describe and discussed each step by step for individual practical included its Learning Outcome with Cite. Facilities to get the print out documents or save on the computer, mobile for further use is also available.

Procedure of Experiment:

Before getting started, a particular experiment and activity required to understand the real sense of content. Therefore, the Online platform of Olabs elaborate step by step for Physics, Chemistry and Biology. It contains digital pieces of equipment, salts, Material required, Real Lab Procedure, the formula used, Simulation Procedure, Observations criteria, tables for reading and results.

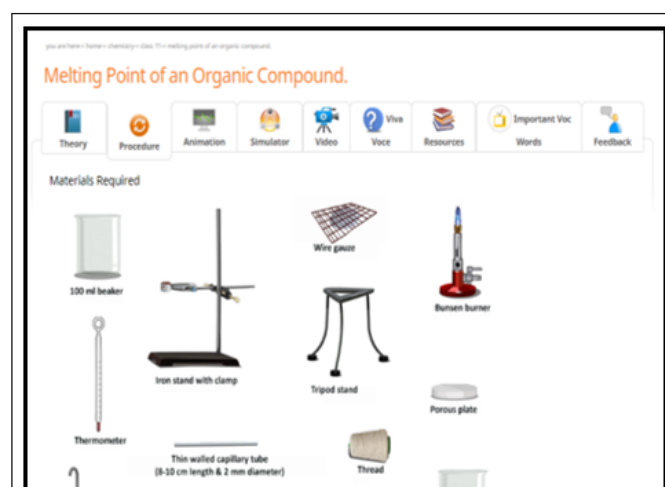


Figure 2: Figure Procedure of Experiment

Animation:

Science discipline itself generates curiosity among learners is a valuable part to perform anything during any state of education. On the digital platform, animations also help learners to understand the procedure of how to perform the experiment with hints, tooltips, and so on. It shows the measurements, operating on the equipment and another Animation tab contains the animated videos of each experiment. This Procedure tab has multiple options for learners like watch later, share on social media like Facebook, Twitter, Google+ and more, etc. It provides more results related to the access topic, the content of that is shown by Olabs for running practice material.

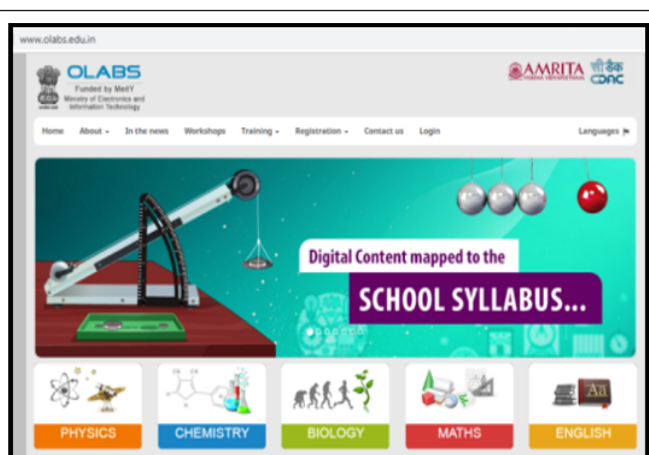


Figure 1: home page of Olabs

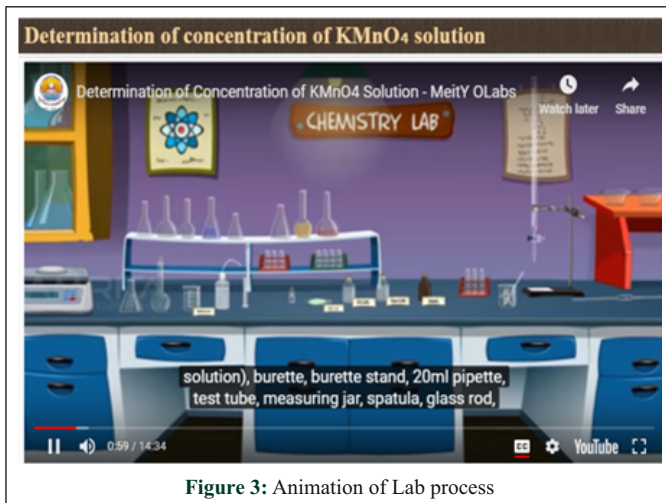


Figure 3: Animation of Lab process

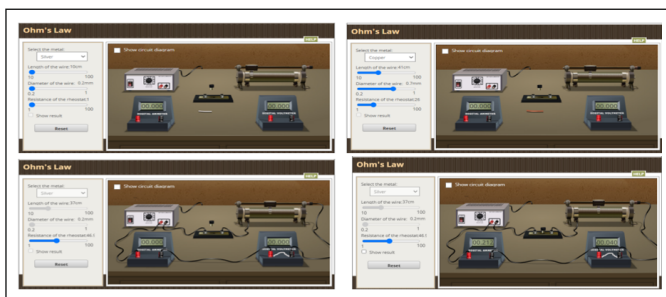
Simulator:

The Simulation can be used to perform the experiment interactively. In the simulation each field related to experiment is given, learner can perform the experiments after filling the required field in the drop down menu of items and simultaneously physical changes also visible online in the process of individual apparatus arrangement.

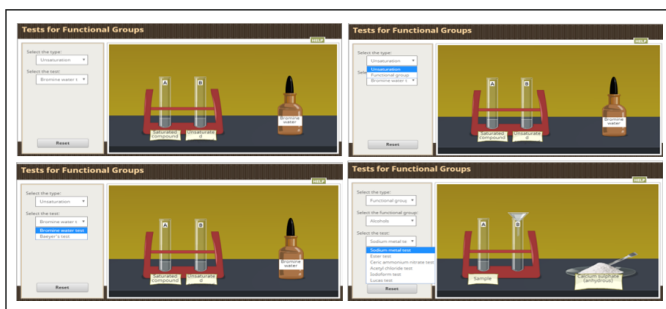
Finally, the process of final result are shown in fig.5,

In case of Physics experiment

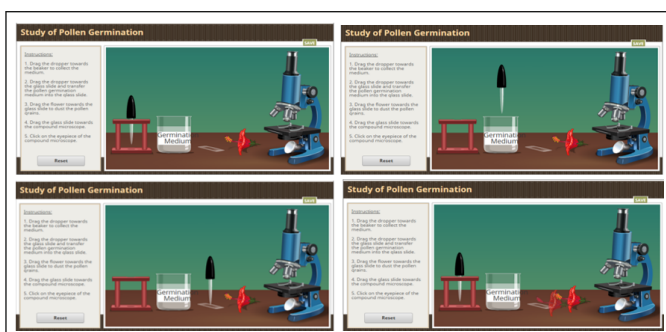
For example, in physics experiment of Ohms law all the field are given that are need to just filled and get the result as shown in fig: 5(a), 5(b), 5(c) and 5(d)

**In case of Chemistry experiment**

Suppose test of Functional Groups, all the types of test and reagents are given, using instruction and drop down menu settings items can be easily set and reagents can be utilize to perform test shown in figure 5(e), 5(f), 5(g), 5(h)

**In Case of Biology Experiments**

In all the biology experiments, proper instruction are given along with starting experiment like chemistry experiment same process can be followed in different class 9th to 12th practicals as shown in figure 5(i), 5(j), 5(k) & 5(l)

**Videos:**

Each experiment is available in the video form that can be performed by the trained subject experts. All video programmes can be accessed multiple times or users can download for present teaching-learning purposes or save for future use without paying any amount. The Video tab shows that the video of the experiment as done in a traditional lab. Videos experiments help to learn demonstrated experiments that are conducted step by step by subject experts. It also works as a learning tutorial for every level. Videos can be paused and watch later, share on social media like Twitter, Facebook, Google+ and more etc.

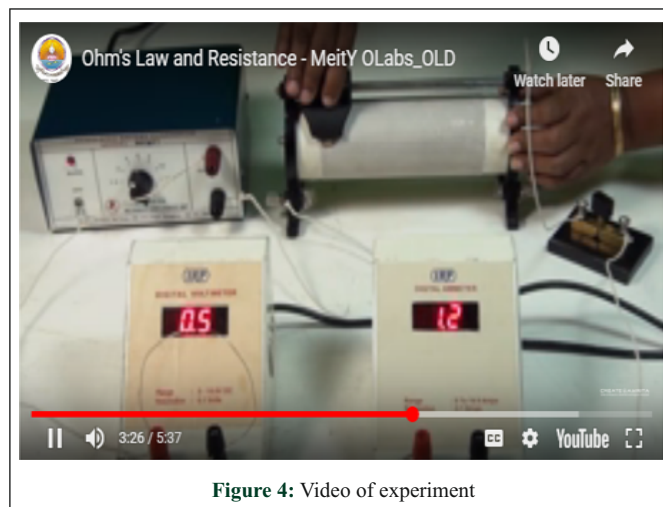


Figure 4: Video of experiment

Viva-Voice:

A self-evaluation can be done through the Viva Voce module. It can be used before, during, and after performing the experiment. It contains multiple objective type questions based on respective experiment. It also helps the learner to memorize the entire process was followed during the learning process.

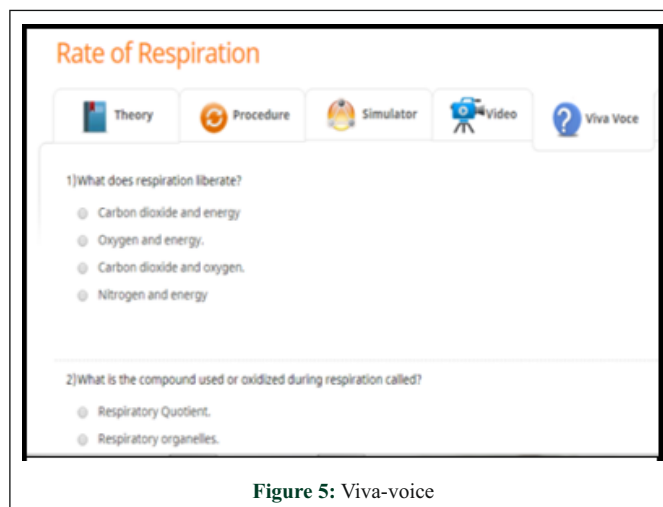


Figure 5: Viva-voice

Resources:

The Resource tab provides information of the list of books, videos and links of sites that support the particular experiment contented and published on the OLabs website. It reflects that the authenticated information was used to prepare the experiment in sense of theory, procedure, animation, simulation, video and resources.

Feedback- Olabs:

Olabs provide the feedback option for different types of required user details to make better the service with development of virtual labs. Feedback option also helps enhance the valued information that is needs in the Olabs tabs. Users also send their feedback anytime, anywhere.

Language of Olabs:

Language barrier always create gap in transferring, delivering and communicating the desired information. Olabs provide its service in eight different languages. Hence, users can easily access and use of information available in various modules of Olabs.

Workshop:

For teachers and educators, workshops are frequently organised in different regions of the Country. The workshop covered presentation-cum- demo on Online Labs, eBasta and Assessment & Monitoring Framework (AMF) followed by the hands-on session of Online Labs. After the training session, certi-

cate of participation gives to teachers and a pen-drive containing OLABS Windows installer and relevant material are also given to school.



Figure 6: Workshop of OLABS

Training Programme:

OLABS provide free of cost training programme to schools and in other location with the request through fill online registration which are also free of cost. User can fill registration form with School details

Training programme includes:

- Registration is free of cost + Workshop kit Certificates will be given to the teachers for participating in the workshop
- One live DVD containing OLABS offline version will be given to each school. Registrations for a batch of students (from class 9 to class 12)/Teachers in a class or multiple classes can be done by downloading the excel sheet, filling the required information in the given format and attaching it to an email that has to be sent to support@olabs.co.in

Registration:

OLABS have online facilities for registration form for schools, teachers and students. Registering to the online labs is easy and free. The registration process includes just a few simple steps. It needs to enter an email address that will be used as username and the ways to communication with schools, teachers and students. It includes personal information includes name, phone number, age group, gender, and other professional / educational information. User can use existing account to access Online Labs that is user can use any of the services such as Google or Yahoo or through his/her registered user ID. Choose account to login to OLABS website.

OLABS is also very helpful platform for learning Science for Teachers and Schools.

- **For Teachers:** Teachers can submit their contributions that include assignments, activities, concept questions and more. For making contributions or modifications on existing content details can be filled online.
- **For Schools:** The OLABS learning platform covers the curriculum-aligned to NCERT/CBSE and State Board Syllabus. Access to OLABS is free for Schools upon registration. To have the OLABS application up and running in computer lab, minimum computer requirements have to be met. Hands-on training sessions and workshops are given to gain a better understanding on how to use the OLABS and to show the potential use of Online Simulation and Animation Labs.

About OLABS:

Regarding OLABS, all the details are given in the Frequently Asked Questions which are prepared after analyzing all kind of user query. Before communicating with respective organization, the learner can get the help from FAQs anytime and anywhere to use OLABS and short out any difficulty free of Cost.

Login Option:

Registered users can Sign In/login anytime, anywhere with their user name/email and password that are generated first time for login. If the registered user forgot the password, he/she can easily retrieve just by clicking on the forget password option given in login page.

CONCLUSION

The OLABS laboratories for science learning in the Indian school helps to improve the experimental process because it provides various experiments and solve different issues, such as the resource and human power unavailability, lack of proper concentration on practical part in the classroom and financial support. On the other hand, the development of 'OLABS' with high-quality realistic in the theory, procedure, videos, animation, simulation, authenticity for resources and feedback method are more helpful for each experiment. It also provides training

including hand practice to every learner with free of cost through different laboratory modules. OLABS also help students to have better understanding on scientific processes and how to apply the acquired knowledge in practice. The future work lies in two aspects. One is to systematically implementation and secondly, improve the network of OLABS module, how to access and its uses.

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