LAB NOT IN A LAB: WHAT CAN STUDENTS LEARN FROM A VIRTUAL LAB?

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Schools have been closed all across the world as a result of COVID-19. Over 1.2 billion students are out of school around the world. As a result, education has experienced major shifts. Teaching is now taking place remotely and through various platforms or modalities (Modular Distance Learning, Online Distance Learning, and Television/Radio-Based Instruction). Given these new delivery modalities, it’s understandable that many teachers are struggling to adjust to this new reality.

Considering the nature of science, students studying science subjects are expected to engage in firsthand experiences such as observation, measurement, testing hypothesis, or experiment, particularly in higher education (Kirschner, 1991).

Science is one of the subjects in junior high school that has been significantly affected by modular distance learning. In a traditional, face-to-face classroom setting, teachers can interact with students, present learning material in an interactive way, check student’s understanding. Our new normal in Science teaching, the distance learning approach, has jeopardized these excellent instructional practices. Because there are no opportunities for students to be in a school where laboratory facilities, essential equipment, and teaching staff are provided, this can be a severe challenge for distance learning education. Since laboratory classes are a part of science, it isn't apparent how teachers and students might do laboratory work. It is now a great challenge for all public secondary schools to address the urgent and increasing needs in the instructional delivery of Science competencies.
One of the unconventional solutions to these obstacles is the use of a virtual Lab. Virtual labs have significant educational potential because they allow students to do hands-on experiments or 'learn by doing.

We have limited lab access due to social distancing caused by the pandemic, and many schools cannot teach essential lab techniques. Through simulated learning environments, performing laboratory experiments and studying concepts and theories without needing to visit a physical science lab can now be done through virtual labs.

In the study conducted by Darrah, M., Humbert, R., Finstein, J. et al. (2014), the results confirmed that virtual labs as effective as the traditional hands-on physics labs based on the data collected from both university settings.

Opportunities to alternative access to science education with the aid of the virtual lab software. It's ideal for science lessons since it allows teachers and students to practice laboratory procedures in a safe and secure virtual setting. If something goes wrong, no one is hurt physically, and students can repeatedly try until they get it right. Students can also have virtual access to more advanced lab equipment and activities that would otherwise be unavailable to them.

Here are some lab options for distance delivery:

1. Phet Simulations- Interactive simulations for Math and Science.
2. Pivot Interactives-Provides the means for students to conduct authentic science investigation online in Physics, Chemistry, and Biology.
3. Labster-Realistic lab experience that allows students to perform experiments. Chem, Biology, physiology, microbiology.
4. eScience Labs-Kits for mailing to your students that include experiments and exercises. Some digital content/virtual labs also.

Students can explore laboratories, study theories, conduct experiments, answer quiz questions, and make mistakes in a virtual lab without the fear of repercussions in the real world. Their teachers can provide support while also facilitating their development to motivate them to learn.

Virtual laboratories are fantastic digital resources that enable students to participate in schoolwork from any location while effortlessly combining the comfort and ease of use provided by modern technology.

Reference:

Options for Virtual Labs and Simulations for Laboratory-Based Courses