

Virtual Experiments versus Actual Laboratory Experiments: A study with e-Questionnaire

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Abstract

Virtual experiments are nowadays becoming more popular as compared to actual experiments performed in the laboratory. Virtual experiments however cannot make concepts very clear in the mind.

Actual experiments can build confidence amongst the students while virtual experiments cannot build confidence. Virtual experiments sometimes can illustrate the concept which even actual experiment cannot teach.

KEYWORDS: Virtual experiments, actual experiments

Theory and Discussion:

Here are few questions which a group of students answered which we collected through Google form mode

Can you know the errors in experiments with the help of virtual experiment?

Majority of the students answered in negative way.

Can you understand the significant figures, relative errors, percentage errors?

Most of the students answered in negative side.

With only virtual experiment can you make your concepts clear?

Most of the students answered negatively. One can conclude from the fact that laboratory experiments also essential for complete understanding of the concepts.

When the question was asked about the concept which if not clear would you like to repeat the experiment in actual and virtual mode ,majority of them answered that only laboratory mode would make their concept very clear. As it is said that when you perform you never perish, means your heart head and hand work in unison for performing the experiments.

They are also of the opinions that theory is also cleared after performing actual experiments.

After performing experiments in virtual mode if the same experiments are performed with offline mode makes experiments more interesting and liked to perform it again.

Vice a versa is not true as was asked to the students.

Most of students answered negatively when asked about time saving in case of virtual experiments as compared to offline mode.

After asked about whether two methods are complimentary to each other they answered negatively.

Do video recording of actual experiments performance would be better as compared to virtual experiments? They answered randomly as I think they are divided mentally or showing fractured mentality.

Most of them agreed to make their own video of the experiment as compared to only watching through virtual mode.

Most of them also agreed to the fact for preparing own U-tube videos on private channel or U-tube channel.

Again most of them agreed to the fact that weekly limited time must be allotted to virtual mode experiments.

Contrary to the fact that curtailing the useful time for performing the actual experiments in the laboratory in place of virtual mode they opposed spontaneously in unison.

Amruta virtual laboratory is found more useful and preferable as compared to other virtual laboratories.

The reasons were

- 1-Systematic execution of the experiments.
- 2- Step by step performance of the experiments.
- 3- Illustrative observation tables, simple columns, elaborative columns in the table.
- 4- Simplified calculations of the results from given data
- 5- Units conversions is easy from the deduced data.
- 6-Time saving advantage as compared to other virtual laboratory experiments.
- 7- Easy to calculate the final result

After asked about whether you make calculations after completion of the virtual experiments they said no, then when asked after actual experiments performance in the laboratory they agreed to complete the calculations.

The concepts like calibrating the apparatus in virtual mode they showed annoyance as compared to actual performance in the laboratory.

Shifting the power of ten, conversion of units, changing the system of unit is easy with actual experiment performance as compared to virtual experiments performance.

Viva-voce questions are not provided with virtual experiments in large numbers. It is better to search the more questions in offline mode experiments.

Nearly all students agreed with the fact that they found confident and knowledgeable after they perform experiments in laboratory mode as compared to virtual mode.

After having asked that whether your spectrum of knowledge is widened after performing experiments with virtual mode they answered in negative.

Whether would you suggest these virtual experiments to more of your friends, they answered in mixed opinion.

Have you read any book on practical' safter asking this, they answered in negative.

It is very clear that students prefer to perform experiments rather than to simply read about it.

Most students suggests about making changes about demonstrating and presentation of the virtual experiments as compared to offline experiments.

Most of them showed annoyance when asked that whether virtual experiment mode be continued more than the actual experiments in laboratory.

Most of them prefer to categorise the experiments for virtual mode performances.

Which topics would you like to prefer amongst mechanics, properties of matters, sound, lights(optics), electricity & Magnetism, modern physics, electronics, communication electronics, Heat and Thermodynamics, spectroscopy, atomic and molecular physics, they were perturbed on that issue.

Conclusions:

Following aspects were agreed by most of the students

- 1- Viva-voce must be based on actual experiments as compared to virtual experiments
- 2- Virtual experiments are not the last alternatives to actual experiments
- 3- It was queer experience to perform experiment on on-line mode without having confronting the apparatus with naked eye.
- 4- Too much imagination is also dis advantageous in preparation of concept.
- 5- Extra reading, extra hard work is needed for clearing the concept with the help of virtual experiments.
- 6-Too much objectivity is also dangerous in preparing the topic of interest.
- 7- Experiencing 'feel factor'is missing in performing virtual experiments
- 8- The virtual experiments may be rated as good (not best neither better)
- 9- Not more than twenty percent of the virtual experiments would be included in the syllabus.
- 10-Experiencing the experiments in the laboratory must be kept in mind while experimenting

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