LETTER TO EDITOR

USE OF COMPUTER-BASED DATA ACQUISITION SYSTEM IN UNDERGRADUATE MEDICAL LABORATORY TEACHING AND RESEARCH: A 10-YEAR PERSPECTIVE

Dear Sir,

Basic sciences laboratory teaching, especially in the disciplines of physiology and pharmacology has improved considerably after the incorporation of computer-based data acquisition system in undergraduate medical education.[1,2] These systems have since become indispensable tools for teaching. Universities in developed countries have long adopted these computer-based technologies, but in developing countries like Pakistan this shift is slow because of dearth of funding, scarcity of proficient staff, computer illiteracy and lack of enthusiasm to adapt the new technologies.[2] The Aga Khan University (AKU) was the first University in Pakistan to equip itself with the latest data acquisition system; PowerLab® and LabTutor® in 2009 for undergraduate teaching and research programs.

The development of these computer-based data acquisition systems was a breakthrough in life science teaching as it allows interactive and conceptual learning. The teaching labs have preconfigured experiments, each with learning objectives, theoretical background, real time recording, analysis of data, report writing and submission.[3] A comparative study has shown that the teaching with computer-based data acquisition system improves both quantitative and qualitative learning of students as compared to traditional teaching systems.[4] In addition, these systems offer safe experimentation on human subjects (either students themselves or patients) as it meets all human safety standards for biomedical equipment.[5]

Before launching of computer-based data acquisition systems, all the physiology and pharmacology undergraduate labs were conducted on conventional systems such as Oscilloscopes, Oscillographs, Polygraphs and Comprehensive Electrophysiology Teaching unit (CEPTU). These systems had complicated circuit diagrams and students experienced difficulty in performing experiments and tabulating the results without the help of facilitators. Since the time we had switched to the computer based system, about a decade ago, the teaching sessions have become effective and more interactive. The students also feel more engaged in the lab which makes the lab sessions exciting and productive. Many students also do their research projects using these systems.

At the time of implementation of the computer-based data acquisition system, extensive training sessions were arranged for faculty and staff. These training sessions continue to take place periodically to ensure latest updates in techniques are communicated to the faculty and staff effectively. These systems, like other electronic devices, also need to be updated and upgraded from time to time. Stocks of accessories and consumables also need to be maintained for at least one academic year to ensure smooth running of the lab sessions. All these challenges can be met if timely aftersales support is provided by the supplier.

To raise the standard of teaching of physiology and pharmacology in the medical colleges across Pakistan, it is important to switch over to new computer-based data acquisition and analysis systems.

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REFERENCES

1. Fitz Patrick KA. An investigative laboratory course in human physiology using computer technology and collaborative writing. Adv Physiol Educ 2004;28(1−4):112–9. Epub 2004/08/21.
2. Aziz N, Simonetta G, Forrester K. Recent developments in data recording system for physiology. Pak J Physiol 2006;2(1):34–7.
3. Zimmermann M, Eckert GP. Enhanced student experience: an analysis of subjective evaluation and objective learning success after the transformation of a pharmaceutical physiology course. Adv Physiol Educ 2010;34(1):1–10.
4. Shokr E. Practical Physiology Power Lab. Experiments for Medical Students. J Adv Chem 2016;12(3):4167–223.
5. Wulsa NSG, Pathapati RM, Buchineni M. Cardiopulmonary and hematological parameters in pregnancy. IAIM 2015;2(12):1–6.