



CREATE@Amrita

Research Agenda for Educational Technologies for Societal Benefit

The Center for Research in Advanced Technologies for Education (CREATE) (www.amrita.edu/create) is the educational technology initiative pioneered by Amrita University with primary focus on providing effective, affordable educational technologies to improve the quality of both school and higher education

By Prof. Raghu Raman



The need to make science education more practice oriented has been a topic of discussion for sometime now amongst the educators the world over. In India, CBSE had initiated mathematics and science labs to make teaching and learning at school stage activity-based and experimentation oriented. But usage of Science Labs are limited in today's schools due to the lack of equipment, insufficient time at lab and dangerous substances or breakable equipments. Enabling all schools in the country to run practical experiments in physical space is too expensive. There is also a limitation of availability of good lab teachers.

The Online Labs and Virtual Labs

initiative, using 2D, 3D interactive animations and simulations are designed to support effective learning in such a scenario. An interactive simulation research initiative that is dramatically changing the way school students perform science practical experiments is Project Online Labs or OLabs. This project is jointly developed by C-DAC Mumbai and CREATE under a research grant from the Department of Information Technology. Even when labs and equipments are available, large size of the classroom usually means that only one or two students or just the teacher actually does the experiments.

A multi-disciplinary team involving subject teachers have developed around thirty experiments. Over 170 teachers have been trained in the use of OLabs and 450 students are using the system. A survey found that 76% students agreed that OLabs improved their understanding of the concepts. 91% of the teachers felt the lab environment was well-simulated and found the animations and quizzes effective.

"OLabs provide high quality simulations, animations, videos and tests to enable students to learn conceptual, procedural and manipulative skills. Best of all, OLabs are free for schools" says Prof. Prema Nedungadi, Principal Investigator for OLabs. The team at OLabs is actively working with world class educational technology initiatives like Phet Project from University of Colorado started by Nobel Laureate, Dr Carl Weiman, Intel Future Scientist to scale the reach of our work, said Prof Nedungadi. Interestingly, initial pilot testing of OLabs on MHRD's Aakash tablet has been successful and this could dramatically increase the reach of OLabs.

Prof. Candace Thille from Carnegie Mellon University who leads the Measuring Learning consortium under this program adds, "CREATE is the only research initiative from India to be included in the nine-country worldwide Measuring Learning con-

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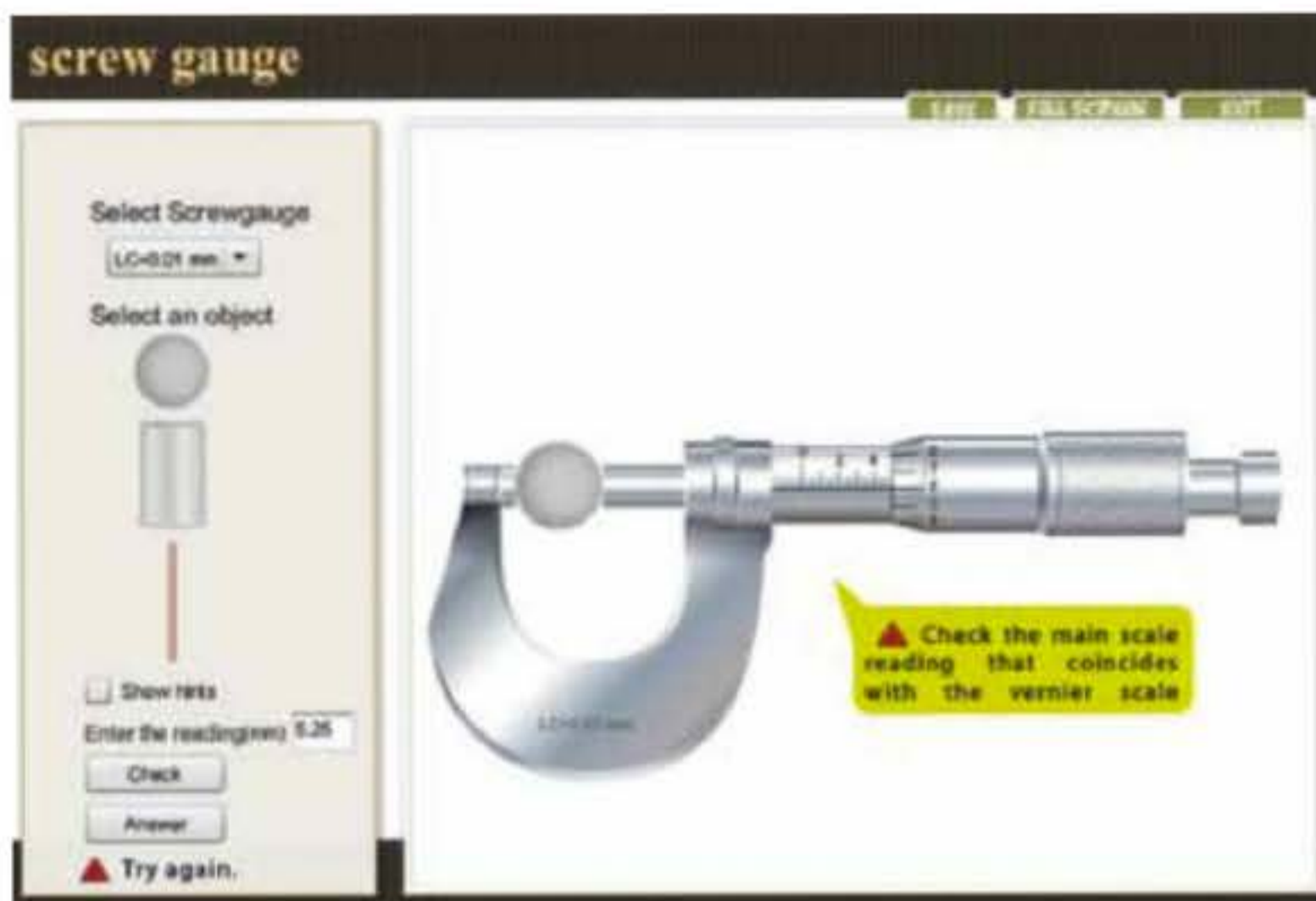
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sortium, something which will help educators quantify how much of what was being taught is grasped by students.”

Similar effort in the higher education space is the Virtual Labs VALUE initiative (amrita.vlabs.co.in) (Virtual and Accessible Technologies Universalizing Education), funded by National Mission on Education through ICT, MHRD. Amrita University and eleven other institutions from across India have been diligently working over the last two years to bring Indian students the most realistic and comprehensive virtual labs possible. Of the nine launched disciplines, Amrita has contributed over one hundred and twenty five experiments to the Biotechnology and Biomedical Engineering, Physical Sciences, and Chemical Sciences disciplines.

Amrita is also developing a Collaborative and Accessibility Platform (CAP) to allow faculty nationwide to rapidly develop and deploy Virtual Labs. 12 part-


ner institutes including IIT’s have used CAP to build over 825 experiments with over 4500 registered users from over 134 countries using them. CAP fully supports secure access along with scheduling support to expensive equipment used in experiments. There are

“Giving students an opportunity to experiment and apply the knowledge to real day problems is what the project expects to accomplish from Virtual labs,” says Prof. Krishnashree Achuthan, Principal Investigator for VALUE project.

In developing nations like India, employability of otherwise technically competent engineering undergraduates is at risk due to their lack of command in English communication skills. The primary need of these students is communicative fluency contextualized to the professional occupation they will be seeking, rather than linguistic accuracy which stresses on grammatical forms and memorization.

In our English Language Learning Lab, interactive multimedia involving real life visuals are used to convey the purpose of new words and sentences. Activities such as role play and tools like pronunciation tutors, assisted by local language translation scaffolds are provided when the stu-

dent requires more support. The unique feature of the approach is that the content studied by the student relates directly to his professional field of interest and area of immediate need. The program includes research from Language immersion, Intelligent Tutoring Systems (ITS) and Adaptive Hypermedia (AH) technologies to provide students with individualised instruction and feedback. With listening comprehension as the focus, all four language skills—listening, reading, speaking, and writing— are developed and retained quickly. Over 700 engineering students of Amrita University have started using this program.

Interestingly CREATE is the only research center of its kind in India that has a dedicated Simulation Lab for STEM skills (Science, Technology, Engineering, Math) and has over 18 research publications in this area. With research initiatives like simulation for medical science students and sustainability simulations, Amrita has very ambitious plans – to build a Center for Excellence in use of Simulation to blend technology and education. 

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