HP Learning Lab

Collaborative Assessment Platform for Practical Skills

(CAPPS) for K-16 STEM

Amrita University, India

Summary

In rural India, many schools lack high quality resources for STEM learning, including laboratory equipment, as well as anywhere near the number of teachers necessary to educate the hundreds of millions of students

under age 25 across the country. Amrita University plans to address the postsecondary aspect of this, and to reach many more students via a multilingual collaborative platform that can be used remotely to teach language, promote adaptive learning, and run virtual experiments. The platform will include a framework for the assessment of reporting and procedural skills, so that students can better concentrate their efforts on the subject areas they need to master.

The platform uses Amrita University's cloud-based eLearning Network, which will make it possible for a pilot group of 3,400 K-12 students across several rural Indian schools to comprehensively test the platform. The participating learners will use HP Mini Notebooks and Elite Tablet PCs to run virtual experiments and watch simulations and animations focusing on key STEM concepts over a period of six months.

As the students use the collaborative platform, they will be subjected to continuous learning assessment. A feedback loop will provide them with personalized attention and interventions that are attuned to their skill levels and styles. To evaluate the outcomes of this project, Amrita University will use qualitative and quantitative analysis to measure changes in a number of key outcomes, including student attitudes, learning, motivation, and high order thinking skills, as well as the collaboration between the teachers who are developing and using the online material.

The Project in Action

"HP Learning Lab Collaborative Assessment Platform for Practical Skills (CAPPS) for K-16 STEM" seeks to improve the state of India's STEM education approach at the secondary level. Project Investigator Raghu Raman states, "STEM has both a theory component and a practical component. And the practical component is neglected quite a bit." Raman and his colleagues at Amrita University aim to bridge this gap through their pioneering HP Catalyst project.

This need has long been identified in rural Indian primary and secondary schools, and the Indian Government sought to partner with universities such as Amrita University to rectify this. Thus, Raman and his team at Amrita University were able to jump quickly into meeting their project's goals.

The project was implemented in five secondary schools in Kerala and the positive impact of the cloud-based eLearning Network has already become apparent. According to Raman, "A survey from the deployment showed that the students found the content beneficial to their learning process, and felt that the topics were well-covered. Seventy-six percent agreed that OLabs improved their

understanding of the subject. Ninety one per cent of the teachers felt the lab environment was well-simulated and found the animations effective." Raman and his group are currently refining their data collection and continuing to the next phase of measuring learning outcomes within the project.

The team's strength comes not only from within the Amrita University community, but also from its strong partnerships at the national and international level. Amrita University works closely with the Indian Government's Department of IT in the Ministry of Communications and Information Technology, and Department of Science and Technology. The group also collaborates with the Central Board of Secondary Education and Intel Teach to the Future. "Recently we started discussions with University of Colorado's Interactive Simulations project called PhET," Raman notes. The team is eager to see where this potential future partnership will take them.

While Raman and his team have accomplished much throughout the project, they have also overcome multiple obstacles. The largest challenge was integrating the computer-based labs into the teaching timetable so that this became part of the teaching curriculum. The team also struggled with availability of enough computers for one-to-one computing, and wished they had procured more equipment.

Technology

Through "HP Learning Lab Collaborative Assessment Platform for Practical Skills (CAPPS) for K-16 STEM", HP provided Amrita University with laptops, Elite Tablet PCs, and Virtual Room software. The project team distributes the laptops and Elite Tablet PCs to participating schools for student use at a one-to-one ratio. They also install a learning lab using the laptops and other digital learning tools for practical skills curriculum in STEM subjects. The technology is incorporated in the teachers' lessons, as students access the online learning lab to conduct interactive projects based on what they are learning in the classroom.

Raman explains, "Under this project a HP-based infrastructure will be created that will enable online experimentation and collaboration among 3000+ users from 27 K-16 institutions across 4 geographically distributed states." According to Raman, the hope is that "students on this project will connect directly with other students in HP Consortium partner organizations using freely available communication tools like Skype, Google talk, Google Docs, etc. to share their ideas."

So far, the students and teachers participating in the project have been very computer literate so basic technical training has not been necessary. However, over 90 teachers were provided a hands-on workshop on computer-enabled simulation based practical experiments. Once the students learn how to use the technology for experiments, teachers have seen a vast improvement in their interest in science. "You ask them to write on a piece of paper and sit and watch a teacher performing and they're so bored. In this way, they have full command and control of the computer," says Raman.