Mumbai Inspiration: UC San Diego Students Seek to Improve Education with $12 Computers

Student researchers create educational games for developing countries that run on 8-bit computers

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Christine Clark

Students at UC San Diego are using a $12 computer as a platform to bring computer-aided learning to millions of children in India, Brazil, Ghana and other developing countries.

Derek Lomas, the leader of the research team, got the idea during summer internship in 2007 with Qualcomm, Inc., in Mumbai, India, where he saw $12 computers being sold in marketplaces.

"The low-cost computers were powerful enough to run effective learning games," said Lomas, a graduate student in the Master of Fine Arts program at UC San Diego. "This is important in developing countries because basic computing skills such as the ability to type can make the difference between earning a dollar a day versus a dollar an hour."

That realization led him to co-found Playpower.org, a non-profit organization composed of like-minded colleagues at UC San Diego, Massachusetts Institute of Technology, Stanford, University of Sao Paola in Brazil, Srishti School of Art, Design and Technology in Bangalore, India, and Zhejiang University of Media and Communications in Hangzhou, China. Playpower.org working groups are "virtual" - they stay connected on the Web with wikis, video streams and email.

Lomas and his fellow researchers will demonstrate their latest software at the Jacobs School of Engineering's annual Research Expo conference at 9:45 a.m. on Feb. 19, on the UC San Diego campus. Their demonstration will be on the first floor of the California Institute of Telecommunications and Information Technology's (Calit2's) Atkinson Hall. The team's subsequent public demonstration will be on March 10, at the O'Reilly Emerging Technology Conference in San Francisco. "These demos are exciting opportunities for us to show our work," Lomas said. "We hope our efforts will help the global community."

Lomas teamed with several researchers at the Center for Research in Computing and the Arts (CRCA) at UC San Diego to co-found Playpower.org's largest working group. The group is based at one of the world's hottest research institutions for telecommunications, the UC San Diego division of Calit2. With help from a manufacturing consultancy in Shanghai, the team has been acquiring low-cost computers from a factory in China and shipping them to different Playpower.org developers, including those at MIT and Stanford.

The educational computers use a 25-year old microprocessor technology that is still in production today. The 8-bit computers come with a full keyboard, mouse, and game controllers and can be sold for as little as $12. Like early home computers sold in the United States, the 8-bit computers use a TV as a screen. This technology is designed for the emerging middle class in countries such as India where the majority of the homes have a TV, but no computer.

"A staggering four billion people make less than $3,000 per person annually," Lomas said. "We hope to help these populations by developing open-source, computer-aided learning games that are affordable, effective and fun. Affordable computers can help millions of people make economic and social transitions around the world."

The 8-bit computers, while largely forgotten in the technological mainstream, are still relatively popular and appear in low-end marketplaces in Nicaragua, Brazil, China, India and other places, according to Lomas.

"If they had higher quality learning games, these computers could achieve much more," he said. "They are already being sold in these countries, so if we supply the manufacturers with the new learning games, we can possibly help millions of children gain access to high-quality computer-aided learning."

The current computers are commonly packaged with educational content that can teach basic typing, language and programming skills. Playpower.org's goal is not only to develop new educational software for the 8-bit computers, but also to create development tool kits that will allow users to write their own software on the machines. "We want to empower users to create their own games and learning programs in their own language," said Jeremy Douglass, co-founder of Playpower.org and a postdoctoral researcher in the Software Studies Initiative at Calit2.

Graduate and undergraduate students from various disciplines at UC San Diego have been working on the project for several months with support from faculty members such as Lev Manovich, a visual arts professor. "Playpower.org is an amazing project and is at the cutting edge of the latest trends in digital culture," Manovich said. "I am happy to support it; it is great to see the students lending their expertise and passion to the project."

Media Contact: Christine Clark, (858) 534-7618