



UNITED STATES



2014 Statistics

- » Life expectancy: 79.6 years
- » Population: 318.9 million (est.)
- » GDP per capita: US\$52,800 (est.)
- » Mobile penetration: 104.8%

Sources: CIA World Factbook (<https://www.cia.gov/library/publications/the-world-factbook>); Mobile penetration data provided by Informa UK Limited and based on market intelligence.

The AR technology brings to life the story of humanity. This is exactly what the art in the galleries does, but in a different way. Ultimately we are trying to show the students how the artwork was crafted, sold and used back during the Silk Road. We are blending the history of the past with technology of the future to bring a full experience to the students.

— **Brian Patterson, Museum Educator for The San Diego Museum of Art**

Augmented Reality Experience Enables Students to Explore New Worlds

Qualcomm Wireless Reach has teamed up with School in the Park (SITP), The San Diego Museum of Art, the San Diego Zoo, and the San Diego History Museum to develop unique educational Augmented Reality (AR) experiences through 3G-connected mobile devices. SITP is using Qualcomm Vuforia™, a product of Qualcomm Connected Experiences, Inc., on MoGo's FreshAiR™ platform to enhance teaching and engage students. By supporting learning in informal settings, museums and educational institutions in San Diego's Balboa Park are helping students to understand focal topics and draw connections between what they are learning in class and the real world.

Challenge

- » Teachers are looking for creative new ways to increase student engagement and learning, while still aligning with state education standards.
- » Many students and teachers do not have resources to apply classroom lessons to real-world experiences.
- » Teachers are interested in teaching real-world issues, such as global environmental problems, that help students learn how to analyze complex systems and to work collaboratively to solve difficult problems.
- » According to data collected from focus groups facilitated by Project Tomorrow, a national education nonprofit organization, students are requesting learning experiences that have immediate relevance to their lives and future careers. For example, they prefer science activities that are connected to a larger and meaningful context and in an environment that resembles scientific practice.

Solution

- » SITP is a multi-visit museum program for low-income students that blends formal and informal learning by utilizing the rich resources of 10 museums and educational institutions in San Diego's Balboa Park.
- » SITP developed AR experiences to support the unique learning environment at three of the Park's institutions: The San Diego Museum of Art, San Diego Zoo, and San Diego History Center.
- » The AR experiences at The San Diego Museum of Art allow 4th grade students to make cultural connections and learn about the first transcontinental highway of the ancient world, the Silk Road, which was a vast network of routes connecting China with western Asia, the Mediterranean, and the Indian subcontinent. Using AR experiences on a tablet with a Qualcomm Snapdragon™ processor, a product of Qualcomm Technologies, Inc., students are immersed into a virtual marketplace along the Silk Road where they assume the role of a potter, weaver, sculpture or calligrapher. When students answer the interactive questions correctly they are rewarded with gold coins, which they can use to purchase items at the marketplace.
- » At the Zoo, 3rd grade students are exploring three habitats using AR experiences to learn how animals and plants are connected in a food chain, such as animated 3-D graphics of snakes injecting venom into their prey.
- » Elementary students attending classes at the San Diego History Center are learning how San Diego's people, places and culture have changed over time. One experience at an outdoor cacti garden allows students to use AR experiences to access digital content that demonstrates how the Kumeyaay indigenous people used natural resources to create materials they needed to survive.

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- » SITP collaborates with museum educators to align content, grade level standards, and the AR experiences to provide unique learning experiences not otherwise available at the museum.

Impact

- » Museum educators reported that the activities were completely student-driven versus teacher directed, providing the students with a different sense of ownership over the experience.
- » Teachers noticed that AR experiences helped students who are learning English as a second language better understand complex ecosystems, vocabulary and pronunciation.
- » Educators stated that the mobile devices helped to structure students' movement through the experience and guided their interaction with the outdoor environment, museum exhibits and with classmates. The students were able to work independently, at their own pace, with the teacher acting as a facilitator.
- » Overall, student survey responses showed a positive shift in their attitudes about their ability to understand focal topics and draw connections between what they are learning in class and in the real world.
- » Technology-rich activities tended to sustain high levels of student engagement and peer collaboration in comparison to less technology focused activities.

Project Stakeholders

- » MoGo Mobile Inc. worked closely with the team to develop the AR solution for education using their FreshAiR platform (<http://playfreshair.com>) and Qualcomm's visual-recognition and location-based technology. The FreshAiR development platform enables anyone to create custom AR experiences without any coding required.
- » Qualcomm Wireless Reach is the primary funder for this project and provides project management and technical support.
- » San Diego History Center provides rich educational space, classrooms, museum educators and assistance with developing grade-level curriculum for the AR experiences that add value and meaning to the many historical resources available at Balboa Park.
- » San Diego Museum of Art provides access to art exhibits, classrooms, museum educators and assistance with developing and implementing the AR experiences.
- » San Diego Zoo makes animal exhibits, food warehouses, classrooms and museum educators available for the project. The Zoo educators develop conceptual AR experiences that align with Common Core Standards.
- » School in the Park oversees the educational aspects of the AR experiences for the San Diego Zoo, History Center and Museum of Art. SITP works closely with partner artists to illustrate, sequence and align all 3-D objects used in the AR experiences, coordinates timelines for the 3-D modeling and curriculum, hires facilitators to support during museum implementations and provides device management, maintenance and performance logistics.



Qualcomm Wireless Reach™

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