3D DENTAL HEALTH SIMULATOR
Judith Chin Ph.D., Associate Professor of Pediatric Dentistry, IU School of Dentistry, IUPUI

Contact Information:
Email: jchin@iupui.edu
Phone: (317) 274-5420
Website: http://www.iusd.iupui.edu/departments/pediatrics/
Address: 1121 W. Michigan St. (DS 220H), Indianapolis, IN 46202

Industry Sector(s): Healthcare, Education
Product Category: Virtual Reality Training

Opportunity Overview
This product provides a 3D virtual reality simulation in a health care field. This project will exploit new and emerging technologies for creating digital data representation of dental objects. It will incorporate Cone-beam CT imaging, micro-focus CT imaging and 3D laser scanners. This product utilizes technology called haptics, where a person can not only see what is happening but also actually feel what they are seeing. We are willing to bring out haptic computer and station for a hands-on experience for attendees at this meeting if requested.

Markets & Applications
This technology raises interactive simulator lab opportunities to a whole new level, bringing virtual sense of TOUCH experiences to students. Students are able to get a FEEL for dentistry like never before through haptic technology. Through our research and outfitted in 3D glasses, students will be able to

• Administer and gain a more realistic feel for different virtual injections
• Restore and feel realistic tactile sensations while preparing a tooth; feel the difference between enamel, dentin and pulp tissue

Competitive Advantage/Value Propositions
The haptic device makes it possible to feel real-life tactile sensation as a student is guided through dental procedure simulation (a dental anesthetic injection) viewed in 3-D on a computer monitor.

• Allows students to practice more frequently without any fear of making mistakes on live patients
• Allows for repeating dental procedures
• Feedback provided- what went right/wrong

Researcher Biography

Judith Chin, DDS, MS
Dr. Judith Renee Chin holds the position of tenured Associate Professor in the Department of Pediatric Dentistry at the Indiana University School of Dentistry (IUSD). After receiving her dental degree from IUSD in 1994, she worked as a general dentist in Indianapolis as well as a Clinical and Laboratory Research Associate at the Oral Health Research Institute. In 1997, she entered the certificate and MS program in Pediatric Dentistry at the University of Illinois in Chicago. In 1999, she accepted a National
Institute of Health postdoctoral Fellowship in Craniofacial Anomalies at the University of California San Francisco. In 2000, she accepted a tenure-track position as Associate Professor at IUSD. She was promoted to Associate Professor in 2006 and received tenure in 2007. She participates on a national level on the Council of Clinical Affairs and Continuing Education Committee for the American Academy of Pediatric Dentistry. She serves as a reviewer for several international journals. Dr. Chin’s research interest is in the area of virtual reality (VR) simulations where students can practice necessary procedures in a computer-based virtual environment. Traditional methods rely on practicing procedural skills on plastic teeth or live patients under the supervision of dental experts. Developed in 2011, IUSD is one of four dental programs in the United States using this type of VR research. Additionally, there are only four other programs worldwide using similar technology. The growing use of computers, multimedia program, interactive 3D, haptic devices, and high-fidelity human patient simulation have just begun to contribute to the enhancement of medical and dental education. Her research is utilized by health care professionals to develop a sense of what it feels like to use dental instruments such as a syringe for injection or drill for fillings.

Development Plans/Needs

1. Obtain funding for future research & development
2. Co-location for software programs: We will be able to project a 3D hologram of images versus looking at a TV screen
3. More haptic software programs
   a. Injections: all types
   b. Placing dental implants
   c. Root canal therapy
   d. Simple surgical extractions
   e. Modify all software for primary dentition & the pediatric anatomy