Arcade Entry #1 - IPE Simulation with Games and Virtual Environment

Entrants: Peregrina L Arciaga; Parvati Dev, PhD; Henry Charles Ruff; Magda Shaheen, MD, PhD, MPH, MS; Evan Williams; Adejare Windokun, MD.

Entry Description: We designed and implemented an online gaming platform, CliniSpace (http://www.clinispace.com/) to offer healthcare students virtual hands-on training on Interprofessional Education (IPE). Simulation ran in a web browser allows two way communication between multiple participants. Students interacted as a team of nurses and doctors, with chance to demonstrate interprofessional teamwork and communication through the active process of learning.

Objectives:
1. Mitigate challenges of training healthcare students in IPE in our environment, which include scheduling conflicts, expense of IPE simulation, inability to provide adequate IPE simulation training, inability to customize scenarios to student level.
2. Demonstrate the ability of Virtual Simulation to enhance the training of healthcare students.
3. Illustrate use of off-the-shelf components (CliniSpace platform - based on an open source gaming platform) to allow educators to create simple to complex teaching clinical scenarios that can be used as adjunct to formal educational programs.

Arcade Entry #2 - Touch Surgery, the Free Operating Simulator for Surgical Trainees


Entry Description: Touch Surgery was founded by surgeons with the aim of making a real change to global surgery. The mission is to provide the best surgical reference and training tools to the global surgical community, and make a real impact on the delivery of surgical care, and patient outcomes. We believe that access to simulation is key so our FREE app is available for any smart device running on Android or IOS and soon to hit Google Glass and the Occulus Rift!

Objectives:
1. This project was developed to solve the needs of surgeons frustrated with the lack of access to training imposed by working time limitations.
2. This training tool must be easily accessible, augment learning and free.
**Arcade Entry #3 - Bone Viewer 3D**

**Entrants:** Mike Beall; Reid A Adams, BA; Eric B Bauman, PhD, RN; Carmen Fuentealba; David Pederson.

**Entry Description:** Bone Viewer 3D is an interactive mobile 3D game based learning tool to prepare medical and veterinary students for core principles of anatomy.

**Objectives:**
1. The student will learn skeletal anatomy landmarks.
2. The application leverages game mechanics to engage the student in active learning.

**Arcade Entry #4 - Diagnose Me**

**Entrants:** Mike Beall; Reid A Adams, BA; Eric B Bauman, PhD, RN; David Pederson.

**Entry Description:** Diagnose me is an interactive mobile 3D game based learning tool to prepare clinicians for OSCE exams including the USMLE step 2 clinical exam.

**Objectives:**
1. The learner will acquire and demonstrate clinical reasoning skills.
2. The learning will be prepared for the standard processes of USMLE clinic step 2 exam.
3. The application leverages game mechanics to engage the student in active learning.

**Arcade Entry #5 - iAnesthesia**

**Entrants:** Mike Beall, Eric B Bauman, PhD, RN; Carmen Fuentealba; Charles P. Hutchison, (DVM); David Pederson.

**Entry Description:** iAnesthesia is an interactive mobile 3D game based learning tool to prepare veterinary students for clinical experiences focusing on the delivery of anesthesia to multiple species.

**Objectives:**
1. The student will be oriented to, learn, and demonstrate understanding multiple modalities of anesthesia delivery for multiple species.
2. The application leverages game mechanics to engage the student in active learning.
Arcade Entry #6 - *Virulent*

**Entrants:** Mike Beall.

**Entry Description:** *Virulent* is a real time strategy game for iPad and PC's that has the player take control of virus particles trying to infect, replicate, and escape inside of a host cell.

**Objectives:**
1. Learners will gain concepts of how a virus attacks cells and how cells fight off virus particles.
2. Teach systems biology building upon learning sciences research on microworld simulations.

---

Arcade Entry #7 - *Augmented Reality and Serious Games in Healthcare*

**Entrants:** Parvati Dev, PhD.

**Entry Description:** SimTabs specializes in creating augmented reality (AR) and virtual reality (VR) environments for operational support and healthcare training. At the Arcade we will demonstrate both AR and VR environments with examples such as real time feedback (AR) for nurses in an operating room, and mobile learning (VR) for critical care, such as sepsis.

**Objectives:**
1. Demonstrate how augmented reality technologies can be used to provide realtime feedback and training to healthcare providers.
2. Demonstrate just-in-time and accessible training for nurses on mobile devices for critical care, such as sepsis.

---

Arcade Entry #8 - *Haptic rendering in virtual environment for improvement of robotic surgical skills*

**Entrants:** Dr. Tauseef Gulrez; John Cabibihan; Woon Jong Yoon.

**Entry Description:** We present a virtual environment (VE) with haptic user-interface (HUI) for training of robotic surgical skills. The training environment is aimed at improving the users’ grasping skills during tele-operated robotic surgeries. HUI emulates the force by stimulating the human fingertip for force sensitive procedures such as grasping a tissue during robotic surgeries. The results show that users were able to discriminate grasp forces.

**Objectives:**
1. To develop a haptic feedback interface for virtual minimally invasive surgery environment to minimize local tissue damage and secure grasp manipulation.
Arcade Entry #9 - Virtual Combat Medic: Procedural Skills Trainer for Point of Injury Care

Entrants: Matthew Hackett.

Entry Description: The Virtual Combat Medic is a game based application focused on procedural skills training for Combat Medics learning Tactical Combat Casualty Care (TC3). Game play requires trainees to triage and assess one or more casualties and to conduct medical interventions, including usage of appropriate equipment. The application also includes an advanced physiology engine, after action review (AAR), and a difficulty system.

Objectives:
1. Augment medical training for military health professionals by providing a virtual training application for procedural skills.
2. Increase engagement of military health professionals through the application of gaming within curriculum.
3. Push the state of the art in realism and interaction capability for virtual medical gaming.

Arcade Entry #10 - Medstar SiTEL Virtual Zoll Debrillator Trainer

Entrants: Robert Hafey, BS.

Entry Description: Have a few minutes to spare? Grab your iPad and check out the MedStar SiTEL Virtual Zoll Defibrillation Trainer. Maybe you use a Zoll Defibrillator every day; maybe you've never had to shock a patient. Our app will make you comfortable using an M Series defibrillator in as little as 5 minutes. Play through our 3D environment as you learn defibrillation, cardioversion, pacing, and AED modes all in the comfort of your own home.

Objectives:
1. Players should be able to appropriately perform the Zoll Defibrillation self-test and deliver a test shock.
2. Players will be able to interpret a shockable heart rhythm and deliver a shock in an appropriate amount of time using the correct amount of energy both in manual and automated modes of the defibrillator.
3. Players will be able to interpret the signs and symptoms of Supra-Ventricular Tachycardia and Bradycardia and employ the correct methods of synchronized Cardioversion and pacing modes to return the virtual patient to a normal rhythm.
Arcade Entry #11 - Using a Game-based Simulation to Complement Face-to-Face Medical Education

Entrants: Gary M Hardee, MA; Marjorie Zielke, PhD.

Entry Description: UTTimePortal.com is a blended-learning portal that uses virtual environments and game-based simulation to allow students to apply and practice concepts learned in classroom lectures and reflect on them through a Discussion Board. The portal complements a course for students in UT System’s Transformation in Medical Education (TIME) initiative and includes 2 interactive modules, one for medical interviews, the other on professional online behavior.

Objectives:
1. This project was developed to research whether a game-based simulation can help improve knowledge and attitudinal measures regarding basic interviewing skills, the medical interview and professionalism in social media use.
2. A second objective of the project was to research whether a game-based simulation is an effective education module for enhancing classroom lectures.

Arcade Entry #12 - PhramaCollege: A Game-based Mastery Approach to Learning Pharmacollege and Prep for Nursing Clinical Rotations

Entrants: Tim J Harrington, EdD; Murray Matens Kimball; Dr. Leila McKinney, DNP, MSN, APRN, NP-C.

Entry Description: Students studying pharmacology for drug administration, assessment, and patient care gain subject matter knowledge through a simulated game-based experience. Designed by Chamberlain College of Nursing and built on a foundation of practical nursing experience using procedural methods for reinforcing protocol and practice in patient care, PhramaCollege solves many teaching and learning challenges presented in traditional pharmacology courses.

Objectives:
1. Improve subject knowledge of pharmacology through identification, observation, and patient care practice.
2. Increase subject knowledge retention as demonstrated through improved scores and pass-rates on the NCLEX exam.
3. Increase application of patient safety measures while administering medications in a clinical environment.
Arcade Entry #13 - *Brush Up*

**Entrants:** Dov Jacobson.

**Entry Description:** Brush Up is a game in which young children learn tooth brushing. It provides immediate feedback from a blue tooth-connected, sensor-enabled toothbrush. Guided by cognitive science and formative tests, the development team designed specialized characters, music, vocabulary and a system of challenges and rewards. Efficacy was measured in a rigorous study that included a one-year follow up.

**Objectives:**
1. Improve brushing behaviors in young children.
2. Even distribution of brushing time across all tooth surfaces.

Arcade Entry #14 - *Serious Games for Science Learning: Genetics and Heredity*

**Entrants:** Jennifer Javornik, MS, PMP.

**Entry Description:** In Crazy Plant Shop, students learn about genes and inheritance by breeding zany plants! Special order requests from mysterious customers require students to understand dominant and recessive traits and how genetic traits get passed from one generation to the next. Profits from successful sales are used to acquire new breeds, purchase upgrades for your shop, and acquire new customers!

**Objectives:**
1. Determine the probabilities for genotype and phenotype combinations using Punnett squares and pedigrees.
2. Explain why offspring that result from sexual reproduction are likely to have more diverse characteristics than offspring that result from asexual reproduction.
3. Explain how cells grow and function is contained in genes in the chromosomes of each cell nucleus and that during the process of reproduction the genes are passed from the parent cells to offspring.
Arcade Entry #15 - Orthotopic Liver Transplantation Serious Game

Entrants: Daniel Katz, MD; Sam DeMaria, MD; Andrew Goldberg, MD; Alan Julius Sim, MD; Mr. Ryan Wang, Medical Student; Jeron Zerillo, MD.

Entry Description: Our serious game is designed to teach proper anesthetic technique for liver transplantation, a complex procedure with five distinct phases, each of which presents different challenges. Users navigate the same management decisions as those found in the operating room; they receive in-game feedback from changes in the state of the virtual patient, a scoring system that reflects procedural knowledge and proficiency, and integrated teaching points.

Objectives:
1. One of objective for this project is to develop a serious game that accurately represents the anesthetic management of OLT.
2. Another objective for this study is to validate the serious game as a training modality equal or superior in efficacy to traditional teaching tools.

Arcade Entry #16 - Stealth Adapt: Trauma

Entrants: Phillip Mangos, PhD.

Entry Description: Stealth Adapt: Trauma is a multi-player, adaptive training experience that allows players to leverage simulated, futuristic technologies for clinical diagnosis. Players can employ special powers (e.g., advanced patient visualization) to aid in triage, diagnosis, and treatment decisions. These provide a means for challenging trainees’ executive-level cognitive skills, including task prioritization, situational awareness, and mental simulation.

Objectives:
1. Develop a game-based training framework for advancing the development of executive-level cognitive skills necessary for team-based trauma care, including mental simulation, task prioritization, symptom profile recognition, and shared situational awareness.
2. Advance the current state-of-the-art in adaptive training and intelligent tutoring capabilities seamlessly integrated within a serious game environment.
3. Promote awareness of and interest in emerging/futuristic medical technologies for augmenting and enhancing diagnostic acumen in trauma care.
**Arcade Entry #17 - Come Play The Safe Surgery Trainer!**

**Entrants:** Curtiss M Murphy.

**Entry Description:** 98,000 patients die each year from medical errors – making medical mistakes the fifth leading cause of death (US). Alion, UCF, IDEAS, and Synensis have been chosen by the Office of Naval Research to build the Safe Surgery Trainer (SST) – a game-based, patient-safety trainer for perioperative teams. Come checkout the game that’s garnered participation from 6 Virginia hospitals and a medical school.

**Objectives:**
1. Provide refresher training of patient safety concepts for perioperative teams.
2. Leverage the strengths of games to develop a stand-alone prototype that can be played without an instructor.

**Arcade Entry #18 – SimX: The First Augmented Reality Medical Simulation Platform**

**Entrants:** Ryan Ribeira, MD, MPH.

**Entry Description:** SimX’s software allows you to project a virtual patient onto any empty hospital bed. The augmented reality system allows you to see the room around you, and use the real tools you use every day to evaluate your patient. Because the patients are virtual, they can be any age or demographic, and they can portray any number of signs and symptoms that are difficult to portray on existing sim technology, all for a drastically cheaper cost.

**Objectives:**
1. Reduce the cost of medical simulation.
2. Increase the variety of medical conditions that can be portrayed through medical simulation.
3. Increase access to medical simulation in community hospitals and the developing world.
Arcade Entry #19 - STAT! ICU: A Serious Game for Training Critical Care Skills

Entrants: Edward M Sims.

Entry Description: Vcom3D created the STAT! ICU Game, which immerses Nurses in a field hospital ICU. The learner uses virtual medical equipment to assess patient conditions and perform physician’s orders on three postoperative patients. The severity of the injuries and their treatment result in life threatening conditions including ARDS, Coagulopathy and Sepsis. The game includes visual cues and physiological models to engage the learner in decision-making.

Objectives:
1. This project/innovation was developed to improve the readiness of expeditionary medical teams deployed to treat casualties of combat and natural disasters.
2. This project/innovation was developed to help critical care nurses diagnose emergent post-operative disease at an early stage and to apply clinical reasoning to provide optimal care to each patient.
3. This project/innovation was developed to rapidly enhance clinicians’ ability to operate unfamiliar critical care medical equipment to diagnose and treat disease.

Arcade Entry #20 - Safe Sedation Training

Entrants: Noah Syroid; Talmage Egan, MD; Ken Johnson.

Entry Description: The Safe Sedation Training (SST) Web-based is designed as an easy-to-use, self-paced, Virtual Preceptorship. It is intended for practitioners (physicians, nurses and dentists) who administer moderate sedation during their clinical practice. The SST aims to achieve mastery of the scientific foundation of moderate sedation practice, including familiarity with practice guidelines.

Objectives:
1. The objective of this demonstration is to orient interested individuals to Safe Sedation Training, an interactive web-based course for moderate sedation.
Arcade Entry #21 - Interprofessional Teamwork Training with TeamSTEPPS Virtual Teams

**Entrants:** Rachel Umoren, MD, MS; Rohit Das, MD, MPH; Evalyn J. Gossett, MSN, RN; Kay E Hodson Carlton, RN, EdD, ANEF, FAAN; Natalia Rybas, PhD; Linda I Sweigart, MSN, APRN; Barbara E Truman.

**Entry Description:** TeamSTEPPS is a teamwork training program developed by the Agency for Healthcare Research and Quality and the Department of Defense with demonstrated effectiveness in improving patient safety. Typical patient care situations were simulated as immersive experiences, embedding the learner in a virtual team. This allowed for a single player experience within a multiplayer Unity environment and resulted in significant changes in teamwork attitudes.

**Objectives:**
1. This project was developed to meet the need for flexible, effective, interprofessional teamwork training for both individuals and groups of health professional students.
2. This project evaluated whether virtual team training using a multiplayer Unity 3D environment improved learners’ knowledge of TeamSTEPPS tools and attitudes to teamwork.

Arcade Entry #22 - Software Simulation for Critical Healthcare Infrastructure to Help Mitigate Potential Risks

**Entrants:** Christine Van Slyke.

**Entry Description:** SCALABLE Network Technologies educates and trains Healthcare IT organizations on the impact of introducing new technologies into their critical infrastructure to help mitigate potential risks. Our family of software products uses advanced high-fidelity, real-time simulation and visualization to ensure networks, networked systems and distributed applications work effectively under all normal and emergency operating scenarios.

**Objectives:**
1. Reduce the time, cost and risks of developing and deploying new technology.
2. Lower the cost of designing, analyzing and testing net-centric devices and systems.
Arcade Entry #23 - A Novel Computer Screen-based Simulator for Defibrillator Skills Training

Entrants: Kathleen Ventre, MD; Anne Brenneman; Joshua Ferge.

Entry Description: We created a simulator that models the look, sounds, and functions of the LIFEPAK® 20e defibrillator and operates in a web browser. Our simulator includes an interactive review of defibrillator functions plus case-based tutorial and competency assessment modes. Using a mouse or touchpad, users position the defibrillator’s accessories on a “patient”, display the patient’s rhythm, and operate the defibrillator's controls as they manage the cases.

Objectives:
1. This simulator was created to augment existing advanced life support curricula by facilitating the acquisition and maintenance of competency in defibrillator operation among large groups of providers, without the need for instructor presence.
2. Through its ability to create and store data records, this simulator will allow educators to gain insight into users’ most common management errors.

Arcade Entry #24 - i-Human Patients with Dynamic DDx: Cloud-based Simulated Patient Encounter Platform for Advanced UME, GME and Experienced Physicians

Entrants: Norm Wu, MS, MBA; Craig Knoche, MS, MBA.

Entry Description: i-Human Patients®, an IMSH 2013 Best in Show winner, is an interactive, cloud-based, multimedia-rich simulated patient platform. Now with Dynamic DDx, students and experienced clinicians can develop and perfect their diagnostic skills while getting objective assessment data and coaching. Hundreds of case scenarios developed by leading medical experts are available. Educators can also develop custom cases using a point-and-click authoring system.

Objectives:
1. This project/innovation was developed to enhance the development of patient assessment and diagnostic reasoning competencies in practicing clinicians.
2. This project/innovation was developed to augment and accelerate apprenticeship training for clerkship students and residents.
3. This project/innovation was developed to integrate basic science education into a clinical context.
Arcade Entry #25 - *DecisionSim*

Entrants: Bob Yayac.

**Entry Description:** DecisionSim™ is a cloud and mobile simulation platform that specifically focuses on cognitive skills by assessing and enhancing decision-making. Adults can better recall, synthesize and apply what they learn by learning in context, practicing the application of knowledge, and receiving personalized feedback. DecisionSim allows the learner to practice decision-making in real-world scenarios, see consequences and receive personalized feedback.

**Objectives:**
1. Demonstrate how DecisionSim can help improve decision-making.
2. Demonstrate how DecisionSim's unique authoring tools allow educators to customize the learning experience.
3. Demonstrate how DecisionSim's objective data can provide insights into learner's decision-making.