

# Multi-Player Virtual Reality Used to Introduce High School Seniors to Medical Technology

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# Dorothy Rider Pool Trust Grant

- Started by Leonard Parker Pool in 1975
- Mission:
  - Enable the Lehigh Valley Health Network to be a superior regional hospital and improve the health of the citizens of the region it serves.

THE DOROTHY RIDER POOL  
HEALTH CARE TRUST



# The Dorothy Rider Pool Health Care Trust Youth Programs Grant

## Objectives:

- Provide experiential opportunities for youth within the context of a Health Care Career Discovery curriculum
- Recruit and longitudinally track students into health care careers at LVHN



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# Health Care Career Discovery

- This program exposes students to a wide variety of health care careers and positive adult role models in authentic, real-world settings.
- It is currently in the pilot stage with ~200 students from Building 21 in the Allentown School District.
- Goal: To create an evidence-based model that can be implemented in other school districts.



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# Research Scholars

- The Research Scholar Program at LVHN is a paid internship program for undergrads that may be interested in a variety of positions within the healthcare field.
- Students work on research or quality improvement projects with mentors in both the network's clinical and non-clinical departments.



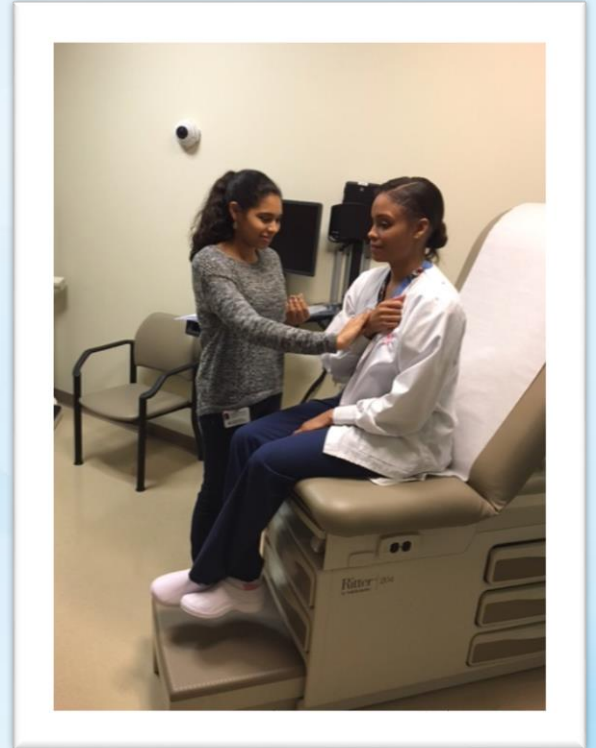
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# Emerging Health Professionals (EHP)

- EHP is a program of Lehigh Career & Technical Institute (LCTI), in partnership with Lehigh Carbon Community College (LCCC), Penn State Lehigh Valley (PSU-LV), and Lehigh Valley Health Network (LVHN)
- EHP recruits high achieving seniors from 9 sending school districts
- EHP has three core features in its curriculum:
  - Dual Enrollment
  - Career Technical Education (CTE)
  - Health Care Career Shadowing/Observations

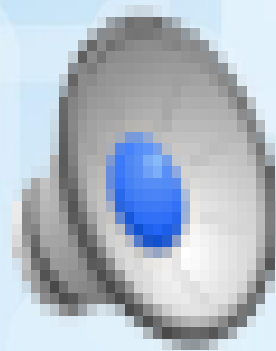


## History of EHP

- EHP was introduced into the Lehigh Valley as a new concept to expose students to health care, a dominant industry in the region
- EHP began with 13 students in 2005
- As of 2016, a total of 600 students have graduated from the program
- Many of the students have gone onto to become nurses, PAs, physicians, PTs etc.



# **Dorothy Rider Pool Trust Grant**



# Simulation

- “Simulation is the imitation of the operation of a real-world process...”
- “Imitation or enactment”
- “The process of pretending”
- Started in 1930s with Link Trainer, a flight simulator
- Medical simulation started with anesthesia to practice intubation, ventilation, and emergency airway punctures
- Examples of other areas using simulation:
  - Sports, Economics, Military, Biomechanics, Weather...

# Healthcare Simulation at LVHN

## ■ Inpatient

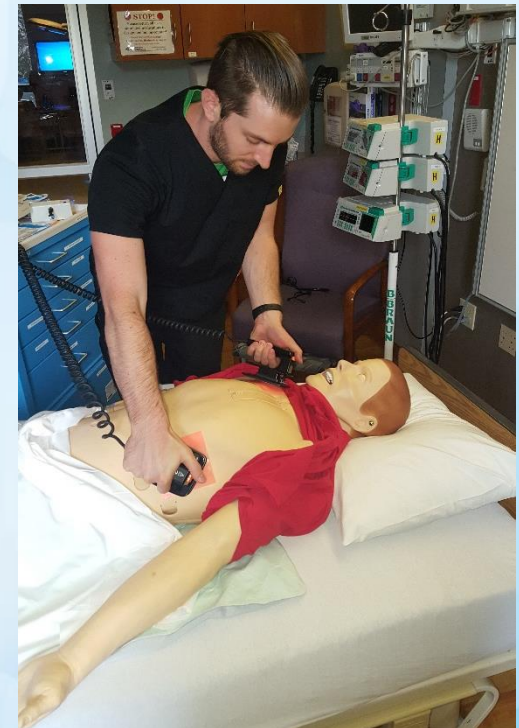
- Medical Surgical Ward
- Intensive Care Unit
- Burn Unit
- Multipurpose Room
- Debriefing Room
- Control Room
- Changing Room

## ■ Outpatient

- 12 Exam Rooms
- Control Room
- Standardized Patient Prep Room
- 3 Multipurpose Rooms
- Debriefing Room
- “Cold Room”
- “Med Room”
- “Wet Room”

# Manikins

- Low Fidelity Vs. High Fidelity
  - Birthing Prompt vs Birthing Manikin (\$10k – \$1.5M)
- Different functional capabilities and benefits



# Standardized Patients

- Active and engaging learning
- Improve performance after receiving feedback
- Actors who portray a role within a simulation
  - Patient
  - Family Member
  - Nurse or physician
  - Voice of manikin



# Prebriefing / Debriefing

- Prebriefing

- Summary of the scenario
- Learning objectives

- Debriefing

- Reflection of the scenario
- Learning objectives revisited
- **Feedback**
  - Information, not advice
  - Descriptive, not evaluative

## Pros/Cons of (Live) Simulation

### Pro

- Safe learning environment
- Tactile interactions, muscle memory
- Immersive

### Con

- Cost of equipment
- Travel

# What are Virtual Simulations?

## ■ Virtual Reality Defined

- "An artificial environment which is experienced through sensory stimuli (as sights and sounds) provided by a computer and in which one's actions partially determine what happens in the environment; also; the technology used to create or access a virtual reality."

– "Virtual Reality." Merriam-Webster.com. Merriam-Webster, n.d. Web. 15 July 2016.

- Computer-based training simulations that take place within 3D virtual environments
- Users control 3D characters called "Avatars"

# What are Virtual Simulations?

- Virtual Environment Platform Examples:
  - Second Life / Open Simulator, AvayaLive Engage, Unity 3D
- Common Features
  - Multi-user environments
  - Voice and Text communication
  - Point and Click interactivity with environment
  - Presentation Capabilities
    - “In-world” collaborative web-browsing

# Virtual Environments

- General Educational Uses of Virtual Environments
  - Virtual Classrooms
  - Virtual Field Trips
  - Virtual Simulations
- Subjects covered in Virtual Worlds
  - Science / Engineering
  - Literature – Literary Worlds Project
  - History – Exploring historical sites/events
  - Archeology
  - Language Learning
  - Etc.



# Virtual Simulation in Healthcare

## ■ Healthcare Training in Virtual Sim

- Communication
- Routine patient encounters
- Equipment training
- Disease management
- Mass Casualty – Triage

## ■ Who is virtual simulation for?

- Doctors
- Nurses
- Medical Assistants
- Medical Students
- Office Staff
- Etc.



# Why We Use Virtual Simulation?

## ■ Benefits

- Distance Learning
  - Geographically dispersed learner population
- Cost / Savings
- Scalability
- Repeatability
- Less faculty required

## ■ Drawbacks

- No physical feedback
- Information Technology Issues
- Learning curve



# History of Virtual Sim at LVHN

## ■ Second Life

- Primary Usage:
  - Online Social Platform, Education
- Benefits:
  - Low Cost (Free client / Rented Server Space)
  - In-world building/scripting tools
- LVHN Projects:
  - Simulation Orientation Course
  - MI Alert Emergency



# History of Virtual Sim at LVHN

- AvayaLive Engage
  - Primary Usage:
    - Online meetings, conferences, and training
  - Benefits:
    - Browser-based client
    - Supported large groups
    - 3D Audio for VOIP
  - DOE Projects:
    - Office-based medical emergencies
      - Cardiac, Respiratory, Behavioral Health
      - Emergency Cart



# History of Virtual Sim at LVHN

## ■ CliniSpace

- **Custom** Environment - LVHN Virtual Sim Center
- Developed from the ground up to be used for virtual clinical simulation
- Rich interactive environments and clinical settings
- Dynapatient
  - Head-to-toe patient assessment
  - 10 patient avatars
  - Dynamic physiology
- Case Authoring Tool
  - Clinical scenario details
  - Event Authoring



# History of Virtual Sim at LVHN

- CliniSpace / LVHN VSC
  - Platform Rollout
    - Bronchiolitis Sim for Pediatrics Nurses
    - Hypoglycemia Sim for Outpatient Clinicians



# EHP Student Experience

- Introduced students to the concept of virtual simulation and the associated vocabulary
- Reviewed possible careers in virtual and live simulation:
  - Simulation Specialist
  - Instructional Technologist
  - Senior eLearning Designer
  - Standardized Patient



# EHP Student Experience

- Students came with a higher level of medical knowledge as compared to average seniors in high school
- We leveraged that knowledge to have them go through a Hypoglycemia case in the VSC



# EHP Student Experience

- A worksheet was handed out to the students to provide them with scaffolding, but also allow them to explore on their own:
  - Example Questions:
    - Identify the following Vital Signs on the patient:
      - BP-
      - SpO2-
      - Temperature (oral)-
      - Blood Sugar-
    - Based upon what you've identified above, what is your diagnosis?
  - We also used open-ended questions to gather information:
    - Did you feel as if you were treating a real patient?
    - If you could come up with a topic/case of your own, what would you choose?

## EHP Student Experience

- All students went through the online orientation built into the VSC to get comfortable moving their avatars and moving around in the environment
- We then gave them the worksheet and allowed them time to work alone on the first half
- The group came back together to finish the case on the projector screen in front of the room

## Feedback from Students

- How has this speaker/presenter assisted you in learning about this health care career path?
  - *“Teamwork and individual practice possibilities limitless.”*
  - *“It assisted in my understanding of different hospital situations and their protocol.”*
  - *“I never knew computer science could be in health care.”*
  - *“I learned how to assess a patient”*
  - *“Jason showed me that there are jobs in the medical field for computer science majors. People with an interest in technology are also needed in this field.”*
  - *“The speaker assisted me in learning about how this simulation is treated as a real-life scenario.”*

# VSC Demonstration



## Conclusion and Future Plans

- Watching the learning occur as the students worked through the case was rewarding
- Hearing through their feedback that they both enjoyed and learned from us is key to our future development
- We learned as much from the students as they learned from us
- We plan to use their feedback and continue working with other student groups including:
  - Building 21 Allentown
  - Lehigh County Medical Society Middle and High School Students from the Allentown School District

# Questions?

Contact Information:

Name

Title

Email address