



Foreword by
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European Defence Agency (EDA)



Exploring Distributed and Remote Learning Opportunities

iEXCEL: Improving Human Performance and Effectiveness in Health Care



Collaborating Across Distance on Health Care Challenges

The University of Nebraska Medical Center is poised to transform health care training, education and research by adopting emerging simulation and visualization technologies to propel health professionals into the next generation.

As the hub for a statewide network of interconnected simulation centers using visualization technologies, collaboration software and mobile simulation units (SIM-NE), iEXCEL is raising the bar for training accessibility and collaboration.

Available expertise and capabilities:

- 3D/AR/VR and holographic module development
- "NextGen" clinical and surgical training using simulation and visualization
- Dedicated simulation environments for technology development, training and testing
- Research and development in human performance and effectiveness
- Disaster training and emergency management
- Live Virtual Constructive Exercises
- Biocontainment and infectious disease readiness
- Biomarker development to improve understanding of neurological disorders



Visualizing Difficult Concepts

Explore training and research opportunities with UNMC by contacting Pamela Boyers, Ph.D. at 00-1-402-559-2442 or pamela.boyers@unmc.edu Omaha, Nebraska, USA

iEXCEL – A Statewide Remote and Distributed Learning Network

iEXCELSM* at the University of Nebraska Medical Center (UNMC) in Omaha, NE, is charged with a statewide training mission. Known as the “500-mile wide” campus, UNMC deans are responsible for overseeing a rural training program network that includes clinical training sites for nursing, dentistry, medicine, public health and allied health professions.

A significant challenge is ensuring that the rural trainees and practicing healthcare providers receive the same standard of training across the state of Nebraska as do their cohorts on the Omaha Campus, including access to advanced simulation and visualization technologies.

In addition to addressing the standardization of health professions training across distances, there is a significant need to support high-quality training for emergency medical responders (EMRs) serving frontier areas of Nebraska. This requires offering accessible and focused simulation training for rural first responders and ambulance services (the majority of whom are volunteers) as well as emergency medical care providers in critical access hospitals (CAHs).

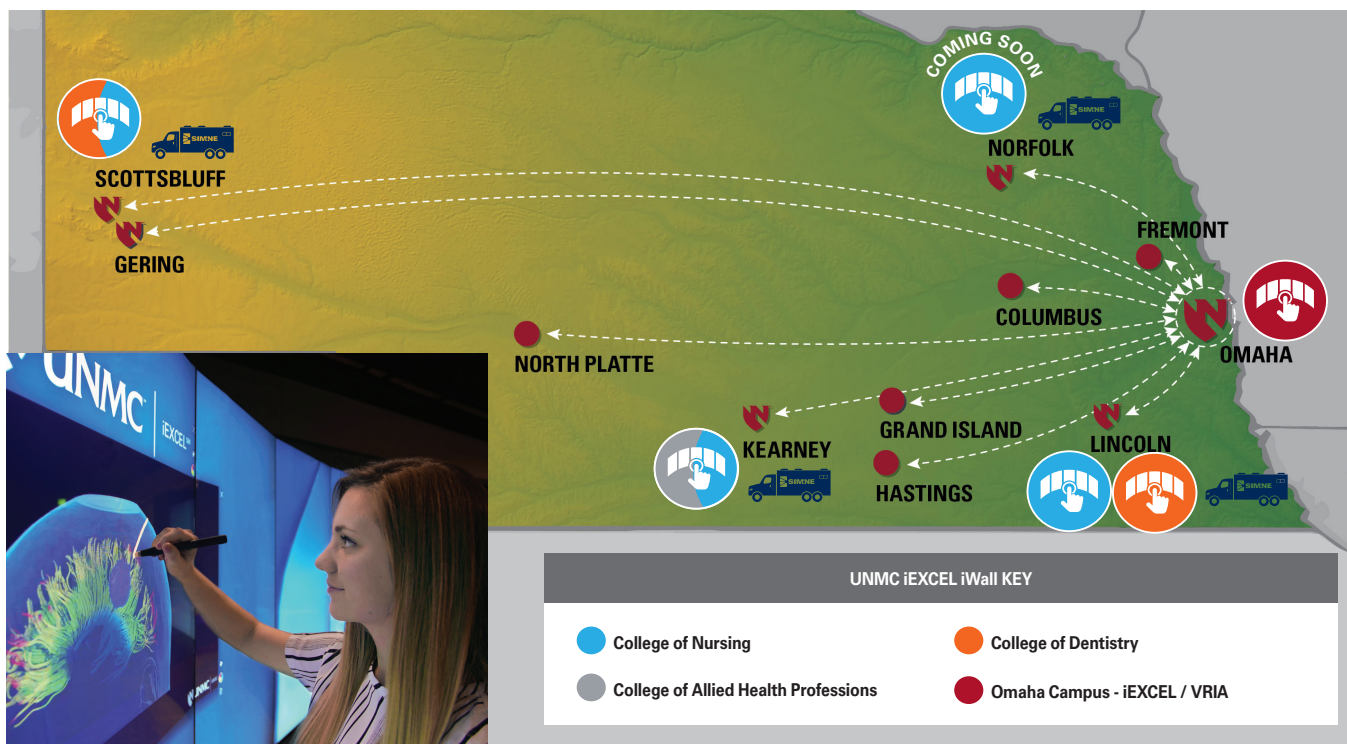
Two major initiatives have been developed that help address the challenge of remote and distributed training. One is Simulation in Motion – Nebraska (SIM-NE), a training program using four mobile simulation labs, and the other, a series of interactive digital walls (iWalls) with

collaboration software that connects training sites across Nebraska.

**Interprofessional Experiential Center for Enduring Learning*

SIM-NE

Initially supported by a generous (\$5 million) start-up grant from The Leona M. and Harry B. Helmsley Charitable Trust, four mobile simulation labs have offered on-site “no cost” training to requesting agencies and organizations. Remote rural sites are routinely visited by these 44-foot mobile trucks. Each consists of two simulation spaces: an emergency room and an ambulance module equipped with high-fidelity patient simulators, and real medical and rescue equipment. Travel and expenses are eliminated for the learners, and they can “train as they fight” next to their fellow emergency medical care providers in their local communities.



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iEXCEL STATEWIDE COLLABORATION

Training Use Cases

Since the first remote mobile simulation training exercise at the Omaha Indian Reservation in Macy, NE, over 330 training events have been held, deploying high-fidelity simulation scenarios depicting emergency childbirth, pediatric asthma, head trauma, myocardial infarction, multisystem trauma and stroke. The four SIM-NE training trucks have travelled more than 50,000 miles across the state delivering training directly to the CAHs and ambulance services. More than 5,000 emergency medical responders (EMRs), emergency medical technicians (EMTs), paramedics, firefighters, nurses, nurse practitioners, doctors, physician assistants, respiratory therapists, school nurses, high school coaches, law enforcement officers, military medics and ancillary healthcare professionals have been trained to date.

Two years of remote and distributed training sessions have resulted in positive and appreciative responses from trainees. SIM-NE is currently expanding the original mission to include collaboration with entities such as the Nebraska Perinatal Quality Improvement Collaborative (NPQIC) to provide neonatal/difficult birth training events; Nebraska Air National Guard on a large-scale drill involving a collapsed building scenario and the transport of wounded patients; school nurses for working with medically-fragile students; and athletic coaches for concussion training. SIM-NE is also collaborating with the Army National Guard, the Nebraska State Patrol Training Academy and the FBI. The need for training using mobile clinical simulation labs that can offer in situ experiences involving a wide range of situations, from responding to narcotic overdoses to preparing for major disaster response, is becoming very evident.



Expansion of Capabilities

Taking advantage of advances in augmented reality (AR) and virtual reality (VR), including virtual ultrasound simulators, is being explored. Equipping mobile simulation labs with interactive digital screens and head-mounted display sets (HMDs) while incorporating mobile platforms will increase the ability to collaborate across distance and ensure the remote and distributed provision of immersive learning opportunities. These technologies allow learners to view exactly what is occurring within the body, such as the physiology of the heart during a heart attack or the brain during a stroke, offering deeper insights of human anatomy and physiologic response – especially under crisis. Seeing the “why/how and what” prior to and during simulation training would better prepare

healthcare professionals to apply targeted and efficient life-saving interventions.

Clinically accurate and evidence-based medical content for these virtual worlds is critically important, and 3D medical images are being created by iEXCEL in cooperation with Nebraska Medicine and UNMC subject matter experts. To continue to expand the capabilities for providing remote and distributed learning to rural areas of Nebraska, iEXCEL is currently exploring the potential of having a centralized trainer interacting with a spectrum of learners using head-mounted displays. If this goal can be accomplished, efficiencies will be attained through reducing time and travel for in-demand clinical experts, and specialized expertise can be made more widely available throughout the state and globe.

Interactive Digital Walls

A network of 2D iWalls consisting of large interactive touch screens is being adopted at key training sites across the state. This brilliant, experiential, interactive and highly-visual technology stimulates new ways of learning by allowing users to interact with visual content and collaborate in real time over distance. These iWalls operate using collaboration software that allows for real-time communication so that a nursing and/or dentistry cohort in Omaha can communicate directly and interact simultaneously with another cohort across the state. All learners are able to view and interact with the imagery. Easy to adopt, this technology has inspired new forms of experiential learning to cover topics such as diabetes, nutrition, pharmacology, dentistry, infectious disease control and health informatics.



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For further information visit: www.unmc.edu/iexcel