

Building a Future Model for Health Professions Education

Interdisciplinary – Experiential – Competency-Based

“If you do not change direction, you may end up where you are heading.” – Lao Tzu

Lessons Learned:

The State of Nebraska and a small group of its committed citizens have made significant investments in a project called iEXCELSM. This support of the Interprofessional Experiential Center for Enduring Learning (iEXCEL) ensures success for the design, construction and future operations of a 192,000 sq.ft. interprofessional simulation facility focused on health professions education (the Davis Global Center) on the UNMC Omaha campus. To ensure the iEXCEL vision of Global Leadership in Improving Human Performance and Effectiveness in Health Care is successfully realized and expensive missteps avoided, it was important to apply lessons learned from prior experience in building and operating medical simulation centers - as well as from other high-reliability organizations (HROs) – including, and especially, the military – which engage in modeling, simulation, visualization and distributed learning to reduce human errors, enhance quality, improve safety and lower costs.

1. Articulate a Societally Impactful Vision

Clearly articulating desired outcomes and benefits for any sizeable investment in construction, complex technologies and expert staff is a critical first step. The iEXCEL message conveys a powerful commitment to impact the outcomes of health care by transforming health professions education. The goals are to reduce medical errors and improve efficiencies through an interdisciplinary simulation center in which procedural and professional skills are honed and assessed. The Davis Global Center will be a highly technical, experiential (hands-on) training facility, where knowledge transfer, communication skills, critical thinking, leadership and team training will be taught, practiced and assessed. The Center will also serve as a clinical test bed in which human factors and other research and development will occur. Significant societal benefits include technological workforce development and creating 3D/Augmented Reality/Virtual Reality (3D/AR/VR) and holographic content for health care. Research opportunities abound for disciplines including engineering, computer technology and the arts - as well as for community engagement and collaboration with the military.

2. Be Bold! Be Relevant! Be First!

Creating momentum by being bold and “first to market” is highly attractive to industry and military collaborators who are interested in opportunities for joint research, trialing and testing equipment, and training methods. The size (and audacity) of the project, in combination with significant institutional and philanthropic investment, creates energy - acting as a magnet for national leaders, innovators and entrepreneurs. Working with the clinical entities to create a new and relevant model for health care training involves galvanizing faculty, students and practitioners to shift from the age-old tradition of “see one, do one, teach one” towards a comprehensive competency-based model of training.



3. Break Down “Silos”

Central to iEXCEL is the creation of a truly interdisciplinary venue. Created as a hub that fosters innovation in training, the Davis Global Center is discipline-agnostic, serving all health care disciplines at all levels of training while providing staff simulation expertise to accelerate the rapid adoption of experiential learning. With the goal of ensuring highly functional and effective health care teams, teaching team skills early and throughout training, and being able to manage the transition of very sick patients throughout the echelons of care, are critical success factors. This interprofessional initiative necessitated total support from the leadership of the institution as well as the “buy-in” of the health care leadership, (including Deans of Medicine, Nursing, Pharmacy, Dentistry, Allied Health, Public Health and Graduate Studies, and our clinical partner, Nebraska Medicine).

Partnering with the faculty and the clinical enterprise(s) to support quality, safety and continuous process improvement involves active engagement with hospital quality and safety initiatives additional to providing support for innovative curriculum development. Ensuring ease of access and technological connectivity, providing highly relevant training exercises, and offering “in situ” simulations are also key to the adoption of simulation by busy clinicians, faculty and learners.

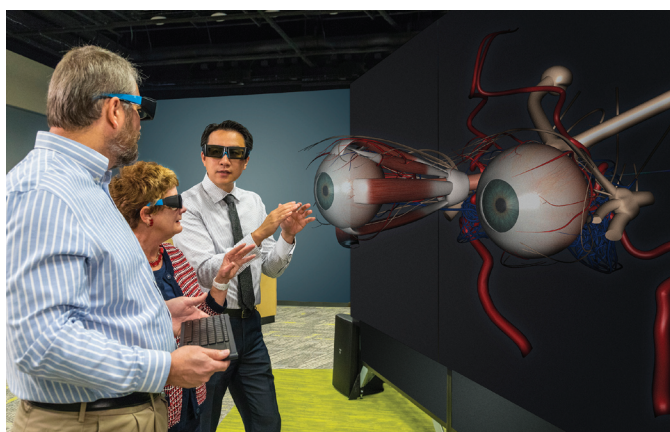
4. Enhance Reputation

Creating a new paradigm for health professions education assists the “University-at-Large” in building stature locally, nationally and globally. A new, cutting-edge facility that fosters innovation in education, research and development backed by the state and in partnership with the private community speaks to a strong commitment to achieving excellence. Recruitment of learners, faculty and staff of the “brightest and best” is achieved, in part, due to the excitement of being educated in a forward-thinking institution. Offering unprecedented learning, teaching and research environments – especially for the new generation of digital learners – is highly attractive. Accreditation of departments, colleges, residency programs, the hospitals and ambulatory centers is also positively impacted by

the availability and capabilities of an interdisciplinary simulation center. Understanding the powerful impact of simulation and competency assessment on safety outcomes within the military as well as the civilian aviation industry and applying these concepts to patient care also enhances the reputation of the clinical entity from the community perspective.

5. Deploy Disruptive Technologies

Incorporation of the widest range of cutting-edge simulation technologies, especially 3D, holographic and Virtual Immersive Reality (VIR), not historically widely embraced in the health professions educational “tool kit”, is extremely important to achieve a transformational learning environment. Learners, industry and the military are inspired by the availability of a wide range of very advanced simulation modalities including surgical simulation (fresh tissue), advanced simulation (human patient simulators, computerized simulation, and task trainers), and 3D/AR/VR to improve outcomes. This combination of technologies offers the ability to create realistic health care scenarios and stimulate new human factors research, such as identifying the most effective methods for improving and measuring learning styles and the resulting impact on patient outcomes.



6. Emphasize Technology Selection & Integration

Taking technological compatibility into consideration when selecting and installing advanced technologies leads to less breakdowns, thus minimizing unanticipated future costs. As advanced educational technologies (especially visualization & simulation technologies) are adopted by health care, it is critically important that these are viewed in total and not as individual “systems within a system.” Whenever possible, technologies must be compatible and interconnected so that “the whole is greater than the sum of its parts.” Sufficient bandwidth to allow remote connectivity and broadcasting to and from other sites requires specialized expertise, especially if this data to be transmitted is 3D and/or highly dense. Reliable connectivity across the organizational sites and with the partner clinical institutions is key.

Connectivity of this complexity requires specialized teams – usually from the world of advanced visualization/high performance computing and even entertainment. These technical teams preferably possess a skill mix to provide network, communication and collaboration solutions, and the ability to offer end-to-end support. Since simulation technologies are rapidly emerging in

the market place, they are frequently promoted while still in the early development stages. It is not only essential that each technology investment be carefully selected for reliability, quality, cost and sustainability, but that selection and integration are managed in such a way that ensures total connectivity. Once integrated, they must work together reliably and consistently. Costly lessons learned from others are leading to the recommendation of a new model for selecting professional AV/IT integrators at the very start of the project in a contract that is of equal importance and yet separate from the architects and construction contractors.

7. Implement Robust Academic & Business Strategies

A framework for interrelated academic and business missions must be purposefully designed to achieve substantive (qualitative and quantitative) academic and business development strategies. Business development opportunities for innovators in the medical professions and beyond can be created with industry and military collaborators, resulting in the commercialization of new products, training methods and improved human performance processes. It is important to address long-term sustainability through revenue generation; however, overemphasis on this aspect too early in the development of a simulation center can detract from achieving the transformational academic mission. Focusing on long-term goals will ultimately yield mission-driven strategic and fiscal results.

8. Engage Digital Learners

Raised with interactive devices and web-based learning, the new generation seeks and absorbs knowledge very differently than their instructors, who are more familiar with lecturing. A “passive” learning model clearly does not meet the learning needs of millennials. As the “NextGen” learners enter higher education, they are facile with accessing information from the web and using highly realistic apps and games to access and transfer knowledge. With learners expecting advanced education to offer the same level of advanced educational technologies, institutes of higher learning are rapidly responding by adopting e-learning opportunities. For skills-based professions, these should be combined with interactive, experiential learning activities. Originally used for entertainment, the worlds of gaming, modeling and simulation, and more recently, artificial intelligence, are converging to offer extraordinary learning opportunities. These modalities can be deployed remotely, bringing learning to life by engaging students and creating virtual worlds. While health care education is adopting clinical simulation to enhance the training of individuals and health care teams, there are still few simulation centers incorporating interactive 3D/AR/VR technologies and immersive learning experiences. As a “spin-off”, developing unprecedented methods for knowledge transfer applicable to every segment of a university’s mission, including teaching, research, service and business development, is definitely achievable.

9. Deploy an Outcomes-based Approach: Assessing and Measuring Performance

Powerful economic and social forces and a changing health care delivery system necessitate transformation

of current health professions education. There is an urgent need to create a robust and reliable competency assessment model that allows for flexible student progression through the curriculum. Curriculum development would then focus upon improved outcomes of care as related to creating safer, more effective and more efficient health care environments for patients - as well as for health care providers. This approach focuses on continuously improving clinical quality of care through performance analysis and collaboration with the clinical environments.

A competency-based training model could potentially shorten training time by developing an alternative to the current “lockstep”, time-based approach to progression through a training program. This is particularly relevant in the delivery of continuing education for practicing health care professionals. It is well known that people learn differently - with some better at knowledge assimilation and testing. However, the latter does not necessarily transfer to proficiencies and expertise in conducting procedures, problem solving or team functioning.

By facilitating shorter training periods, this model would add the benefit of addressing current and projected shortages of health care workers. It would also ensure the training model for health care professionals is highly relevant, incorporating knowledge, skills and professional development, and carefully designed to take care of patients in the current and future health care delivery models.



Once developed, this approach would offer learners the ability to proceed through the curriculum at their own pace as they develop the required discipline-specific competencies for their level of training, before and long after they enter practice. When a well-defined level of competency in a given procedure has been identified, e.g., inserting a central line or performing well in a clinical scenario, learners can advance to the next level of the curriculum. Progressing faster through the curriculum would mean joining the health care workforce or mastering new skills earlier with less debt to the individual and costs to society.

10. Create a “Purposeful” Culture

A critical yet often overlooked success factor that can “make or break” all well-intended investments and efforts is the selection and nurturance of a highly collaborative, talented and interdisciplinary staffing model that:

1. Exhibits and practices genuine interprofessional and interdisciplinary collaboration between the health care and related disciplines.
2. Creates and maintains a harmonious balance of academic and entrepreneurship values.
3. Continuously develops an innovative, nimble and rigorous culture.

4. Remains nimble and flexible, avoiding becoming overly "corporatized" or concerned with exclusivity, competition, and intellectual property, which seriously limits collaboration with other simulation centers, the military, and joint grant opportunities - thus stifling collaborative innovation.
5. Offers a wide breadth and depth of modeling and simulation expertise, including visualization with the goal of creating new models for education, teaching and research.
6. Incorporates a non-traditional approach to design, construction and implementation of the vision, so that the Center is perceived, operated and utilized as an innovation hub and clinical test bed for research and development - as well as an extraordinary teaching center.
7. Develops a system that rewards and recognizes faculty, staff and students’ time and simulation accomplishments that include transformation of the curriculum, learning methodologies, process improvement, product design and development – including new teaching methods – and outcomes research.
8. Sustains an innovative and entrepreneurial (yet accountable) culture that engages and challenges the total culture, including departments and entities such as legal, purchasing, IT and facilities. Engaged departments will require the overall institution to convey an understanding of the cultural expectations.
9. Creates opportunities for new kinds of research and technology transfer — including expanding opportunities for collaborative grant funding, as well as helping drive much needed quality and safety efforts in the health care enterprise.
10. Understands the important strategy of learning from other high-reliability organizations. Significant tangible societal benefits can be gained from collaboration with industry, government and the military (including military contractors).

The opportunity to take a bold step forward in the education of health care professionals is truly daunting. To do so in partnership with nontraditional industry and military partners is even more challenging. Yet, each day, there is more and more convincing evidence of the accuracy of the trajectory and the need for innovation. While bold steps can be daunting, and change is hard, not addressing necessary changes is irresponsible and inconsistent with core principles of our profession. *Primum non nocere!*

Co-Authors:

Jeffrey Gold, M.D., Chancellor, University of Nebraska Medical Center and Interim Chancellor, University of Nebraska at Omaha.

Pamela J. Boyers, Ph.D., Associate Vice Chancellor for iXCEL, University of Nebraska Medical Center

**For more information please visit:
www.unmc.edu/iexcel**

