SLAM
SIMULATION

Sacred Heart University
College of Health Professions

SLAM SIMULATION

This is an era of dynamic changes in health care: increasing need and demand resulting from an aging population, high incidence of chronic disease, the escalating sophistication of medications and therapies, destabilizing global health issues and significant challenges presented by health care reform. These changes are driving a revolution in schools of medicine. There are growing demands for curriculum reform that embrace experiential learning and inter-professional collaboration. The pace of change in therapies and technologies and public demand for improved patient safety has placed a renewed emphasis on continuing education, professional development and inter-professional training.

The Simulation Center has become the symbol of a new approach to learning and communication, and the physical manifestation of these facilities is increasingly important to the competitiveness of top-tier academic medical centers. Immersive learning spaces are expensive and complex facilities not well understood by most architects. SLAM is a leader in the health sciences education industry - Our expertise is informed by extensive research to keep abreast of new developments as well as recent projects bringing lessons learned to our medical school and medical center clients.

There are a wide range of features that can be incorporated into a comprehensive Simulation Center. Spaces that support simulation range from simple mock exam rooms that support standardized patient interactions to computer labs that link teams of medical student avatars in a virtual reality space to sophisticated control rooms that manipulate environmental and manikin reactions to specific scenarios. SLAM recognizes that there are multiple levels of “intelligence” needed to produce an effective Simulation Center design. We focus on working with institutions to define the center’s mission/vision and build a business plan to guide our programming and planning efforts.

Johns Hopkins Hospital
Simulation Center

SLAM EXPERIENCE

SCHOOLS OF MEDICINE

Baylor College of Medicine
- New Education & Research Building

Charles Drew University
- School of Medicine

Drexel University College of Medicine
- Tower Health Regional Campus

Duke University School of Medicine
- Trent Semans Learning Center

Duquesne University
-College of Osteopathic Medicine

Emory University School of Medicine
- Medical Education Building

Indiana University, School of Medicine
- Stone Family Center for Health Sciences

Johns Hopkins School of Medicine
- Center for Individualized Medicine

Medical University of South Carolina
-Medical Office & Academic Building

Sam Houston State University
- College of Medicine

SUNY Upstate Medical University
- Innovation Center

University of Houston
- College of Medicine

University of Minnesota School of Medicine
- Health Sciences Education Center

University of North Carolina-Chapel Hill
- Medical Education Building

University of South Carolina
- School of Medicine Relocation

University of Texas Austin Medical School
- Health Learning Building

University of Utah
- Medical Education & Discovery Building

University of Washington
- Health Science Education Building

University of Wisconsin-Madison
- Health Science Learning Center

Virginia Commonwealth University
- SOM, Sanger Hall Renovation

Virginia Tech Carilion
- School of Medicine

Western Michigan University
- School of Medicine

NURSING & HEALTH PROFESSIONS

Augusta University
- School of Nursing & Allied Health

Georgia Southern University
- School of Nursing & Health Professions

Iona University
- School of Nursing & Health Professions

Notre Dame of Maryland University
- School of Nursing

Penn State University
- School of Nursing

Providence College
- School of Nursing & Health Sciences

Sacred Heart University
- School of Nursing & Center for Healthcare Education

Springfield College
- College of Health Professions

SUNY at Brockport
- School of Nursing

University of California, Irvine
- College of Nursing & Health Sciences

University of San Diego
- Institute for Nursing Research, Advanced Practice and Simulation

University of Southern Indiana
- Nursing School

University of Texas at Austin
- School of Nursing

Virginia State University
- Hunter McDaniel Hall

SCHOOLS OF PUBLIC HEALTH

Emory University
- Rollins School of Public Health CNR/GCR - Expansion/Renovations
- Rollins School of Public Health (RRR)

Georgia State University
- School of Public Health

Temple University
- School of Public Health

University of Georgia
- School of Public Health

SCHOOLS OF PHARMACY

SUNY Binghamton University
- School of Pharmacy

SUNY at Buffalo
- School of Pharmacy & Pharmaceutical Sciences

University of Cincinnati
- College of Pharmacy

University of Georgia
- College of Pharmacy

University of Iowa
- College of Pharmacy

SIMULATION CENTERS

Albany State University
- Nursing Simulation Center

Johns Hopkins School of Medicine
- Simulation Center

SUNY Upstate Medical University
- Simulation Center

University of Illinois at Chicago
- Simulation Center

University of Texas at Austin
- School of Nursing & Simulation Center

University of San Diego
- Simulation Center

Duke University School of Medicine
- Simulation Center

University of Texas at Austin
- Nursing & Medicine Simulation Center

Grand Valley State University
- Simulation Center

University of North Carolina-Chapel Hill
- Simulation Center

University of Minnesota
- Simulation Center

Western Michigan University
- Simulation Center

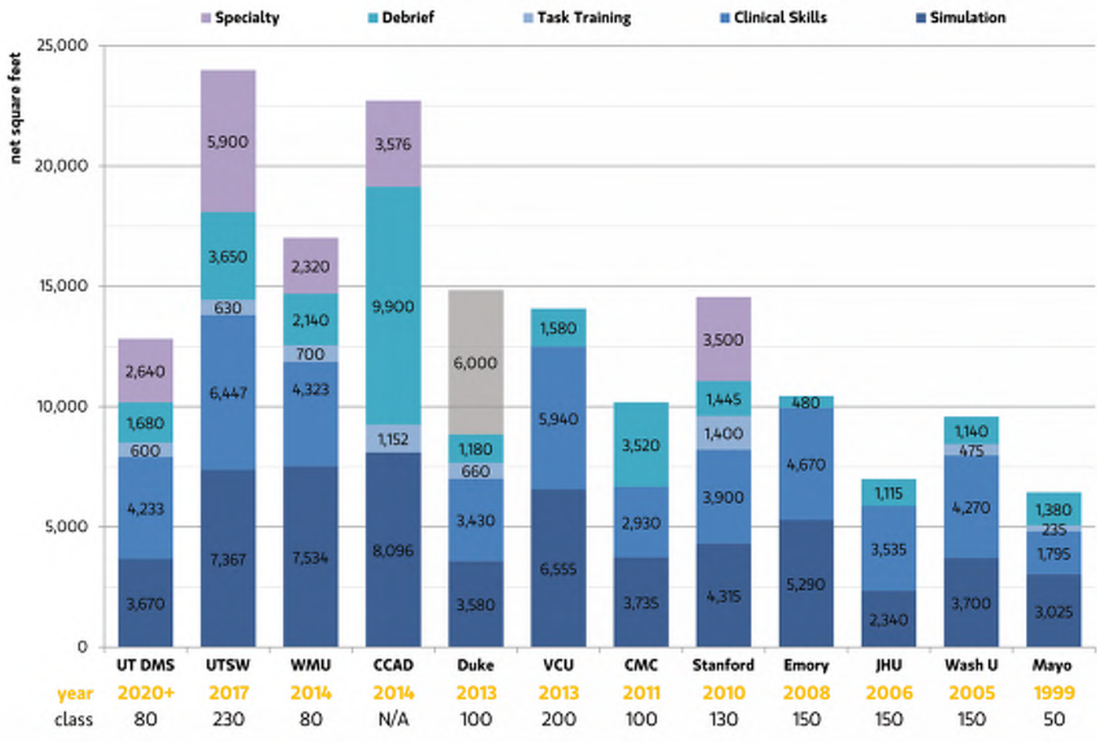
Tufts University
- Simulation Center

Florida State College at Jacksonville
-Medical & Nursing Simulation Center

St. Francis Hospital
-Innovation & Learning Center

SIMULATION CENTER BENCHMARKING

As illustrated by the data below, Simulation Centers vary greatly. SLAM will work with you to establish an appropriate utilization target that leaves time for scheduling changes, repairs and upgrades and then apply that utilization rate to projected students and curriculum in order to confirm the number of simulation theaters needed to serve the intended population.



Although the physical manifestation of each comprehensive Simulation Center is unique, they all integrate three space types:

1. CLINICAL ENVIRONMENTS:
The clinical EXPERIENCE is at the heart of the simulation program. The primary objective of any medical simulation is education. Replicating the clinical space does not necessarily produce the best educational environment. For example, some rooms (i.e. mock exam rooms) may be oversized to accommodate instructors or other students. Medical gases may be replaced by compressed air. Photo realistic curtains may substitute for equipment bays. In designing simulated clinical environments educational outcomes, not replication, should drive the design.

2. EDUCATIONAL ENVIRONMENTS:
Simulation Centers offer students and health care professionals a safe place to learn and explore. The environment outside the active clinical settings should be distinctive from the hospital. Conference, debrief and breakout areas should be designed to promote engagement and interaction for adult learners. Furniture that can be reconfigured from lecture- to team-based learning mode works well in these areas. Larger multipurpose rooms can be designed to accommodate lecture- or station-based training, providing the highest degree of flexibility.

3. THEATRICAL ENVIRONMENTS:
This system of spaces poses the most sophisticated design challenges and is where a deep understanding of the simulation process is essential. At the foundation of the theatrical environment is the front stage/backstage concept. The front stage is where students experience simulation education and the backstage is where the simulation and preparation take place. Planning for the center is guided by this front stage/backstage concept, directing the flow of students so they are separated from the "backstage" rooms that are used solely by instructors or staff. Also included in this backstage area are standardized patient support spaces and, ideally, the standardized patient access to mock exam and other "front stage" rooms. The goal of the simulation theater is to immerse students in the learning activity.

PROGRAM DRIVERS

✓	UNDERGRAD MEDICAL EDUCATION
✓	GRADUATE MEDICAL EDUCATION
✓	CONTINUING MEDICAL EDUCATION
✓	INTER-PROFESSIONAL EDUCATION
✓	HOSPITAL SAFETY & CERTIFICATIONS
✓	COMMUNITY HEALTH AND SAFETY
✓	INDUSTRY

FULL TIME EMPLOYEES

EQUIPMENT COST

AV EQUIPMENT COST

SQ FT SIMULATION

SQ FT STANDARD PATIENT

TUITION

REVENUE

BUDGET

$500 - $600 / SF FIRST COST

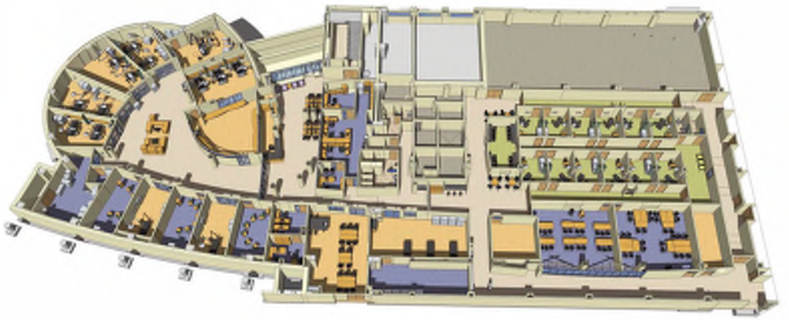
SAINT FRANCIS HOSPITAL, CENTER FOR INNOVATION & LEADERSHIP: The Center for Innovation at Saint Francis Hospital and Medical Center in Hartford, CT is a 12,000-SF renovation of the existing medical library on the first floor of the Research and Education Building. The existing library became a condensed and focused component of a larger program. The Innovation Center is a new destination where teams of medical practitioners and administrators can gather and collaborate. The new Center is a unique environment that provides a platform for team building, distinct from the clinical environment of the greater hospital.

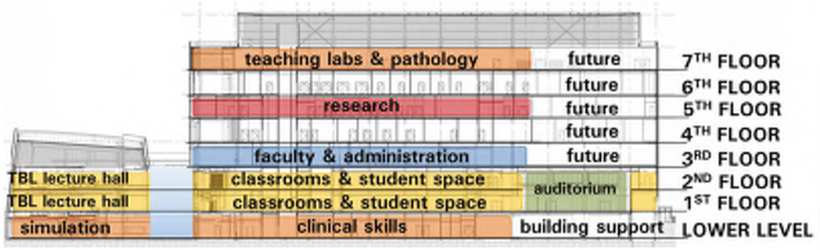
A multifaceted program was developed through a combination of open discussion zones, high-tech conference spaces and simulation workshops. All of the separate pieces of the Center congregate and connect around a collaborative commons that combine low-tech peer-to-peer interaction with high-tech tools and surfaces.

The Simulation Studio is a large, flexible, high-bay space where an infinite number of environments can be mocked up and explored for training, research and development. The focus of this space is on building team and communication skills making flexibility more important than fidelity. The space supports simulated environments as small as a single consult room to OR-size areas. Depending on the size of groups participating and the simulated environments, debriefing can occur either in the room or in an adjacent conference room.

DUKE UNIVERSITY, SCHOOL OF MEDICINE: Duke University's new Interdisciplinary Health Professions Learning Center is a 115,000-GSF facility that is five stories in height and also includes physical connections to the adjacent library and renovations of one floor for learning center support functions. The building is designed for two additional floors of vertical expansion. The intent is to create an appropriately forward-looking yet contextual facility that will serve as a new home and focal point for the School of Medicine's teaching, administrative and social activities while also creating an enhanced visual identity for the School and the medical education program.

Duke University's 10,000-SF Simulation Center integrates clinical skills/ assessment and human patient simulation into a flexible inter-professional learning environment The facility is designed to provide advanced and innovative training for physicians, residents, fellows, physician assistants, nurses, medical students, health care providers, and industry professionals. It also supports a robust standardized patient training program that serves a number of healthcare institutions in the region. In addition, the Simulation Center is used to conduct funded research on patient safety and team communication. The simulation program includes two large simulated OR rooms with a shared control room and a flexible ICU room. The pre-existing Surgical Education and Activities Lab (SEAL) was also incorporated into the new center and accommodates a range of task trainers. Reception, debriefing and storage rooms are shared between simulation and skills.





WESTERN MICHIGAN UNIVERSITY, SCHOOL OF MEDICINE: The Western Michigan University School of Medicine (WMU SOM) Regional Simulation Center serves as a regional resource for the education and assessment of medical students (undergraduate medical education), resident physicians (graduate medical education), practicing physicians and surgeons (continuing medical education), nurses and nursing students, and all allied health professionals and students. The center also provides opportunities for simulation-related research in areas such as skill acquisition, competence assessment, communication, teamwork behaviors, human error and patient safety, human factors, device and product testing, and systems analysis. The Simulation Center program includes two large sim labs to support OR and ICU scenarios and 6 smaller multipurpose labs. These rooms can be combined to recreate various clinical settings. Each simulation lab is supported by a dedicated control room. Also included is a Virtual Surgery Studio with 8 stations and a Robotic Surgery Lab. Space for a CAVE (cave automatic virtual environment) has been planned to leverage developing visualization technologies. Complementing the simulation labs is a clinical skills area with 12 exam rooms and standardized patient training and support.

The SoM is a new resource for the entire Kalamazoo healthcare community, supporting the region's ambitions to become a benchmark for contemporary healthcare delivery and innovation.

GEORGIA SOUTHERN UNIVERSITY, WATERS COLLEGE OF HEALTH PROFESSIONS: Georgia Southern University enrolls more undergraduate nurses and health professions students than any other college or university in the state of Georgia. SLAM worked with key stakeholders to develop a program to enhance nursing education by simulating clinical practice using sophisticated technologies in a safe learning environment, including a 27,500 DGSF Simulation and Nursing Suite. The new Simulation Center is located just inside the building main entrance as one of the major student-focused learning environments.

The new Simulation Center includes high fidelity simulation labs and a clinical exam suite designed to provide hands-on learning in a space that reflects real-world healthcare environments.

Simulated spaces such as ICU, emergency, labor and delivery, isolation, and patient rooms create the simulated hospital. These flexible areas house sophisticated human patient simulators and are linked electronically with a robust AV system for detailed and extensive debriefing and experiential learning.

The simulated clinic houses 12 clinical exam rooms including 4 large rooms for sonography and a separate entrance, a moulage room, monitoring, and accommodations for a standardized patient program.

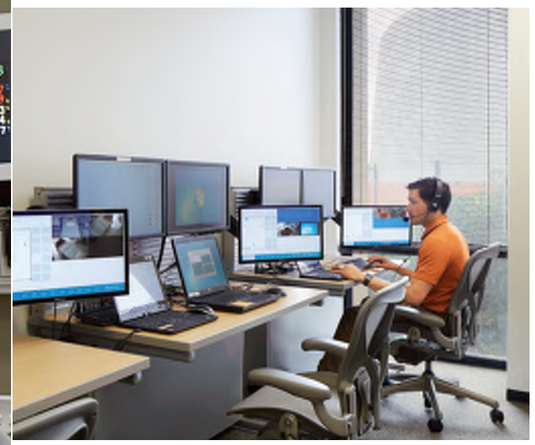
Five new Nursing Assessment and Skills Labs form the 8,000 SF Nursing Suite: each lab housing five hospital beds or exam tables per suite with documentation stations and meeting area totaling 29 stations. An additional flex lab provides four stations for unique scenarios and after-hours student use. A new anatomage table for virtual anatomy has dedicated space for any of the health professions to explore in a safe environment.

UNIVERSITY OF ILLINOIS AT CHICAGO, SIMULATION AND INTEGRATED LEARNING INSTITUTE: The Simulated and Integrated Learning Institute "SAIL" provides the University of Illinois at Chicago a largely transformed facility to enhance healthcare education by simulating clinical practice using sophisticated technologies in a safe learning environment. The new design offers daylight and views; right-sized rooms; robust technology; and needed space and functions for hands-on learning in an immersive environment.

The 29,000 SF project tripled the size of the current facility, and is comprised of two new components - The Simulation Institute and the Clinical Performance Center.

The 19,000 SF Simulation Institute, includes high fidelity human patient simulators and task trainers in a variety of flexible simulation labs. The ability to simulate O.R., ICU, E.R., Labor and Delivery, and Inpatient rooms are supported with the necessary debriefing rooms, control rooms, nurse station, storage and lockers making this a highly functional flexible facility. The Skills Lab accommodates up to 80 learners practicing procedural skills. A 50-seat classroom is centrally located on the floor. Two of the flexible labs are able to convert into additional debriefing rooms.

The 10,000 SF Clinical Performance Center, has 22 exam rooms (four are larger for inpatient scenarios); right-sized exam rooms, separate circulation for standardized patients and learners, dedicated standardized patient training/lounge, classroom space, lockers for learners and robust technology for recording and playback.

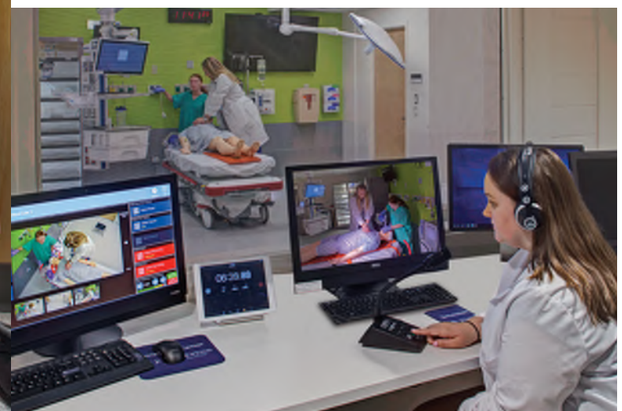


UNIVERSITY OF TEXAS AT AUSTIN DELL MEDICAL SCHOOL & SCHOOL OF NURSING: The Dell Medical School Education Building at the University of Texas (UT) at Austin is the first phase of a master plan to create a new academic medical center at one of the nation's leading research universities. The new Health Learning Building is envisioned as the heart and centerpiece of evolving Medical District, which also includes a major research building, medical office building, replacement hospital and parking garage. As the Medical School's identifiable face and image to the public, the new building reflects the School's goal to serve the community and raise the overall quality of healthcare in central Texas.

Immersive and experiential learning activities are merged by co-locating standardized patient exam rooms with skills and anatomy labs. Leading-edge technology is completely integrated with all rooms equipped with remote observation / recording capabilities as well as latest visualization and imaging. In addition to the new Health Learning Building, the team was asked to renovate a portion of the UT School of Nursing to provide an updated, technologically advanced "Phase I" Simulation Center that supports the needs of the School of Nursing and the Dell Medical School. This new simulation space preserves and enhances the School of Nursing functions and programs, supports the Dell Medical School mission for inter-professional education, and maintains a focus on efficiency and cost-consciousness.

JOHNS HOPKINS BLALOCK SIMULATION CENTER: The Simulation Center renovation is the first phase of the 13-story, 370,000-SF CMSC facility re-purposing at the heart of Johns Hopkins University (JHU) Medical Center. The scope of SLAM's work includes assessment of the existing building infrastructure, fit analysis to identify highest and best use, and cost/benefit analysis exploring a range of solutions from total renovation to demolition. The phased renovation includes the creation of a 48,000-SF Simulation Center on two of the CMSC floors for the Johns Hopkins School of Medicine.

The Johns Hopkins Sim Hospital occupies a de-commissioned OR suite in the Blalock Tower, taking advantage of existing wall locations to provide true continuum of care training for hospital clinicians as well as medical students. Dedicated spaces include an Intensive Care Room, Trauma Room, MedSurg Rooms, Labor-Delivery Room, and two Operating Rooms. Debrief rooms offer direct observation into sim rooms. The centralized tech support area maximizes operational efficiency with a layout that supports simultaneous events but also enables single technical staff member to support multiple rooms. A just-in-time-lab houses haptic surgical trainers and procedural skills task trainers, available 24/7 for hospital staff to practice procedures.



CONSULT YOUR MOST VALUABLE RESOURCE - YOUR PEOPLE

The individuals who operate and teach in the Simulation Center on a day to day basis are a treasure trove of knowledge about what works well and what does not. During a recent visioning workshop session, SLAM conducted a “Space Report Card” activity. This allowed educators, leadership, students, and operations staff to assign grades to their inpatient and outpatient learning spaces. During discussion, it was revealed that while sometimes students and educators graded a space “A” or “B”, the operations staff graded the same space as a “C” or “D”, and identified the challenges they faced making the space work. For example, doors were too narrow to easily move equipment, lighting was poor for video capture, power outlets were inconveniently located, standardized patients had nowhere to store their personal items, and more. It is important for university and hospital leadership to include their sim staff in conversations about sim center space development.

If you are a staff member, consider keeping a running “wish list” of ways your space could be improved to better serve your learners. This will help when the time comes to contribute your observations to leadership or your architects. At SLAM, we find that engaging the educators and operations staff in design conversations is of utmost importance.

MAKE USE OF MULTI-USE SPACES

In the world of Simulation Centers, bigger does not always mean better. Consider what types and quantities of spaces will best serve your current needs and your projected growth. Perhaps your cohort sizes require you to separate a training exercise into multiple groups/days to serve all learners.

How can a room do more than one thing? In a healthcare setting, rooms typically serve a specific purpose and remain outfitted to serve that purpose. A Simulation Center is serving as a microcosm of the entire healthcare continuum of care in a limited amount of space. Maybe you need a simulated OR but will only use it once a month or even a few times a year. If you add a head wall or two on a wall within that space, it can be used as a LDR sim room, a trauma room, a multi-bay PACU, or even a procedural skills lab on the days that OR training is not occurring.

At SLAM, we work with simulation staff to find the right balance of utilization and flexibility. We benchmark centers all over the United States and help our clients determine their typical space needs, their surge space needs, and strategies for accommodating their busiest seasons in innovative ways.

STORAGE, STORAGE, STORAGE

The number one complaint we hear when talking to sim staff is that a lack of storage impedes day to day function. Studies show that clutter and lack of storage has a negative impact on productivity and efficiency. Often overflowing storage rooms lead to equipment and supplies being stored in corridors and even in sim and debrief rooms, limiting the ability for a center to best serve its learners. A good rule of thumb for storage needs in a "Sim Hospital" is that 25% of the total area of simulation and debrief rooms should be tacked on to the total suite area for storage. In a Clinical Skills/OSCE suite, 10% of the total area of the exam rooms should be tacked on for storage. If local storage is a challenge, consider if a larger space for less-frequently used equipment and supplies could be accommodated on an adjacent floor or basement. Keep in mind: If a room is designed to be multi-functional, more storage space will be required.

SLAM implemented a flexible storage solution at the University of Minnesota by creating a back-of-house storage/staging corridor within their new state of the art Simulation Center. This area serves as an out of the way, but centrally located, zone for staff to stage equipment and store regularly-used supplies.

WHEN IT COMES TO ASSESSMENT TOOLS, FIND YOUR PERFECT FIT

Not all video capture software, task training equipment, or AV systems are created equal. Whether you are launching a brand new ground-up program, transitioning into new space, or just renovating your current suite, this transition is the perfect time to consider how your current software and assessment tools are working for you. The network of cameras, microphones, speakers, and AV infrastructure, tied into an integrated video and data capture program, is what distinguishes a simulation room from a regular training room. Consider how your workflow is aided or hindered by your existing technology and identify key features that are crucial to the delivery of curriculum and assessment of learner objectives.

At SLAM, we are software-agnostic and have designed centers using a wide range of software options. We work closely with leading AV consultants to help you determine the right combination of features for your specific workflow and learning objectives. We have also designed and developed spaces for the newest technologies, including Virtual Reality, Data Visualization, Virtual Anatomy, and 3D printing.

SLAM

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