Designing for Dental Education






SMITHGROUP

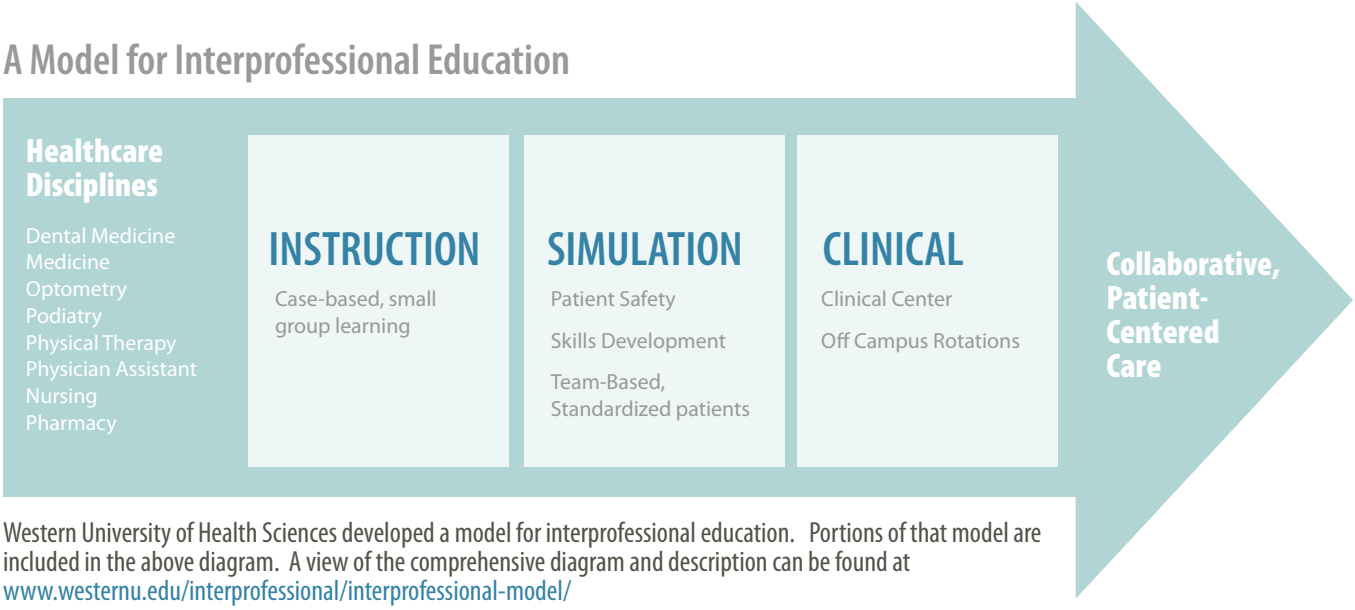
Interprofessional Education:

Shaping the Dental School of the Future

Research continues to illuminate the role of dentistry in a comprehensive, holistic approach to health care. In turn, dental education must shift from a focus on purely technical skills, to one that understands the central role that dentists play in a patient's healthcare delivery team. With this in mind, the SmithGroup dental school design team's most recent meeting with our Dental School Client Advisory Board concentrated on the question of how the changing role of dentistry will affect the dental school of the future.

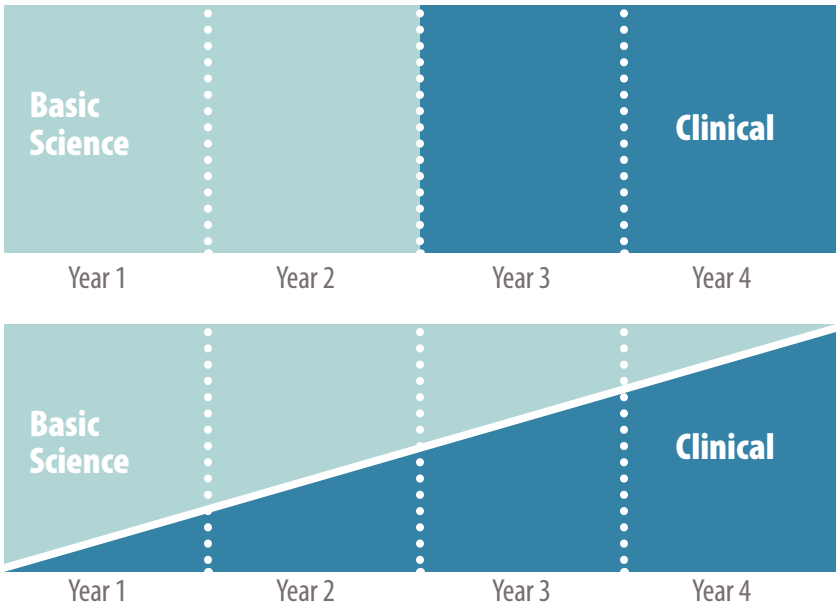
Critical to this new approach is the idea of Interprofessional education. The ability of health professionals to work effectively as a coordinated care team has never been more important to quality patient care. Integrating the dental profession into the larger care team will be particularly important for chronic conditions that require long-term management. Diabetes, for example is closely linked with oral health issues. As the incidence of diabetes continues to rise, so will the need for dental students to understand the role they can play in its treatment. Interprofessional education will better prepare dental students to practice in an evolving market that demands both higher quality and lower cost care.

A Model for Interprofessional Education



Western University of Health Sciences developed a model for interprofessional education. Portions of that model are included in the above diagram. A view of the comprehensive diagram and description can be found at www.westernu.edu/interprofessional/interprofessional-model/

Curricular Change



Traditional Curriculum

- Two years of basic science instruction followed by two years of clinical skills training
- Disconnect between basic science learning and application to clinical problem solving
- Large format classrooms for didactic instruction—accommodate the entire cohort

New Curriculum

- Early and continuous exposure to clinical skills
- Direct application of basic science knowledge to clinical issues—Problem-Based Learning (PBL)
- Small, collaborative, interprofessional groups of learners—Team-Based Learning

Curriculum Innovation

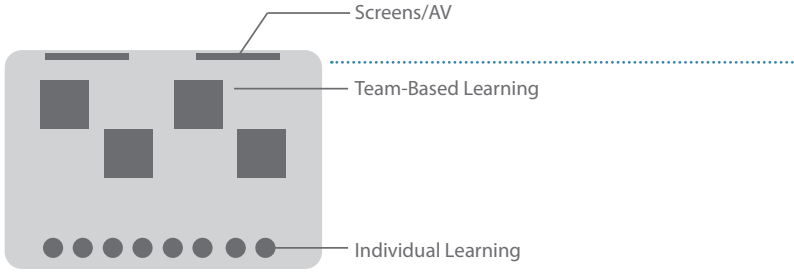
Those schools that have implemented interprofessional programs have seen that to be successful, the programs must begin early in the curriculum, and continue throughout the student experience in both the classroom and clinical environments. Schools have found that simulation and standardized patient training are particularly well suited for interprofessional pedagogy.

Differences between programs can make interprofessional education (IPE) difficult to implement. Unequal class sizes can be a challenge, as can determining how to match students at different points in their educational paths. This is particularly true of medical students who, unlike dental students, do not graduate with a licensure ready degree. It may the case that medical residents are better suited to a joint curriculum with dental students. If IPE is not mandatory, convincing students that the program is worthwhile can be difficult.

Innovative programs are driving the need for small group, team-based learning spaces – both formal and informal – that are needed for Problem-Based Learning (PBL) and case-based courses:

- **Western University's** Interprofessional program begins in the first year with a series of case studies, analyzed over several weeks by teams of students from eight different clinical and allied health specialties. Intermediate and advanced courses focus on standardized patients and actual clinical cases.
- **University of the Pacific** has pioneered its Helix Curriculum which is based on small group, case-based learning that is built around multi-disciplinary teams. The central focus of this new curriculum is driving significant changes in faculty recruiting as well as facility planning.

Team-Based Learning



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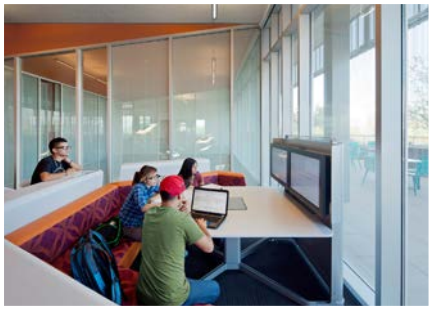


Extramural Experiences

With the growing understanding of the importance of oral health to general wellness comes a desire to provide quality dental care to a broader spectrum of the community; especially historically underserved populations. While dental schools have always operated clinics, and these clinics have generally provided care to less well served populations, they have begun to expand their reach even further. Some schools have begun providing services in prisons, public schools, and homeless shelters.

The accent on interprofessional practice continues in the community outreach programs. Community clinic spaces can and should be designed to allow medical as well as dental students to attend to patients. For simple exams, medical students may be able to see patients in a dental chair.

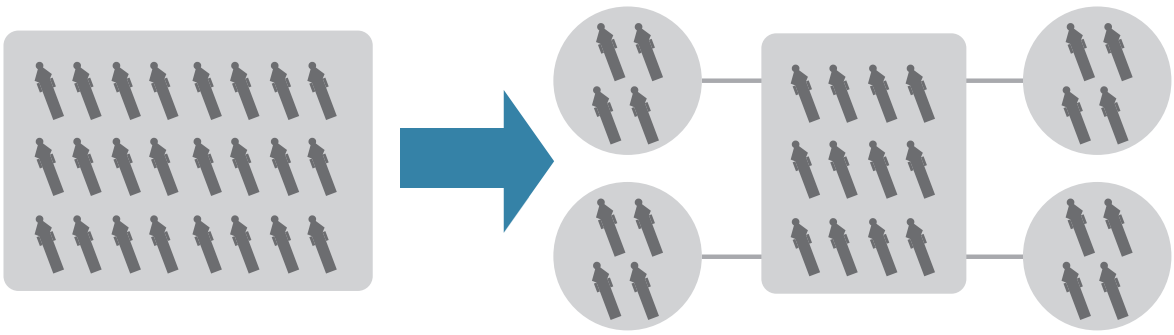
Community based practice requires specific management and training support. Quality control can be more difficult at an off-site location. An investment in faculty development will be required, as practice in a community based setting requires a substantial "frame-shift" from education to diagnosis.

The walls of the traditional dental school are opening up as patient care opportunities extend into the community, improving students learning experiences while reducing the need for expensive clinical space on campus:

- **Boston University i**s a leader in creating new knowledge aimed at eliminating dental disparities. The Chelsea Comprehensive School Base Dental Program works to improve dental access for public school children, while the Healthy Baby/Healthy Child Oral healthcare Program trains public health nurses to deliver oral health education and preventive care to high-risk pregnant women and their children. Additionally, at BU, the APEX program enables students to take what they have learned in the classroom and apply it in a real-world professional setting in dental offices and community health centers.
- The **University of Kentucky**, College of Dentistry is currently participating in the Nexus Innovations Incubator program through the National Center for Interprofessional Practice and Education. This program enables dental students to participate as part of interprofessional teams on the UKHC Stroke Care Unit at Cardinal Hill Hospital using rapid cycle testing of enhanced communication, problem solving, and planning care with patients as they transition from acute care to rehabilitation.
- At the **University of Michigan**, reflective essays and reflective practice concepts are built into the community based dental education program. Learning and development of critical thinking skills are enhanced by reflection and meta-reflection by students on their IPE clinical experiences.

To further expand the clinical environments within which students can practice, schools have broadened their international outreach. In the case of the **University of Pennsylvania**, this has taken the form of memorandum of understanding with a university in Krakow. The **University of Louisville** actually provides students an opportunity to practice in the developing world, with its Dentistry in Belize program.

Changing Clinical Environments



Many U.S.-based dental education programs have extended their reach to international markets, partnering with univerities overseas to offer dental education in other parts of the world.

Community outreach has been a cornerstone of the Henry M. Goldman School of Dental Medicine (GSDM) since its inception. Improving the overall health of the global population remains a key component of our School's mission.

Team Re-Definition

Even with all of the challenges, the benefits that community based education can provide in preparing students for practice are worthwhile. It is not unlikely to think that large healthcare entities like Kaiser Permanente will begin to see the value of integrating dental care into "one stop shop" clinics, thereby changing the current standard model of operations for most dentists.

The primary challenge in creating a community based Interprofessional program is finding the right partners. The programs that would most closely align with a dental-led clinic would be nursing, physician assistant, and pharmacy. A University of MIchigan clinic that paired nursing and dental students for a pediatric dentistry clinic was well received by the nursing students. Optometry and dental successfully share a clinic at Western University

The concept of team needs to consider medicine as a key component, and there are a range of opinions about how the two professions can be integrated in an educational setting. Curriculum innovation will help facilitate the two coming together. At the University of Michigan, the College of Dentistry is taking the lead on developing a coordinated program across disciplines. Students will also be instrumental in driving change as is the case at Western University where medical students asked to participate in rotations in oral health.

This new and evolving concept of "the health care team" is driving a re-thinking of the business model and changing the thinking regarding how an "operatory" should really function:

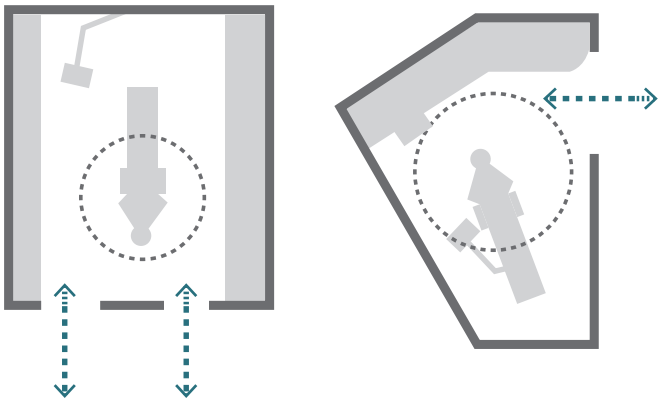
- The **University of Detroit Mercy** has developed an Interprofessional dental hygiene/physician assistant program, concentrated preparing PA's to assess the oral health of pediatric patients and to apply fluoride varnish. Students were supportive of the program, and felt it improved their ability to provide patient care. Additionally, UDM is considering changing their diagnostic process for new patients by having a PA participate in the evaluation to provide more comprehensive care as well as potentially increased revenue.
- **Louisiana State University Health Sciences Center** created a program that paired dental hygiene students with public school nurses, to assess the oral health of children with developmental disabilities. Both students and nurses rated the program highly. More importantly, 43% of the children were found to have untreated cavities, and 17% had urgent needs for dental treatment.

Creating new partnerships can be challenging. Students must have a basic foundation knowledge of communications skills and scope of practice, as well as the goals and reasons for Interprofessional healthcare delivery. Faculty must coordinate curriculum and assessment methodology.

Patient-Centered Care

The Standard Model

The Patient-Centered Treatment Room



Pioneered at the University of British Columbia by Dr. Lance Rucker, the wedge-shaped operatory results in a high-density of chairs for a given fl oor-area than the standard model. For a fixed number of chairs, the Patient-Centerd Treatment Room requires less overall building, generating substantial capital and operating savings.

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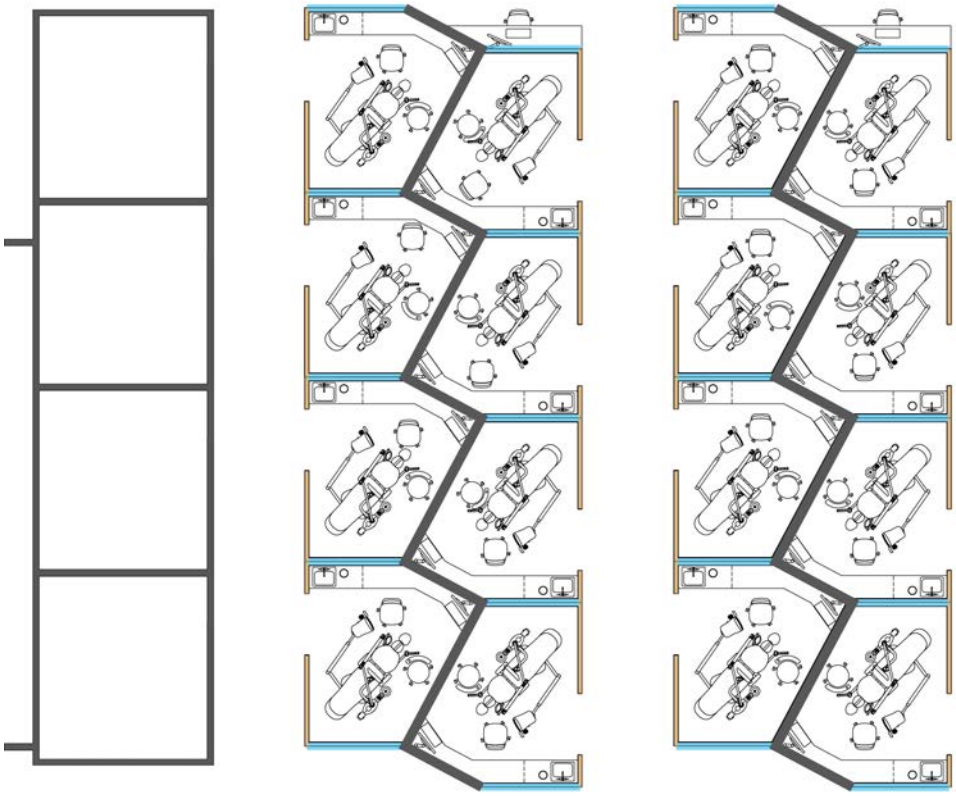
Partition Scheme



Partitions
Partitions separating bays are elevated. Clear visual and auditory boundaries are established between operatories served by separate aisles. Visual boundaries between operatories also block views across the clinic, constraining perception of space.

Tall, solid partition
Short, solid partition
Translucent partition

The increasing use of digital technology is driving the need for dental facilities that have flexible infrasturcture (hardware) that can be adapted to dental technologies (software) that will change over time.

Technology

Like all healthcare professions, dentistry has been transformed through digital technology. Electronic records are pervasive, and digital imaging is the standard. New scanning and 3D forming technologies may relegate physical impressions to the past.

Although the changes have been substantial, they have not been universally adapted. Dental schools must consider where students will ultimately practice, and determine how much of the "old" technology they still need to teach, to allow students to work in situations where they may not have access to the newest innovations.

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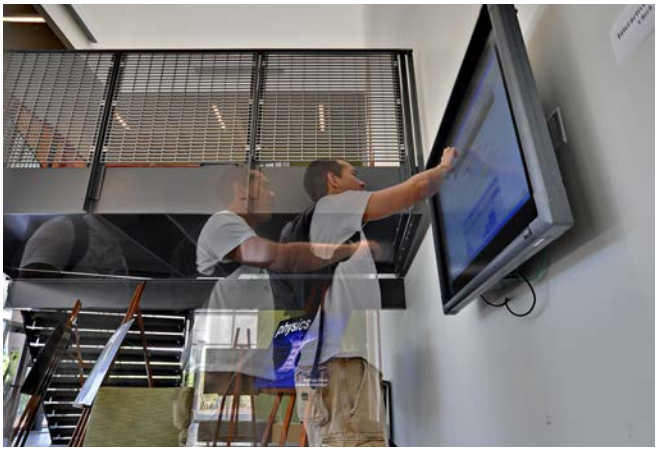
- **Boston University** will have completed the implementation of a seamless, digital dentistry initiative in 2014. This will be a fundamental change in the way students learn to practice in terms of technical skills as well as patient care management.
- **Loma Linda University** has concentrated on improving student's three dimensional visualization skills through interactive, navigable, non-linear electronic systems. Digital implant planning software has been added to the implant dentistry course, along with training in cone beam computed tomography interpretation.
- Videoconferencing is a big component for both Community-Based Education (CBE) and IPE; the **University of Kentucky** has a program that connects Dentistry with Physical Therapy. Access to the appropriate technology is instrumental in the effectiveness of this communication.



Design Implications: The Dental School of the Future

The successful implementation of IPE requires a new perspective on the dental school of the future. . If it is to be implemented in a clinical setting, operatories may need to be larger to accommodate more students and a broader array of technology. Small conference or "teaming" rooms are critical, as they provide a place for types of case management conversations that IPE hopes to encourage. As numerous departments will be sending students to these spaces, the question of "ownership" can become an issue. Spaces located in more "neutral" zones not dedicated any particular department can alleviate some of these tensions.

Classrooms will need to evolve to support **team-based learning**. Even large lecture halls will need to allow students to break into smaller work-groups. **Movable furniture and flexible spaces** will be required. Video conferencing capability in classrooms and team rooms can also expand teaming opportunities.

Facilities will need to foster social learning and increase the amount of "in between spaces" that enable students from different professions to connect with one another outside of the classroom, lab or clinic.

Community based education may encourage the decentralization of clinical facilities, moving them out of the dental school into satellite facilities. The community clinics may be built on a different model of ownership, where the school owns the curriculum, and manages the operations; but the community partner develops and owns the clinic space. This development model may allow a re-thinking of the clinical environment, with an increased focus on a **quality patient experience**, and an accent on branding.

The digital revolution has changed not just the practice of dentistry, but also education. **Simulation and virtual reality technologies** allow students to practice in "clinical" settings earlier in the curriculum, and can play a crucial role in interprofessional education. The amount of space dedicated to these pedagogies should be expected to grow.

The dental school of the future then, should be expected to be more inclusive of other health care professions, more engaged with the community, and more technologically advanced. An environment that combines these attributes will create an attractive, productive space not just for students but also for faculty and the community.

More About the SmithGroup Dental Education Advisory Board

As planning and design professionals deeply involved in higher education, SmithGroup is keenly aware of the profound changes affecting our institutions of higher learning, and the need to anticipate how these changes will impact and inform the development of new campus spaces and facilities. To this end, SmithGroup hosted a Dental Education Advisory Board that brought together dental educators and administrators from across the country to engage in discussions about the challenges and opportunities confronting dental education today.

The group had the opportunity to network with peers, share best practices (and challenges), and generate ideas to influence the future direction of dental education facility design. They were joined by SmithGroup dental and health sciences design leadership team, who engaged in the dialogue, which centered around interprofessional education, digital dentistry and designing the dental school of the future.

On behalf of SmithGroup, we would like to thank the dedicated dental education professionals for their participation and insights in this discussion on the future of dental education.

-- The SmithGroup Team

Dental Education Advisors

Mert Aksu, DDS, JD, MHSA
Dean
University of Detroit Mercy, School of Dentistry

Cynthia Beeman, DDS, PhD
Associate Dean for Academic and Student Affairs
University of Kentucky, College of Dentistry

Steven Friedrichsen, DDS
Dean
Western University of Health Sciences, College of Dental Medicine

Russell Gilpatrick, DDS
Dean
Midwestern University, College of Dental Medicine-Arizona

Henry Gremillion, DDS, MAGD
Dean
Louisiana State University, Health Sciences Center, School of Dentistry

Robert Handysides, DDS
Associate Dean for Academic Affairs, Associate Professor
Loma Linda University, School of Dentistry

Jeffrey Hutter, PhD
Dean and Spencer N. Frankl Professor in Dental Medicine
Boston University, Henry M. Goldman School of Dental Medicine

Michelle Henshaw, DDS, MPH
Professor, Department of Health Policy & Health Services Research
Associate Dean for Global & Population Health
Boston University, Henry M. Goldman School of Dental Medicine

Carol Anne Murdoch-Kinch, DDS, PhD
Clinical Professor of Oral Medicine Associate Dean for Academic Affairs - School of Dentistry
University of Michigan, School of Dentistry

Nader Nadershahi, DDS, MBA, EdD
Executive Associate Dean and Associate Dean for Academic Affairs
University of the Pacific, Arthur A. Dugoni School of Dentistry

John Williams, DMD, MBA
Dean
Indiana University, School of Dentistry

Lawrence Wolinsky, PhD, DMD, FACD, FICD
Dean
Texas A&M Health Science Center, Baylor College of Dentistry

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