WHITE PAPER

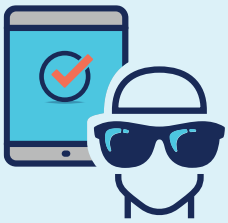
Learning Through the Professor's Eyes:

How augmented reality enhanced medical education at Long Island University to close a growing gap between students and instructors

OPTICSURG

INTRODUCTION

In the world of healthcare, firsthand experience is invaluable not just for patient care but for education. Instructors draw from years of experience to train the next generation of healthcare professionals in complex critical healthcare procedures. However, the all-important value of institutional knowledge often comes at the cost of accessibility: labs, training courses, and other hands-on learning opportunities are traditionally available only to in-person learning audiences.



Acceptance of teaching technologies among medical students is at record highs and expected to reach $87 billion by 2030.

A 2012 study found that when used as a teaching device, videos of medical procedures filmed from a first-person perspective engaged learners, improved their understanding of the skills being taught, and enhanced learning, especially when compared to videos filmed from the third-person perspective. Acceptance of teaching technologies among medical students is at record highs, and market interest underscores the growing appetite for technological evolution: ed-tech investment is expected to reach $87 billion by 2030.

In addition to the efficacy and acceleration of educational tech, the COVID-19 pandemic highlighted the need for alternatives to traditional in-person education. In a 2020 study, 75% of medical students felt they were wasting their study potential due to closure and cancellation of vital courses due to the COVID-19 pandemic. In addition, almost 40% were concerned about the effects of COVID-19 on their training progression timeline.

ADDRESSING THE KNOWLEDGE-SHARING GAP

These trends underscore the need for authentic, first-person teaching tools that can bridge the gap between educators and students, both in the classroom and remotely. Likewise, healthcare educators want and need new ways to connect students to that knowledge in order to create opportunities, improve learning and healing outcomes, and move medicine forward – today and in the future.

Knowledge remains the single greatest asset in the medical profession, and how we share that knowledge is changing. For example, 62% of hospital C-suite executives and administrators surveyed in 2021 said they want a greater level of virtual interaction across areas like product education, sales, pricing, and procurement.

Most virtual training tools do not allow students to tap into the perspective of their instructors – to see through their instructor's eyes in true first-person. Moreover, those tools that do are limited by functionality, leaving students unable to truly parse what their instructor is explaining, leading to weaker comprehension and less skill adherence.

The OpticSurg Vision Beyond™ Solution is a patent-pending proprietary software enabled by hands-free, voice-activated augmented reality smart glasses, allowing students to experience education through their professor's eyes. It streams video directly from the instructor's field of vision to web-enabled screens and devices. It gives learners a unique chance to interact with and annotate what they see in real time for greater collaboration and comprehension.

Augmented Reality
A technology that superimposes a computer-generated image on a user's view of the real world, thus providing a composite view.

"In healthcare, we expect the same outcomes from individuals with 20 years of experience as those with 20 days of experience. The OpticSurg Vision Beyond Solution was created by providers, for providers, to help bridge that gap. It allows a greater understanding of how people learn, and to what extent they learn it, to set them up for success, be it in the classroom or the OR."

— Dr. Tran Tu Huynh, President & Founder, OpticSurg

REMOVING BARRIERS

Vision Beyond creates a seamless, direct link between the instructor's field of vision and what students see on their interactive screens. When combined with state-of-the-art augmented reality glasses, the Vision Beyond software removes barriers for in-person and remote learners, creating a deeper, more immediate, more meaningful connection between students and the practical knowledge they need to thrive.

The following case study example demonstrates how LIU, a leading university, used Vision Beyond in its occupational therapy program training, to connect better with students in and out of the classroom.

BACKGROUND: A LAB CLASS IN NEED

Long Island University, in its Brooklyn Campus in New York, is one of the largest private universities in the country, known for its academics, renowned faculty, comprehensive career services, and state-of-the-art facilities. LIU Brooklyn's Occupational Therapy program prepares occupational therapists with practical skills and training for a rapidly changing urban healthcare environment.

LONG ISLAND UNIVERSITY

Location: Brooklyn, NY

Venue: Occupational therapy lab

Tools: Ultrasound, static and dynamic orthotics

Class size (pre-pandemic): 40 students

An LIU Occupational Therapy lab focused on hands-on training of orthotics fabrication and use of therapeutic modalities is typically structured with weekly two-hour in-person lab sessions of approximately 40 occupational therapy students. The labs consist of instructor demonstrations and hands-on learning across three practical disciplines:

- Static orthosis (creating and fitting orthoses with no moving parts)
- Dynamic orthosis (creating and fitting orthoses capable of mounting levels, springs, or pulleys to improve range of motion through therapy)
- Therapy modalities (using ultrasound, electrical stimulation, and Kinesio taping for therapeutic purposes)

In each of these practices, students typically gather in a central spot to observe the instructor's demonstration before breaking off and duplicating the procedure on one another from their lab stations. Optimally, students end the semester prepared to apply orthotics to patients to help them rehabilitate in the weeks following an injury.

CHALLENGES:

Different point of view

Lower comprehension

Repeated demonstrations

Winnie Tsui, OT, CHT, MBA
Professor of Occupational Therapy

CHALLENGE: DIFFERING VIEWPOINTS AND INTERPRETATION

Even before social distancing measures were put into place, these labs struggled with distance and accessibility issues. For one, the stationary ultrasound system essentially tethered students to it in shifts. Also, visibility issues created significant barriers between the source of knowledge and students learning from the demonstration.

Professor Winnie Tsui, OT, CHT, MBA, is the professor responsible for the Occupational Therapy In-Person Lab for Making Orthotics at LIU and a Clinical and Commercial Product Associate with OpticSurg Inc. In a typical classroom setup, "Everyone would see [the demonstration] from a different point of view," leading to many 'interpretations' of the demonstration. Students closest to her station got the clearest view, while those further back or behind her were at a disadvantage, leading to repeated demonstrations or lower comprehension among students. "There was always a limitation, always a failure between my demonstration and what students were expected to replicate," she adds.

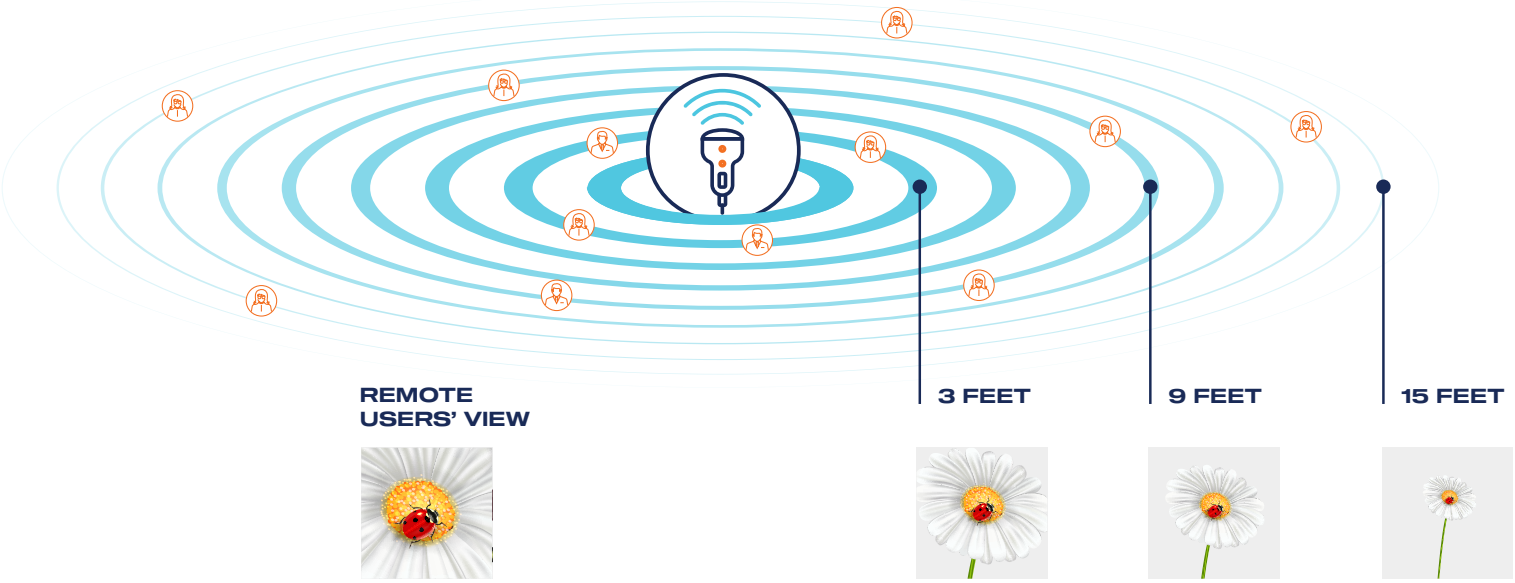
PRE-PANDEMIC DEMONSTRATION TO CLASS OF 40 STUDENTS

LIU consolidated the orthotics lab in both size and structure to reduce students' and instructors' potential for exposure to COVID-19.

These necessary restrictions meant that students had to observe the instructors' demonstration even further away, with students in concentric circles around the professor. The first ring of students stood three feet from the professor; the second stood nine feet away; the third and final group of students per lab stood 15 feet away from the professor's orthotics demonstration.

Of course, these new viewing requirements further strained students' ability to see the detailed demonstration being conducted at the center of the classroom. The lack of perspective put some students at a significant disadvantage, especially when asked to imitate the demonstration at their own lab stations. The distance and limited, stationary ultrasound equipment also forced professors to conduct demonstrations twice per lab to satisfy two separate lab groups, creating repeated work and mental fatigue for instructors.

SOCIAL DISTANCED DEMONSTRATION - STRAINED ABILITY TO SEE



SOLUTION: VISION BEYOND™

When it became apparent that physical distancing and remote learning would impact the in-person lab, LIU faculty needed a new approach to address the in-classroom challenges and provide each student the best viewpoint when viewing demonstrations.

Tsui needed a solution that would provide:

First person view to all students

Hands-free communication

Student interactivity

Ability to respond to questions

Both in-person and virtual usage

Professor Tsui reached out to OpticSurg for the Vision Beyond solution because it let students see exactly what the professor sees, down to the slightest detail, whether students were across the room, on the other side of campus, or even learning from home. These benefits could significantly improve learning conditions during COVID-19 and into the increasingly digital future of learning.

To ensure safety, the formerly collaborative, open environment changed in a number of ways:

- **From weekly two-hour labs to five six-hour labs spread across the semester**
- **From 40 to 23 students per lab, split into groups of no more than 12 students (requiring professors to conduct each demonstration twice per lab)**
- **One professor and two teaching assistants per lab**
- **Physical distancing and mask mandates applied for students and faculty in every lab**

IMPLEMENTATION: PROVIDING IDENTICAL LEARNING

Professor Tsui and the teaching assistants utilized the Vision Beyond Solution with specialized augmented reality glasses to share valuable knowledge with LIU students in a new, exciting way.

- Each lab consisted of 23 students across two groups tasked with duplicating the professor's creation and application of orthotics on a lab partner.
- Professor Tsui wore augmented reality glasses utilizing the Vision Beyond software while demonstrating making and fitting orthotics. Her glasses were connected to wi-fi, allowing her to stream video of her exact field of vision using a camera mounted on the lenses. A microphone mounted in the glasses allowed her to operate the software using only her voice, letting her respond to students, access the Vision Beyond interface, and more without interrupting the demonstration.
- Students logged into the Vision Beyond web app (accessible from desktop, laptop, tablet, or smartphone) to view the streaming video from the professor's view.
- The professor conducted the lab as usual, demonstrating the orthotic application and therapies while wearing the AR glasses equipped with Vision Beyond software.
- Using the intuitive annotation features of the Vision Beyond Solution, students could click on areas of their viewing screen, which would send visual prompts to the instructor's view in real time. Students used annotations to ask questions, clarify what they saw, or direct the instructor's attention to specific portions of the demonstration.

Crucially, every student was able to see the exact same video content, all streamed directly from the professor's field of vision, regardless of their physical location. Some students joined virtually from another classroom while others joined from their homes, and all had the same opportunity to collaborate and learn with the rest of the class.

RESULTS: ENHANCED LEARNING

Survey results from lab participants indicated a strong preference for the use of Vision Beyond to enhance learning in hands-on practical labs.

of respondents found the demonstration utilizing Vision Beyond more helpful than the normal in-class demonstration

said they would recommend using it again in the Ortho Lab.

said they thought it would be helpful in other hands-on labs like neurology, kinesiology, anatomy, and dissection.

FEEDBACK:

"It allowed me to live vicariously through my professor's eyes."

"It was a lot easier to see up close without being on top of everyone else."

"The first-person perspective provided by the OpticSurg [Vision Beyond Solution] eliminated blindspots and provided a better visual vantage point for all viewers to appreciate. This contributed to a better learning experience. It's also a cool piece of tech."

SUMMARY: A TEACHING AND TRAINING SOLUTION FOR TODAY AND THE FUTURE

"The limitations of in-person learning weren't clearly evident until the pandemic," Professor Tsui adds. The new paradigm highlighted those limitations, forcing healthcare trainers to consider solutions beyond "the way it had always been done" and "removing barriers" in a risk-averse industry.

"Vision Beyond allows educators to collaborate and share their critical knowledge more effectively and authentically than ever before."

— Professor Tsui

"It has applications beyond just now," she adds. "The application of OpticSurg Vision Beyond allowed people to try something new for the first time," providing a new way to see old problems that might otherwise have remained barriers to better teaching and learning outcomes.

There is no replacement for experience, and Vision Beyond allows educators to collaborate and share their critical knowledge more effectively and authentically than ever before. The need for telecollaboration solutions is growing across disciplines, from education and surgery to therapy, home health care, elder care, and more. Any technology positioned to fill that need must be provider-focused, addressing their specific challenges while empowering them to guide healthcare and training toward better outcomes. The potential for collaboration, iteration, and experimentation has never been greater – and only the right tools can help educators unlock the true potential of their expertise.

"In the medical field, seeing is believing. There's nothing like being able to see, do, and teach in a real-time environment."

— Dr. Tran Tu Huynh

President and Founder, OpticSurg

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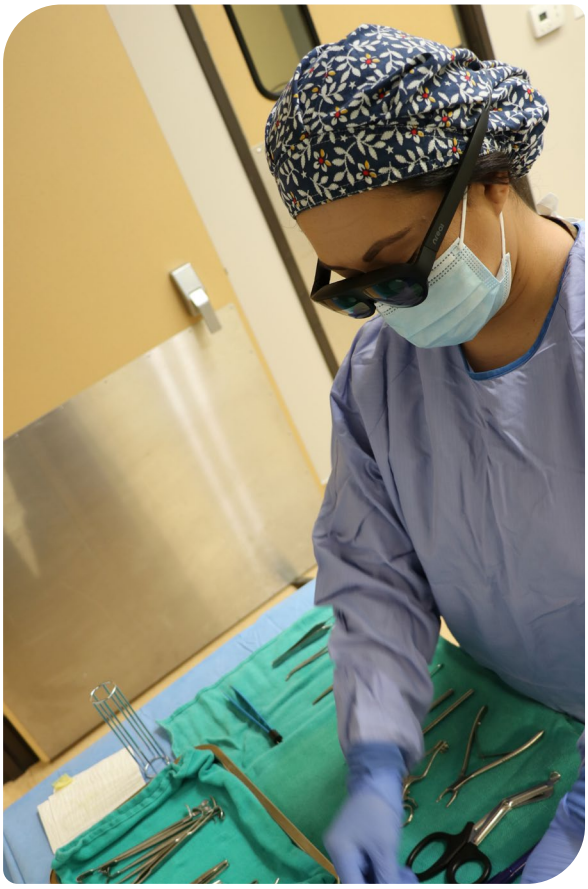

ABOUT OPTICSURG

We are a tech-enabled healthcare software startup. We boldly center our mission at the intersection of healthcare, deep tech, digital health, and future of work.

Our North Star is giving frontline healthcare workers and providers the tools they need to do their jobs better, minimize complications, and save lives. We are particularly driven to expand access in vulnerable and underserved communities. In short, we aim to expand capacity and extend provider reach.

We are empowered by our diverse team members who come from the trenches of healthcare including surgeons, clinicians, security experts, business leaders, and technology veterans. Our expertise in healthcare, business, technology, and design is connected through our united pursuit of improving patient care.
For more information about OpticSurg please visit www.opticsurginc.com.

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