Delivering Virtual Labs in Rehabilitative Sciences During COVID-19: Strategies and Instructional Cases

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Abstract

The COVID-19 pandemic has led to an unprecedented shift in how health science education is delivered (Sandars et al., 2020). With face-to-face learning, such as lab and classroom interactions, largely unavailable during the pandemic, institutions have been required to quickly shift the learning environment to a fully virtual format. While in-person clinical training for students effectively came to a halt, the University of Saint Augustine for Health Sciences (USAHS) leveraged its technology infrastructure, clinical simulation resources and expertise, digital learning resources, and innovative culture to implement a continuity plan for both faculty and students.

Due to federal and local regulations related to social distancing during the COVID-19 pandemic, programs in the medical and rehabilitative sciences have been faced with the unique challenge of converting hands-on laboratory activities to an online format. This conversion has been complicated by rapidly evolving standards regarding activities acceptable to meet accrediting body guidelines for fieldwork and/or clinical education. However, most accrediting bodies have sanctioned the use of virtual labs to maintain continuity of instruction by preparing and in some cases substituting virtual for hands-on learning activities.

This paper will provide an overview of the strategic learning framework that is being employed by the University in response to the COVID-19 pandemic and share practical case examples of how faculty have used university resources and support to not only maintain academic continuity, but to deliver excellence during virtual instruction.

The USAHS Active Learning Framework

”Active learning‘ is any instructional activity that involves and engages students in the process of their own learning (Bonwell & Eison, 1991; Prince, 2004). It is based on the theory of constructivism, which posits that learners ”construct‘ their own understandings through interaction with others. Active learning activities are designed to engage students with faculty and peers, usually at a deeper learning level such as application and synthesis. For an active learning activity to be effective and relevant, it must be linked to one or more measurable outcomes, and designed so that the overall cognitive learning experience engages students to construct new knowledge, which can be demonstrated and measured against the outcomes.

At USAHS, the learning model has always been a dynamic blended learning approach with a commitment to active learning techniques. The University¬s mission is to develop healthcare professionals who are innovative problem-solvers, interprofessional collaborators, evidence-based practitioners, and excellent communicators. This is done by combining immersive campus experiences, clinical education, and superior quality online learning - both in terms of digital media, as well as immersive, active learning pedagogical approaches such as simulation and experiential labs. Additionally, technologies of the future are integrated across the curriculum, preparing students for trends in connectivity, automation, and advanced analytics.À

Thus, when higher education pivoted to virtual learning, the University was already well prepared to deliver virtual education. The challenge was how to convey the hands-on, immersive campus experiences in a virtual format, while preserving the fidelity and personalized feedback of the lab instructional environment. Below, we discuss four strategies that form the pillars of our virtual approach to preserving our unique active learning model for clinical skills development.À

COVID-19 Institutional Strategies for Virtual Learning

Strategy 1: Invest in Instructional Design and Resources for Media Development

A quality digital video approach, particularly in the health sciences where visual cognition is important for learning, incorporates and integrates rich, relevant, and outcomes-linked instructional video. Skills demonstrations and clinical scenarios using standardized patients and simulated environments provide students with the important visual models and processes to prepare them to perform competently in authentic clinical settings (Woroch et al., 2020)

The University already invests in the organizational infrastructure and experienced staff to promote quality in digital learning. The Teaching, Learning and Innovation team includes the following departments with staff distributed across each of the University¬s five campuses in Florida, Texas, and California.

- *Digital Learning Design.* The Director of Digital Learning Design manages a staff of four Learning Innovation Designers; and a Video Production Team Lead with three Digital Media Designers. Each campus has a recording studio with professional

recording equipment, as well as the capabilities to do offsite recordings.

- À*Centers for Innovative Clinical Practice*. The Director of Simulation Education manages dedicated simulation centers on each campus, and a staff of four Clinical Simulation Specialists and a Simulation Educator.
- À*The Institute for Teaching Excellence and Innovation*. The Director of Faculty Development manages all faculty development activities and supervises a team of three Sr. Faculty Development Specialists, as well as a Technology Innovation Peer Support (TIPS) team of campus-specifIc faculty peer mentors.
- À*University Libraries.* The Director of Libraries manages five campus libraries and digital services with a team of five Librarians, and campus Circulation Managers.

Under normal circumstances, the USAHS dynamic blended learning model features the use of video to support online delivery of didactic content, as well as preparatory instruction for lab settings. Students receive didactic instruction online by reviewing faculty-created lecture-style video, demonstrations, and scenarios, and engaging in online assignments such as case study briefs, discussions, mastery exercises, and other formative assessments. Then, they attend campus laboratory sessions where they actively apply concepts learned in didactic instruction, as well as manual and clinical communication skills that have been demonstrated, discussed, and instructed online. The organizational teams work together to support the virtual and campus elements of the teaching and learning experience.

During the rapid pivot to virtual instruction, two additional pedagogical considerations emerged —1) the need to quickly produce new video and multimedia content to supplement minimized or lost physical lab demonstration time, and 2) the need to adopt a ”two-way‘ video approach to replace the physical lab feedback model.
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To create new videos, the Digital Learning Design team began partnering with faculty to plan for and record new videos to support virtual lab instruction. Because all federal and local authorities classifIed educational professionals working to support distance learning as essential staff, the team was able to continue to work with faculty, who could sign up for a video session on campus to meet with Digital Media Designers and using personal protective equipment (PPE) and social distancing, safely record new video content.

Where it was not possible for faculty to visit campus for recording, the Digital Learning Design team launched ”professional editing services,‘ to support faculty who had created video in a home setting. Faculty were able to submit their video to the digital media team so they could finish it with a more professional look and feel, as well as add accessibility features such as closed captioning. In addition, the Digital Media Designers partnered with the Institute for Teaching Excellence and Innovation to host a series of workshops on tips and strategies for recording video using a smartphone. Going into Fall 2020 term, the University is now also investing in ”tech kits‘ for faculty who teach virtual lab instruction, which will include a high-quality webcam, microphone, and tripod kit.

Strategy 2: Implement Simple Yet Powerful Active Learning Techniques

In a systematic review of online innovations that used active learning strategies, Davis et al. (2018) found that cooperative learning, simulations and gaming, and interactive multimedia were the most impactful strategies to promote student learning. Although there are many ways to do this online, our focus is on supporting faculty to adopt a few essential technologies to accomplish a) synchronous and asynchronous interactions with personalized feedback, b) critical thinking activities that promote authentic learning, creativity, higher level thinking, and application, and c) knowledge and skill competency using hands-on learning activities.

Promote and Support Synchronous and Asynchronous Interactions with Feedback

A critical component of lab instruction is individualized student feedback. The USAHS model is an experiential lab model, designed to be an engaging and simulation-based learning process. Generally, formative and summative feedback is given to students. In the face-to-face experiential lab environment, students typically work in groups or with partners and are immersed in hands-on simulated clinical experiences. They are encouraged to self-re‡ect based on just-in-time feedback provided by faculty and lab instructor assistants. Summative feedback is given in face-to-face lab practicals by faculty, where students are assessed on how they perform certain skills and demonstrate competencies according to a standardized rubric.ÀÀ

Thus, in the move to fully online instruction, a focal point has been on using technology to provide this level of feedback for both formative and summative exercises. Having the right technology is one part of the equation, however, the facilitation methods and online lab plans are the essence of the ”real learning.‘ The University has supported synchronous web conferencing via Blackboard Collaborate and RingCentral (powered by Zoom) as the primary tools. The latter is emerging as the preferred tool due to the stability, ease of use, and additional features such as breakout rooms. As described in several of the instructional cases presented in this paper, the approach for ”virtual lab sessions‘ has been focused on using simple technologies, and optimizing instructional design for interaction, ability to engage using video, and techniques for just-in-time virtual feedback.À

For summative assessment, specifIcally lab practical exams, faculty need to provide students with private feedback. In the virtual environment, the ability to record and document feedback, as well as share it privately with students, was a feature required by faculty. GoReact was adopted as the platform for two-way video lab practicals, as well as formative assessments with specifIc feedback, and use cases are also described in the instructional cases.

Emphasize Authentic Learning Using Virtual Simulation

The University maintains a dedicated simulation lab (Centers for Innovative Clinical Practice or ”CICPs‘) on each of its five campuses, equipped with an in-patient ward, a complex simulation and observation room, and assessment rooms all with AV technology to allow streaming and recording. Simulation allows students to practice their hands-on clinical skills, critical thinking skills, and communication strategies using standardized patient actors. Research confirms that simulation as an active learning approach in health sciences enhances clinical skills development. For example, in a randomized controlled trial within a higher

education nursing environment, Padilha et al. (2019) found that virtual simulation improved knowledge retention and clinical reasoning, and also showed improvements in student learning satisfaction in the long term.

To maintain immersive, simulated learning experiences during the COVID-19 pandemic, face-to-face simulations have been modifled into virtual and telehealth experiences. While students have been unable to come to the simulation lab to interact with standardized patients, they are still able to communicate with, assess, and provide intervention to standardized patients in a synchronous telehealth web-meeting forum.

Most virtual simulations are conducted as synchronous telehealth sessions, using standardized patient actors. Students typically review pre-brief media to learn about the patient case and then login to the synchronous meeting to observe the session. Following, there is an online synchronous debrieflng session for re‡ection and feedback, which can also be carried over to a discussion forum asynchronously. Details about how these are created and facilitated are included in the instructional cases presented later.

Provide Students with At-Home Materials

A key element that can be lost in the transition to virtual labs includes the ability to use specialized equipment and supplies normally available on campus. USAHS courses, such as gross anatomy and orthotics, routinely use anatomical models and special supplies for the build of orthosis. The University, recognizing the need to maintain clinical skills building, committed to providing students with ”virtual lab kits.‘

Virtual lab kits were developed by faculty to provide specialized equipment and supplies such as 3-D printed anatomical models, therapeutic exercise equipment, acute care supplies, and orthotic fabrication materials that would normally be in the physical lab classroom. DeBoer et al. (2019) conducted a randomized control trial in a higher education neuroscience online course in which the treatment group was sent at-home lab kits. These kits contained the equipment needed to perform certain hands-on course activities at home. The study showed that students in the treatment group had signiflcantly higher course grades and levels of self-efflcacy.ÀÀ

Students undeniably lost the face-to-face interactions in the classroom, however, the gain of the teacher-learner relationship within a virtual environment, the access to essential equipment and supplies, and the ability to obtain more immediate feedback were positive shifts. Using Blackboard Collaborate or Ringcentral/Zoom, web conferencing sessions allow faculty to demonstrate techniques using required equipment, and also allow students to use the same materials within their home environment to immediately demonstrate what they have learned.

Strategy 3: Amplify Development, Support, and Digital Resources

As the University leaned into the virtual environment, we made a decision to not just provide support to faculty, but to *overwhelm* them with support opportunities using a just-in-time, active, and multi-modal approach.

Faculty Support

In March 2020, when instruction shifted to virtual, the Teaching, Learning and Innovation team quickly launched the Keep Teaching initiative. The Keep Teaching initiative included an online Keep Teaching Guide, as well as live help sessions offered almost daily. The Keep Teaching Guide is a centralized online hub where faculty members can flnd information and resources for teaching fully online. The Keep Teaching Showcase was also launched, which is a blog that highlights creative and impactful approaches and instructional examples posted by faculty to inspire their colleagues.

Live Help Sessions are offered almost every day and modifled each week to offer new topics and opportunities. Each Sunday, the Director of Faculty Development sends an email providing a full list of the topics, dates, times, and online meeting links for that week-s offerings. Sessions are recorded for later viewing, and topics include those related to using web conferencing platforms, designing virtual lab plans, staying connected with students, and best practices for recording quality video from home.

In addition, the University-s Technology, Innovation, and Peer Support (TIPS) team of faculty on each campus continue to offer virtual sessions for faculty peers and provide one-on-one consultation on a variety of topics to support instruction and overall teaching effectiveness.ÀÀ

Student Support

A Keep Learning initiative was also launched, which includes a Keep Learning Guide with resources and support opportunities for students as they have pivoted to fully virtual learning. In addition, the Information Technology Department launched its help.usa.edu site, which includes the series of ”Thrive Sessions,‘ which are live sessions on a variety of topics such as study strategies, technology set up, and software platforms such as Kaltura and GoReact. Very impactful, also, has been the availability of the ”Virtual Kiosk,‘ which is on-demand technology support offered through RingCentral/Zoom.

The Teaching, Learning and Innovation team also launched a robust Student Readiness Orientation, which was designed to prepare new, incoming students for the fully virtual online learning environment. It consists of a 4-module Blackboard course (Technology Requirements and Support; Setting Up Your Learning Space; Student Services and Support; and Online Learning Resources and Success Strategies). Students gain access to the orientation about one month before the term starts and it is facilitated by a team of student success staff and volunteer faculty.À

Digital Resource Support

Amplifying digital resources was a priority for the USAHS library. In some cases, doing so was more about leveraging the deep catalogs of content already owned or to ensure both students and faculty members were aware of existing resources and how to use

them. Academic library digital collections are often underused (Fry, 2019; Gagnon, 2017), and while tools like discovery services may help to increase digital content usage (Calvert, 2015), they may do so unequally, thereby bolstering content from some platforms while undermining content from others (Ngo et al., 2019).

For example, one challenge for the University was flnding a substitute for hands-on cadaver labs for students studying anatomy. A solution was the 3D anatomy software already available to students and faculty through a library subscription. Students and faculty were reminded of this resource in multiple ways: posts on library social media pages, emails to faculty members, a sliding banner on the library¬s homepage, and inclusion on the University¬s Keep Learning and Keep Teaching pages. Multiple ongoing webinars for faculty are also provided and recorded for later asynchronous access.

The Library has also increased its availability of digitized print resources. Library staff members scanned book chapters and journal articles not available through digital collections for faculty members to provide to students within Blackboard courses, or for individual use by students or faculty members. As a result, more than six times the number of documents from the print collection in March 2020 (the flrst month our campuses closed) as the same month the previous year, and more than twice as many documents in May 2020 (the flrst month of the summer trimester) as the same month in 2019 were scanned.

This method required careful attention to copyright laws and restrictions, and this was made possible through the University¬s Academic Annual Copyright License from the Copyright Clearance Center. Also, library staff members host multiple sessions of a webinar for faculty and instructional staff on copyright for digital instruction. The webinar focuses on the basics of copyright law, how to check a publication¬s status in RightFind, and options for public domain or Creative Commons licensed content online.

Strategy 4: Adopt the Mindset of an Innovation Culture

Innovative cultures in higher education yield dynamic and thriving environments for faculty and students to develop new ways of thinking and engage in collaborative problem solving (Caliskan & Zhu, 2020). At the heart of the University¬s mission is ”innovation.‘ We know we are being ”innovative‘ when we as educators and institutional leaders thoughtfully apply and experiment with different tools, technologies, and approaches in order to optimize student learning.

At USAHS, a culture of innovation manifests in many ways. For example, grant support is competitively awarded to faculty and staff (including flnancial, professional development funding, and technical resources) through the Innovation Steering Committee, which is dedicated to supporting new ways to strengthen student outcomes. Our cultural mindset fosters and encourages a passionate curiosity and a measured risk-taking approach. The University is committed to scanning the internal environment for problems that need to be solved, and also scanning the external environment for best practices, tools, and technologies to foster continuous improvement in healthcare education outcomes.

During COVID-19, as we were faced with the need to quickly innovate to solve problems, teams from across the flve campuses came together quickly to examine data, discuss solutions, and identify potential solutions. Internal collaboration allowed us to work together, but agility allowed us to innovate solutions quickly but responsibly. As solutions were identifled, we moved quickly to implementation with a healthy tolerance for risk taking. For example, as noted, faculty required solutions for formative and summative feedback in the virtual environment. Faculty were invited to submit solutions and suggestions, and it was from within the faculty that GoReact was suggested. Within just a few days, the Information Technology, Finance and Contracts, and the Teaching, Learning and Innovation teams had collaborated to license, install, and integrate the platform into the learning management system. A similar process was executed with Respondus, which was needed to replace campus-based proctored testing.

The instructional innovation cases we present below are just a few examples of how the University leveraged its culture of innovation, agility, and problem-solving to meet student needs. Faculty across the University designed and implemented hundreds of such cases and continue to do so as we approach a future shifting toward a greater reliance on virtual teaching due to COVID-19.ÀÀ

Instructional Innovation CasesÀ

The cases below tell USAHS stories of student-centered collaboration, innovation, and a passion for teaching and learning. We selected six cases that illustrate how the strategies above converged to practical solutions to ”keep teaching‘ and ”keep learning‘ during COVID-19 and beyond in a shifting virtual teaching context.

Case 1: Virtual Lab Kits for Home Fabrication of Orthoses, Dr. Debbie Ruediger, St. Augustine Campus, OCT 5330C OT Methods I: Assistive Technology

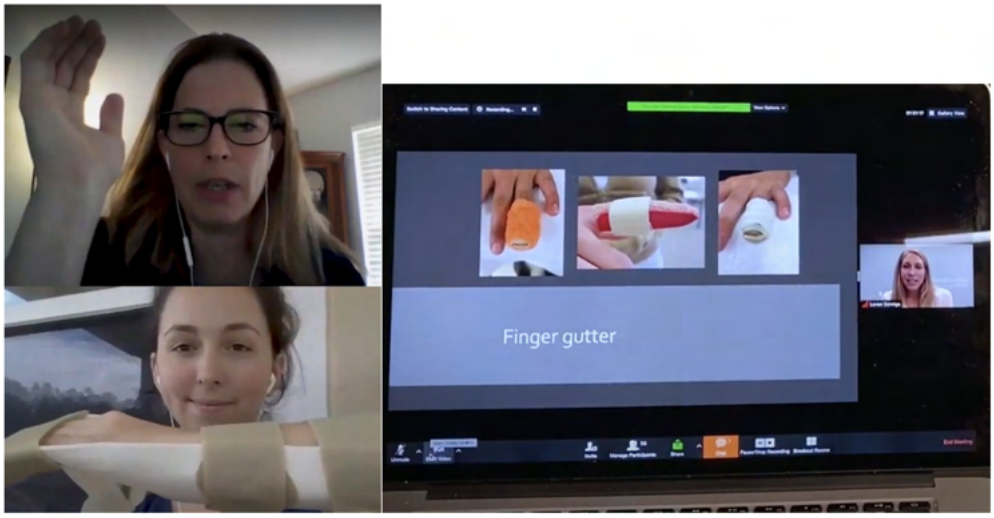
Students within the occupational therapy orthotics course were challenged with fabricating flve orthotics at home as part of a virtual, synchronous, hands-on lab session. To prepare for the session, faculty worked with the Digital Learning Design team to record original video in a simulated clinical setting on campus demonstrating the fabrication steps of every orthotic.

A list of the required materials was created. The simulation center staff assisted with the procurement of materials, which after much research, wound up being procured through Amazon. Items were ordered, assembled, and then volunteer staff on each campus coordinated and collaborated to pack and mail the ”kits‘ to all enrolled students. This included all thermoplastic materials, strapping, and patterns needed to complete the fabrication of flve different orthotics.

Students were instructed to review the instructional videos before the lab. In preparation for the live session, they were divided into groups of flve for their case study orthotics. During the lab session, which was facilitated using RingCentral/Zoom, faculty flrst demonstrated the fabrication objectives and methods to the entire course. Then, using the breakout room feature of RingCentral/Zoom, students divided into their groups and were provided direct live feedback and step-by-step advice on fabricating their own orthotics by the supervising lab assistants. See flgure 1.

Students were very hesitant in attempting the fabrication from their homes prior to the course term beginning. A pre-course survey was issued to the students and the results showed they felt increased anxiety completing the orthoses from home without face-to-face contact from the faculty. Students were graded with live feedback within private breakout rooms within the web conferencing. A post-course survey showed that they believed the virtual guidance and step-by-step instruction helped them achieve outcomes, and they reported a high level of satisfaction with the session.À

Figure 1
Virtual Session with Student Using Orthosis Lab Kit



Case 2: 3-D Printing of Anatomic Models, Dr. Gabe Somaribba, Miami Campus, PHT 5121C Gross Anatomy IÀ

Gross anatomy courses commonly have objectives that include the identifIcation of structures on plastic models. Working with the anatomical models provide a spatial relationship, kinesthetic experience, and visual representation of the structures. Students access anatomical models while in the classroom to augment their studies. Thus, the course teaching team sought to procure certain models for students, but it was not impossible to purchase from a vendor the items needed in time for distribution to students.

This was where Dr. Somaribba suggested 3-D printing of vertebrae. The University maintains a Fusion 3-D printer on each campus, which was used to replicate key anatomical models used in the classroom setting. The Centers for Innovative Clinical Practice (CICPs) worked with faculty to print vertebrae models that were then packaged and sent to students for their use while in virtual labs for anatomy. See flgure 2.

The application of use for these models included synchronous activities in virtual lab sessions through Ringcentral/Zoom, asynchronous through lab video recordings, and for self-guided studies. During synchronous activities, the students had the opportunity to identify the structures presented by the professors virtually by using the 3-D printed models concurrently with the professors. Asynchronously, the students may view recorded presentations of the structures while using the models as reference. Lastly, during self-study activities, the students have the models to identify and self-quiz the relevant structures. These learning opportunities align and prepare the students for the assessments that may be delivered in an on-campus or virtual setting. During a virtual oral practical assessment, the students utilized the 3-D printed models to identify structures through a webcam and speak through the relevant information associated with the structure.

Figure 2
3-D Printed Vertebrae for Student Anatomy Lab Kits

Case 3: Using GoReact for Formative Assessment of Psychomotor Skills, Dr. Ryan Reed, Miami Campus, PHT 5350C Musculoskeletal II: Extremity

Dr. Ryan Reed, Instructor in the DPT Program at the Miami Campus proposed GoReact as a solution for summative and formative virtual assessments. The Teaching, Learning and Innovation team quickly partnered with Information Technology and Finance/Contracts, and the platform was procured, integrated with Blackboard, and training commenced within just a few days.

As Physical Therapy faculty moved to a virtual environment, the need arose for ways to provide students feedback on psychomotor skills. Physical therapy programs require students to master psychomotor skills, including blood pressure assessment, goniometric measurements of different joints, manipulations of various joints, manual muscle testing, and muscle length tests. While there was a time during virtual lab sessions for feedback on psychomotor skills, the camera angles were not always clear, and students did not always have a partner to practice with during the scheduled lab time.

Formative feedback of psychomotor skills is now being provided using the GoReact platform. The student records a short video clip of a psychomotor skill, uploads the video to GoReact, and the faculty can access the video to review and provide comments. GoReact allows the instructor to stop the student video clip of the psychomotor skill and add text or video feedback at critical moments in the performance of the psychomotor skill. The instructors are able to give video and written feedback regarding hand placement during a psychomotor skill, as well as progression or order of completion of psychomotor skill suggestions. See Figure 3.

The GoReact platform was most helpful for students without lab partners during synchronous lab times. The students who did not have a lab partner would fllm psychomotor skills for the upcoming virtual lab by watching an instructor~s video of how to complete the technique. The student without a lab partner would then receive live or synchronous feedback from an instructor while their classmates were practicing the psychomotor skill that had just been demonstrated. Students who had lab partners also submitted videos of psychomotor skills when they felt they needed more formative feedback. Overall, based on course evaluations from Spring 2020 term, students were satisfled with the GoReact features and stated that the technology was easy to use. Students also indicated that they felt the feedback given from the instructor using the GoReact technology was sometimes more specifllc than the feedback given face-to-face on campus. Instructors felt they were able to provide more feedback and be more specifllc with students using the GoReact technology because they could start and stop the video and rewind in a way not possible in a face-to-face lab.
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Figure 3

Virtual Lab Assessment

Case 4: Using GoReact for Summative Assessments / Lab Practicals, Dr. Tobi Baldwin, St. Augustine Campus, PHT 5250C Musculoskeletal I: Introduction to Orthopedic Physical Therapy

GoReact was also used as a modality for summative assessment for a lab practical exam both asynchronously and synchronously. In the asynchronous model, the students were provided opportunities for formative practice before the practical exam to become familiar with GoReact. On the day of the practical exam, students were divided into two groups, and each group logged into RingCentral/Zoom at a specifllc time to receive the list of skills to be tested. The students then had 30 minutes to record and upload videos to GoReact of the required skills. Faculty were able to access student videos in GoReact through Blackboard to grade and provide private, individualized feedback asynchronously. See Figure 4.

The synchronous model for lab practical exams involved using GoReact for in-the-moment feedback and critique of the student÷s skills demonstration. The written and oral feedback was time-stamped to the exact moment the student performed the skill correctly or required modifications. The session was also recorded along with the feedback, so students could return to the recording later to review and re‡ect.

Student feedback about the use of GoReact has been positive, as reported on the course evaluations. There were minimal technology issues, with the main problem being slow uploads of the videos. Students complimented the ease of use of GoReact. Faculty members reported that GoReact allowed them to consistently grade students while providing more specific feedback than they can in the face-to-face environment. In a face-to-face lab practical, faculty members are not always able to stop and provide feedback to the students on every detail due to time constraints. The grading criteria and grading checklist were the same when using GoReact as when doing a face-to-face lab practical; standards and expectations were not changed, and preliminary evidence from Spring 2020 to Summer 2020 shows no difference in student achievement based on the scores.

Figure 4

Virtual Practical Assessment

Case 5: Telehealth Focused Virtual Simulation, Dr. Kelly Layne, St. Augustine campus and Ms. Elizabeth DeLuca, Austin campus, OCT 5425C Clinical Applications in Geriatrics

Simulation based learning (SBL) is known to enhance communication, collaboration, psychomotor skills, and interprofessional practice (Chown & Horn, 2017; Gellis et al., 2018; Harris et al., 2016; Robertson & Bandali, 2008), and thus the University is committed to supporting simulation across the curriculum. During the COVID-19 pandemic, simulated learning experiences that were previously done face-to-face in the Clinical Applications in Geriatrics course needed to be transitioned to a virtual format to continue the use of simulation across the curriculum.À

The move to a virtual format afforded several opportunities. First, shifting the scenarios to simulate a telehealth session leveraged the real world context of healthcare during the COVID-19 pandemic. Second, continuation of these simulations virtually allowed for the achievement of level I fieldwork competencies, since standardized patients could still be used virtually. In addition, the experience was also designed to meet accreditation requirements related to the use of technology in practice, including virtual and telehealth contexts.ÀÀ

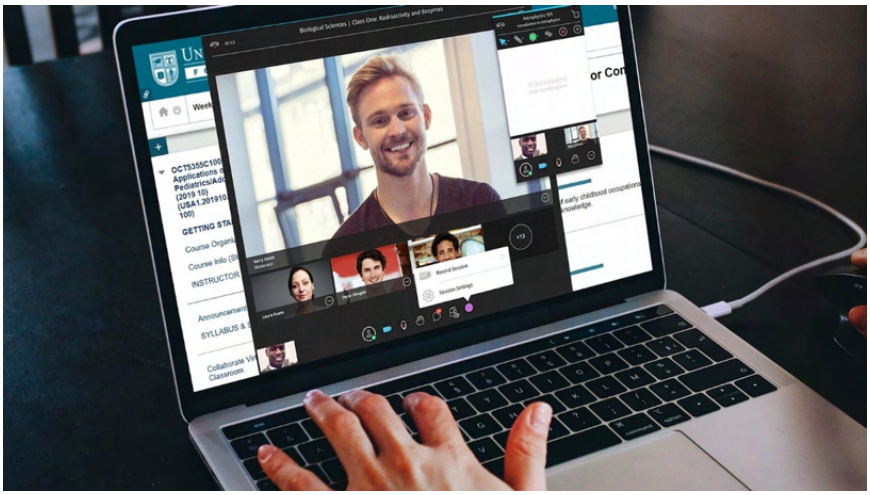
The purpose of this two-part telehealth simulation, which was run as a case conference, was to improve students÷clinical reasoning and communication skills through small group planning and implementation of a telehealth home assessment and a brief intervention with a focus on fall prevention and home safety. A video of the case conference was created by the Center for Innovative Clinical Practice (CICP) staff in collaboration with the Digital Learning Design team. Students were instructed to review the video and case specifics, such as electronic health records using EHRGo for standardized participants, and then be a part of a synchronous web-conferencing session using Ringcentral/Zoom. See Figure 5.

The case conference was simulated during the session by the Occupational Therapy faculty and students and student volunteers playing the roles of Physical Therapists, Nurses, a Medical Doctor, and a Social Worker, and interacting with standardized patients.ÀÀÀ

Following the session, all participants stayed on the session and shifted to a debrief, led by the Occupational Therapy faculty members. Students were led through a debrief and were assessed based on their completion of a clinical documentation assignment. Students also completed a self-assessment regarding their performance. Preliminary results of these assessments indicated that this experience advanced their understanding of technology in practice as well as how they perceived their learning of clinical reasoning skills.

Figure 5

Virtual IPE Case Conference SessionÀ



Case 6: Virtual COVID-19 Patient Case Simulation Using the Double Robot, Dr. Norman Belleza and Dr. Jim Mathews, California campus, PHT 5430C Patient Care Management II

The complex nature of inpatient physical therapy makes it challenging to ensure that Doctor of Physical Therapy students, also called student physical therapists (SPTs), have the core competencies (Gorman et al., 2010) needed to ensure that SPTs are ready for clinical experiences as required by accreditation (Commission on Accreditation in Physical Therapy Education, 2020). Through the use of deliberate practice (Griswold et al., 2012) in a simulated learning environment, SPTs in the course Patient Care Management typically engage on campus on a weekly basis to master these skills. In the Spring of 2020, SPTs in the Patient Care Management course completed 8 of the 12 required labs prior to the mandatory COVID-19 stay-at-home orders. Learning activities were designed to ensure that the remaining virtual labs would be meaningful and allow faculty to assess the inpatient core competencies.

One such learning activity included a simulation that integrated the use of the Double Robot (each campus recently invested in a unit as part of the Centers for Innovative Clinical Practice), synchronous web conferencing using Blackboard Collaborate, and collaboration with the Digital Learning Design team to create original pre-brief video for the scenario.

During this virtual simulation, two Physical Therapy faculty and a standardized patient streamed video from campus while SPTs watched and participated from their remote locations. This scenario was unique because it was written to demonstrate physical therapy treatment approaches with a hospitalized COVID-19 patient, which also contextualized real-world events into a realistic practice setting.

The scenario was run from the inpatient ward and other areas of the simulation center to simulate an acute care setting. With support from the Digital Learning Design videographers, and simulation center staff, students logged into a Blackboard Collaborate session and could simultaneously watch the Double Robot perspective (representing Physical Therapist 1 who was treating the patient in a telehealth context), as well as other camera perspectives (representing Physical Therapist 2 who was treating the patient in the acute care setting). See Figure 6.

During the scenario, students were able to interact through the discussion chat. Other Faculty members managed the chat dialog and provided questions and input to the student observers. The simulation also played out as an animated lecture where students would watch specifIc behaviors, identify correct or incorrect technique and lecture on proper protocol for interventions, procedures, and tasks. DebriefIng was conducted at specifIc intervals after students completed the scenario.

A fInal debrief on web conferencing session was conducted during which students could critique faculty performance in their simulated roles as Physical Therapists treating the COVID-19 patient to assess whether they identifIed the intentional errors embedded into the scenario. In fact, students caught many more mistakes and had perspectives on things not anticipated by the faculty. Faculty and students discussed learning gaps and re‡ected upon possible solutions to the errors made, and other techniques that could have been utilized. Following, a brief lecture on proper technique and interventions as well as medical equipment and durable medical equipment used in the scenario was given.

Students were asked to provide verbal feedback about the virtual simulation, as well as was measured by course evaluations. The feedback was overwhelmingly positive and students expressed a desire for further interactive virtual simulation opportunities. The activity showcased the technological capabilities and the ‡exibility for our campus and program to use multiple technologies and platforms to enhance synchronous and online learning. It also demonstrated an ability to take on very current issues such as COVID-19 and integrate them into relevant teaching for students to bridge academic learning to real-world clinical practice. The activity was put together as a quick-response to the change in the course due to the COVID-19 shelter at home orders. It became a model to use in other courses in order to provide content for other courses such as PCM1 and PCM3.

Figure 6

Virtual COVID-19 Patient Case Simulation

Looking to the Future

USAHS has been able to quickly apply a strategic learning framework with innovative solutions to preserve the integrity of the University's active learning model during a rapid shift to fully virtual learning due to the COVID-19 pandemic.À

Undeniably, the pandemic has changed higher education, in some ways potentially permanently. If there is a silver lining in such a tragic episode, it is that the pandemic has forced all higher education stakeholders to solve instructional problems creatively and be resilient. Technology has also afforded us the opportunity to stay connected virtually, and rather than merely replicating our campus environments, we have had to innovate new ways to teach.

At the University of St. Augustine for Health Sciences, we remain committed to innovating new and enhanced teaching and learning strategies, as well as assessing our progress using data-driven approaches. The University has established data points and ongoing measurements for learning outcomes and student satisfaction throughout the alternative teaching period. As noted throughout, all preliminary outcomes and feedback about adapted teaching strategies are positive. Further research and analysis of these data will inform any permanent changes to the University's learning model.

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