

Return to Learn: The Path to Re-opening UC San Diego

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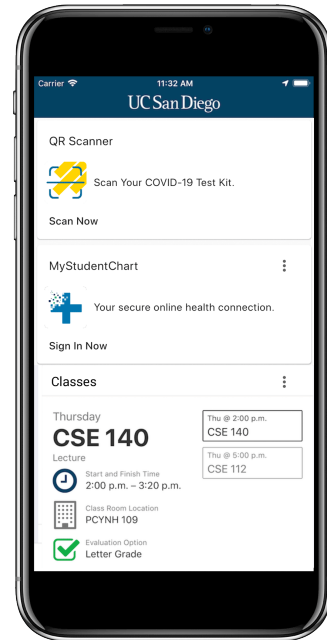
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Introduction

Is it possible to administer do-it-yourself COVID-19 tests to 65,000 faculty, students and staff each month so UC San Diego can safely re-open? We won't know until we try! The Return to Learn Program combines health care, continuous improvement, IT and problem solving to chart a path to bringing people back to UC San Diego. A May 2020 testing pilot conducted with on-campus residents is the first step.

Backstory

One of the things we hear quite a bit in the news is how can we safely start to re-open the country – and, at a smaller scale, the UC San Diego campus. Invariably that's followed up with increased COVID-19 testing and social distancing.

Therefore, UC San Diego Chancellor Khosla put forth a lofty goal to members of his cabinet to ask how we can leverage the unique brainpower at UC San Diego including clinicians, epidemiologists, bioinformatics specialists and information technology to provide COVID-19 testing at a mass scale to the campus community. The idea is if we can minimize exposure by ensuring those on the campus are free from the virus, we'll be better positioned to begin a safe return to some level of in-person activities in the fall.

Return to Learn

In a matter of weeks, a plan was laid out to pilot a free COVID-19 testing program for 5,000 undergraduate and graduate students still living on campus. This initial phase was conceived of as a pilot to think about how we could scale up to accommodate periodic testing of a population 10 times this amount.

The program is called Return to Learn (<https://coronavirus.ucsd.edu/return-to-learn>), and it aims to broadly test students, faculty and staff on campus on a recurring basis for the presence of the SARS-CoV-2 virus that causes COVID-19. This evidence-based program, which includes plans for contact tracing and isolation housing for on-campus resident students who test positive for the virus, is intended to better position UC San Diego to resume in-person activities when fall classes begin in September 2020.

To get Return to Learn even started, we had to be creative in our thinking. The lab selected to perform the testing had not done anything at this scale. To this point, testing was administered by a clinician on a test subject at the lab. If we were to scale this to eventually 65,000 students, faculty and staff, we had to think of a way in which the test could be self-administered with oversight by clinicians, instead of clinicians administering to each and every patient.

In addition, it wouldn't be feasible to have all those people go to a lab site to get tested, so we need multiple sites established around campus located where the students currently reside.

UC San Diego's Operational Strategic Initiatives (OSI) department is spearheading the initiative. Its staff includes experts in process improvement, operational efficiency and Lean Six Sigma. OSI led efforts to brainstorm ideas for how the workflow would play out. We needed to develop a system that was low touch as much as possible.

A three-week starter program was outlined with a focus on testing undergrads in Week 1, grad students in Week 2 and the remaining in Week 3. Testing sites were established in locations next to housing for each of those student populations. Emails to the resident students went out letting them know about the Return to Learn program that provides free COVID-19 testing.



Student-focused marketing video 1

Testing Process

Below is the high-level process for testing:

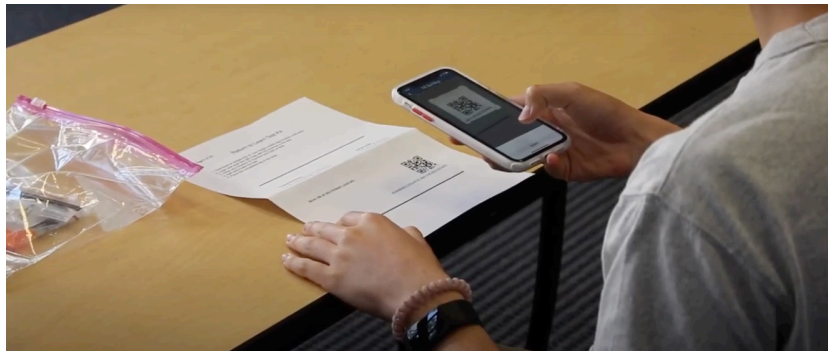
- Students visit returntolearn.ucsd.edu, a log-in protected site with an instructional video on the DIY testing process, mobile app instructions as well as test sites, times and locations.
- At the testing site, students pick up a test kit and scan it with their UC San Diego mobile app.
- Students perform a DIY nasal swab test, seal their test, and place it in the test collection box.
- Samples are retrieved periodically and returned to the lab.
- A lab technician uses an iPad to scan the test kit and receives all the info about the student, which is then entered into Epic, the University's medical record system.
- The technician completes the test.
- Results are posted for students in the MyStudentChart app. Students with positive tests receive a phone call Student Health Services with clinical guidance on next steps. Positive tests are reported to county public health authorities, and contact tracking begins.

IT as Connection Point

The test process needs to be as contactless, speedy, DIY and secure as possible, and the IT components make it all work.

The thought was if we were going to accommodate testing en masse, we had to assemble test kits en mass. For us to assemble kits that were pre-labeled for each student in scope for the test, it would be a huge bottleneck.

Then we came up with the idea to use the UC San Diego mobile app to scan test kits, thus matching a test kit to an authenticated individual. We also developed a companion app for the lab to be installed on an iPad. As test kits arrived at the lab, the technicians would use that app to scan the QR code and would bring up the information about the student.



Both the barcode scanning app and the iPad QR code reader app used by the lab were developed over a weekend “hackathon style” by two developers. It was then integrated into the mobile app, refined and released into production within two weeks.

Both the campus mobile app and the lab version of the barcode scanning app are based on the Google toolkit, known as Flutter, which allows the team to write in one codebase and deploy native apps to both iOS and Android. The upshot is reaching a wide audience with less development effort than managing disparate mobile platforms.

What about students who encounter difficulty with the app or getting connected? One of the things we did from the IT support side was to deploy laptops at each of the testing sites running a Zoom session. If students have any type of IT issue, they walk up to the computer and we troubleshoot and help them remotely.

Over 75 tickets have been logged, with nearly all resolved in a matter of moments. Common issues include network connectivity and app login difficulty. Since this mobile-based support is working so well, we've been thinking about how this type of format could be leveraged by the Service Desk for other types of IT support issues.

Continuous Improvement Makes Today Better Than Yesterday

Over 3,200 UC San Diego staff members have received introductory training in Lean Six Sigma (LSS), a process improvement methodology built on reducing waste and improving efficiency. Dozens more have earned advanced LSS Green and Black Belt certifications. That training and mindset drives the Return to Learn program.

Management visited the lab to conduct a *Gemba* walk, a core LSS activity to directly observe a process up close on the "shop floor." Additionally, a "5 Whys" exercise was completed, during which those involved ask "Why?" five times as they drill closer and closer to a defect's root cause.

Continuous improvement is also all about observing and measuring, then implementing small, incremental enhancements. A total of 822 cycle-time-related data points are tracked, including

- Number of test sites on campus
- Number of students tested
- Self-test cycle time, from entering facility to leaving
- Number and types of issues or defects (eg, mobile app issues, health and safety concerns, discarded tests)

Data is collected electronically via technology, but also manually by team members equipped with clipboards, pencils and charts to note down wait time, customer concerns and more. Results are analyzed daily, with improvements implemented as soon as possible.

One major process improvement concerns the workflow once test kits arrive to the lab. As indicated, the lab technician has an iPad that he or she uses to scan the test kit to bring up patient information. At the outset, the technician saw the patient info on the iPad but still had to manually perform a search for that person in LabSoft (the lab software). The technology and process improvement was to develop a way to translate the test order number into a barcode, which appears on the iPad. So now the lab technician first uses the iPad to scan the test kit, then uses the LapSoft device to scan the iPad so the test information automatically populates in LabSoft. This step reduces the chance of errors, and also saves time. Those few seconds saved, dozens or hundreds of times a day, really add up in the end.

Timing @ 2-3pm.

Process Observation Form *Mesa Nueva*

Step #	Description of Operation	Time Available									
		1	2	3	4	5	6	7	8	9	10
1	Wait time in line	0:08	0:01	0:03	0:10	0:01	0:02	0:04	0:02	0:04	0:01
2	Handwritten notes	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00
3	Time to accept kit and scan QR code	1:30	2:01	2:02	2:11	2:22	2:32	2:41	2:50	3:00	3:11
4	Time to scan QR code	1:59	2:02	2:05	2:14	2:24	2:33	2:42	2:51	3:01	3:11
5	Time to self-administer sample	2:01	2:02	2:04	2:10	2:20	2:29	2:38	2:47	2:56	3:05
6	Break and administer and document, and up to 10 min	2:02	2:05	2:08	2:14	2:24	2:32	2:41	2:50	3:00	3:10
7	Time to exit site	2:03	2:06	2:10	2:21	2:29	2:38	2:47	2:56	3:05	3:14
Time for one observation		5	5	7	5	6	4	9	8	8	6

Count:
 10-11 = 9
 11-12 = 7
 12-1 = 7
 1-2 = 6
 2-3 = 20

3-5 = 15

Example of time-tracking at testing site 1

Conclusions and Updates

Over the first two weeks of testing (May 11 – 22), 1,161 students self-administered tests, while 77% of students surveyed indicated a willingness to get tested to help reopen campus.

Finally, below are examples of daily improvements implemented and the results

- Zoom support positioned at each testing site, which reduced wait times as testers got their issues resolved on the spot without physical contact with support staff.
- Implementation of graphic-based instructions (vs written), which reduced mistakes, incorrect sequencing of steps, and cut-down on questions to staff
- Direct communication from residential deans and student associations, which led to a more than 50% increase in participation
- QR code labels adhered to collection bag (instead of separate pieces of paper to be removed, scanned, and put back in the bag), which decreased test cycle time by an average of one minute each and eliminated lost paperwork and confusion of QR code placement
- Introduction of smaller swabs to allow test tube lids to close better and eliminate leakage, which saves the time it would have taken to re-test leaked samples (14% of all samples during Week 1)

At the time of submission, the Return to Learn program is completing the final week (Week 3) of student self-testing, however campus leadership has already seen outcomes that support feasibility and scalability of large-scale self-administered testing for Fall 2020. The program will continue to explore options and expand over the summer to on-campus staff, such as those performing essential functions or working in labs.

