

PROCURING DIFFERENTLY: How Colorado Used User Research and Active Vendor Management for COVID-19 Technology

A CASE STUDY BY THE
BEECK CENTER FOR SOCIAL
IMPACT + INNOVATION

PUBLISHED FEBRUARY 2021

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About the Beeck Center for Social Impact + Innovation

The Beeck Center is an experiential hub at Georgetown University that trains students and incubates scalable, leading edge ideas for social change. We believe impact at scale requires the courage to think and behave differently. Our work centers on investing in outcomes for individuals and society. We equip future global leaders with the mindset to promote outcome-driven solutions, using the tools of design, data, technology, and innovation. We convene actors across the public, private, and civic sectors to advance new tools, frameworks, and approaches necessary to achieve these outcomes.

About this Case Study

This case study was researched and drafted by Elaina Faust, Reilly Martin, Conor Carroll, and Hayley Pontia as part of the Beeck Center's [New Digital Service Teams](#) project.

This report is released February 2021 under a Creative Commons Attribution-ShareAlike license, and should be cited as: Faust, Elaina; Martin, Reilly; Carroll, Conor; and Pontia, Hayley (2021). Procuring Differently: How Colorado Used User Research and Active Vendor Management for COVID-19 Technology , Beeck Center for Social Impact + Innovation, Georgetown University, Washington, D.C.

Summary

As part of an effective pandemic response, the State of Colorado needed a comprehensive digital solution for case investigation and contact tracing, which has been used by local public health agencies. In June 2020, the state implemented an innovative and entirely virtual vendor selection process to evaluate these solutions under the direction of the Colorado Digital Service (CDS), a team within the Governor's Office of Information Technology. **Vendors were invited to provide a test environment where their solution could be assessed** based on functionality, user experience, and technical fit. Stakeholders across the state of Colorado participated directly in an interactive evaluation and selection process, which provided opportunities to assess vendors' work style and culture, center evaluation on user needs, and generate buy-in from users. A human-centered approach was essential to ensure widespread use of the solution and to provide robust data for state-level decision-making on its case-investigation and contact-tracing efforts. By requiring vendors to demonstrate value through "[demos not memos](#)," CDS was able to support the Colorado Department of Public Health and the Environment (CDPHE) in selecting the solution that enhanced CDPHE's ability to meet public health needs while still saving the state time and money. **A vendor was selected in just 19 days and \$15 million under budget.** Separate from this project, the State of Colorado has also enabled software for the public to receive [exposure notifications](#).

Introduction

Case investigation and contact tracing are effective public health tools for containing the spread of a virus or other communicable diseases. Before COVID-19, the volume of data that contact tracing produced was small enough that it could be managed with lightweight technology solutions like spreadsheets. Now, COVID-19 has exasperated existing technology systems with high volumes of data. Without a single source of truth or ability to share data with one another, public health entities lack the tools to effectively manage COVID-19.

In Colorado, the state was on its way to directly sourcing a single solution based on the recommendation of county public health staff who gathered information and conducted demonstrations with technology vendors. In order to ensure that the selection effectively met needs across local and state public health users, Colorado Digital Service was engaged in order to review the procurement strategy and recommend a path forward to rapidly assess how potential vendors could meet Colorado's contact tracing needs.

Founded in 2019, the Colorado Digital Service brings human-centered solutions to Colorado's most pressing technology programs. As the state prepared to select a vendor, CDS proposed a "vendor bake-off"—a side-by-side comparison of vendor capabilities—that would test potential solutions against user and technical needs, but delay implementation by a month. CDPHE agreed that a more robust decision process would reduce the risk of buying an untested product and generate buy-in from stakeholders across the state, justifying the delayed rollout. The CDS team set up a project to test this alternative approach.

Problem Statement

County-level adoption of the selected tool throughout the state was essential to containing the spread of COVID-19 statewide, which often relies on cross-county collaboration as well as support from state staff. In the absence of a unified state-led approach that met local needs, counties used a patchwork of systems that led to data being entered two or three times, lacked consistent data standards, and made cross-jurisdiction case management cumbersome, if not impossible. Colorado is a "state supervised, county administered" state for the services it provides, meaning counties are the lead decision-makers for how to provide services to the public. The state's public health department does not have the authority to require use of the selected software system at the county level. It was therefore essential to encourage voluntary participation from the 53 Local Public Health Agencies (LPHAs) across the state.

Traditional vendor selection processes evaluate the ability to produce a high-quality written proposal rather than the usability of the software or the quality of the technical support provided by the software vendor. Typical processes—often heavily based on the release of a Request for Proposal (RFP) and evaluation of written responses—often fail to assess what matters most to the people who will interact with the system every day and act as a barrier to entry for smaller vendors that lack professional writers or dedicated proposal teams.

Any procurement for this system would have been expedited to quickly respond to the spread of COVID-19. However, the State of Colorado was looking to do things differently and set up new standards of procurement in order to create a more human-centered and inclusive evaluation process to ensure the system worked for as many LPHAs as possible. Without this, individual LPHAs did not trust that the technology would meet their needs and were on track to procure many one-off systems that may or may not have worked well with one another or with current state systems.

Solution

Colorado Digital Service (CDS) offered to lead an innovative, human-centered vendor selection process that required vendors to *demonstrate* rather than describe their value add through a vendor bake-off. The process engaged case investigators, contact tracers, and team leads from Local Public Health Agencies (LPHA)s and Colorado Department of Public Health and the Environment (CDPHE). These folks helped try potential solutions in a fully-functional test environment and participated directly in the evaluation through user interviews, which increased county-level buy-in for the selected tool and set the stage for statewide scaling.

Theory of Change: By using an interactive, human-centered, demo-based approach, the team will be able to evaluate vendors in a real-world environment on the criteria that matter most, and will be more likely to select the solution that best meets user needs. Involving frontline public health workers from the counties in the evaluation and selection process will generate buy-in and increase uptake of the selected software solution.

Implementation

Team Structure

The team was made up of employees from multiple state departments.

Colorado Digital Service staff that was involved:

- A procurement lead facilitated the overall project process and vendor engagement.
- A user experience researcher and product manager conducted usability tests with staff from LPHAs and CDPHE.
- Two engineers and a deputy director led the technical review process (alongside staff at the Office of Information Technology) and interviews with vendors.
- All of these staff members were involved in the eventual implementation of the system.

Office of Information Technology staff that was involved:

- Three full-time and 20 part-time staff members focused on technical review (security, solution architecture, and application management) and eventual implementation/integration, rollout, and support of the system.

Colorado Department of Public Health and the Environment staff that was involved:

- Six full-time staff members who contributed deep knowledge of functional requirements during the technical review process (and future implementation) as well as working relationships with the LPHAs during usability testing; and
- The procurement/contracts team.

Preparation

System Integration

The contact tracing solution is a part of the state's COVIDtech portfolio which includes technology support for lab testing, contact tracing, isolation and quarantine support, and disease surveillance.

The Office of Information Technology works with CDPHE on an ongoing basis to manage the integration of new systems. For contract tracing, the systems needed to communicate with the Colorado Electronic Disease Reporting System, the state's Health Information Exchanges, and any additional systems that may be in place at LPHAs.

Integrations work happened concurrently with the procurement process. It helped inform the technical review process used to evaluate how potential vendors would fit within the state's pre-existing public health technology environment.

Engagement With Local Public Health Agencies (LPHAs)

To ensure LPHAs were engaged, CDS presented and collected feedback on this new vendor evaluation and selection process before the process kicked off with potential vendors. They were also invited to take part in usability studies with each vendor. Ultimately, eight counties representing urban, rural, and frontier areas of the state participated in the [usability testing](#), as did CDPHE representatives.

Market Research and Vendor Engagement

LPHAs and CDS conducted market research with private sector companies, non-profits, and other state governments that had recently implemented contact-tracing solutions. CDPHE took this information and invited four vendors to

participate in the proof of concept evaluation. Advanced conversations allowed vendors to plan and allocate resources to participate; the state used its “open market” limitation to offer reimbursement for up to \$25,000 worth of expenses for each vendor, consistent with the existing procurement law. The Colorado team maintained an open line of communication with vendors throughout the process, allowing the vendors to ask questions and seek clarification on requirements. This facilitated a more detailed and nuanced exchange of information than simple yes-or-no answers in a written questionnaire.

Execution

The reimagined evaluation process assessed vendors on the following three criteria: functionality, usability, and technical considerations. The vendor selection process took place over a total of 19 days from June 29 to July 17, which included one week of usability testing and technical review.



Timeline for the Proof of Concept Process

Two vendors participated in the full procurement process. Two vendors declined to participate because they were unable to meet the tight timeline necessitated by the state’s COVID-19 response efforts.

Participating vendors submitted three major deliverables for the evaluation process: technical documentation, a fully functional test environment including administrative login credentials and 36 test accounts, and an implementation plan with pricing information and timeline for scaling to 53 LPHAs. They participated in a technical interview mid-way through the bake-off, and were given the opportunity to respond to initial user feedback from usability interviews.

Evaluation Criteria

Functionality

Functionality was evaluated based on a variety of [user stories](#) and a [service blueprint](#) to assess each solution's capacity to meet the needs of counties across the state.

The **user stories** described the unique needs and priorities of the user groups interacting with the software (patients, contact tracers/case investigators, and team leads to name a few). The stories were informed by interviews with people from the participating LPHAs as well as existing written documentation of contact tracing and case investigation needs produced by a LPHA working group.

COVID-19+ person or contact

- I need to be treated with respect and equity no matter my circumstances.
- I am confident that my information is securely managed and appropriately used by the public health workforce in accordance with laws and regulations governing disease control.
- I need to be able to contact my local public health agency easily and without friction when something changes or a need arises.
- I need to be directed to local resources that best meet my needs so that I can successfully isolate or quarantine specific to my location.
- I rarely answer calls from phone numbers unknown to me and would prefer to answer your questions on my own or schedule a time to talk to you at my convenience.

Example User Story

The **service blueprint** outlined the end-to-end workflow from symptom onset (or preemptive testing) to public data sharing as well as unique workflows and configuration needs for LPHAs.

Usability

Participating vendors were asked to create fully-functional test environments that included representative sample data sets. This human-centered design process added an interactive element to the assessment not present in typical demos where vendor-produced slides, videos, or images often illustrate functionality.

Usability testers included both contact tracers and team leads from the various LPHAs and CDPHE. 35 usability sessions were conducted with 11 team leads and 12 contact tracers/case investigators.

These tests allowed the team to evaluate the systems on how easy or not the system was to use. It also allowed the team insight into how much customization might be required to accommodate desired workflows.

The team shared insights from user testing with vendors midway through the process to assess how they might respond to our partnership. Their responses to user research input were also incorporated into the evaluation.

Team Lead	Case Investigator/Contact Tracer
<ul style="list-style-type: none"> ● How might you pull data from the system to drive decision-making in your county? ● How might you assign a case to someone on your team? ● How would you go about configuring the interview guide? ● Thinking about your workflow, what other areas of the tool are you interested in exploring? ● Reflect on your experience. What went well / didn't go well? 	<ul style="list-style-type: none"> ● Imagine you are about to contact a person. Walk us through how you might prepare to talk to them. ● Imagine you attempted to call someone and were unsuccessful. What would you do next? ● This person is experiencing homelessness. How might you capture that in the system? How would you find resources that could help them? ● Imagine you learned that this case resides in another county. What would you do next? ● How might the tool help you stay in contact with an individual? (e.g., to send them some documentation)

Usability Study Tasks

Technical Review

Rather than interacting solely with sales representatives, which can often be the case in traditional vendor selection processes, CDS and CDPHE engaged with vendors' technical experts directly via a technical interview. Other relevant technical stakeholders from the Governor's Office of Information Technology and technical leads from LPHAs were given the opportunity to submit questions in advance. In this manner, the State of Colorado was able to evaluate how vendors would respond to

technical questions in the future and address key questions related to engineering, security, data, and integration. Interviews between key stakeholders allow for a richer exchange of information and help the state assess the client-partner relationship.

In addition to the interviews, each vendor was reviewed using the following methods:

1. Review of technical documentation, such as data dictionaries and sample security audit reports, which allowed staff to evaluate technical feasibility. 58 documents were collected and evaluated by CDPHE and OIT staff, including CDS.
2. Tests of each solution's application programming interfaces (APIs) to assess their ability to integrate with the state's existing systems.
3. Tests of the solution using simulated low-bandwidth environments, because the application would be used across the state in many rural areas via limited wireless networks.

Findings and Next Steps

Findings

The findings from the bake-off were presented back to CDPHE and OIT staff, and then LPHAs separately via virtual presentation using video software demonstrations, screenshots of the softwares highlighting features explored during the usability testing, and quotes from the usability studies. LPHAs submitted feedback through an online survey. Then, all of this was submitted to the CDPHE executive team for the final decision.

To move contracting along as fast as possible, before reviewing findings from the bake-off, the procurement staff within CDS, OIT, and CDPHE began reviewing state contracting terms and conditions. This happened with both participating vendors, so that regardless of the state's choice, the remaining contract work would move expeditiously.

In addition to comparing traditional factors used in procurement, such as timeline and cost, decision-makers were able to compare user reactions to both systems. They could see how closely users felt the systems may or may not have aligned with their workflows out of the box, making it easier to select the system that users could likely learn more quickly and that would require the least amount of customization/modification.

It was found that both participating vendors had solutions that:

- Met the state's technical requirements;
- Were able to accommodate local configuration needs, although both vendors recommended standardizing where possible;
- Were API-driven, allowing for their integration into Colorado's existing health data infrastructure; and
- Would require end-user training before going live. Contact tracers reported some confusion about the terminology used in both systems as well as some concerns about the rigidity of the interview workflows.

In the end, one vendor stood out as more user-friendly, with terminology and workflows that felt more familiar and natural to public health. This solution would also require less configuration and would allow for a simpler, faster, and more transparent contracting process, in addition to being the more affordable option. The process also found that over a three-year period, working with the selected vendor would save the state a minimum of \$15 million. This would allow the State of

Colorado to reinvest some of the savings to add new features and support implementation.

Next Steps

Once the State of Colorado selected a contact-tracing solution, the tool was provisioned and adapted to meet Colorado's needs. The entire process from final vendor selection to reaching scale took about 16 weeks in total. Initially, two LPHAs went live in the minimum viable product (MVP) version of the new system as part of an initial pilot phase which was implemented one month post contract execution. Two months and several sprints later, Colorado scaled statewide to all LPHAs, requiring that this system be used for cross-county collaboration and requests for state assistance. Colorado stood up a service desk to respond to specific needs associated with the new system. The system has moved from the active implementation phase to a system that continues to evolve as the pandemic changes. After implementing this contact tracing and case investigation system for county public health workers, the state also deployed exposure notifications to enable individuals who have tested positive to alert others they have spent time in close proximity with. The lessons learned from this procurement and implementation helped inform additional technology deployments to combat COVID-19.

Lessons Learned

1. **The “show, don’t tell” framework was a powerful evaluation strategy.** Software demonstrations, usability studies, and API prototyping revealed additional information and insights not reflected in written proposals or descriptions.
2. **Work in the open to help build trust with stakeholders and users at every level.** In addition to multiple modes of ongoing collaboration, the team made all documentation, including user feedback and the [user experience/product roadmaps](#), publicly available, so that anyone could know what was going on during the project at any time.
3. **Think critically about the number of usability tests to perform.** Colorado chose to conduct 35 usability tests, which allowed at least two roles to be represented from each county. This strategy went a long way toward building consensus and buy-in across counties, but was also relatively time and resource intensive. In planning usability testing, it is important to carefully balance unbiased representation and resource needs.
4. **Work through contract negotiations with vendors in parallel with the evaluation process.** This allowed the Colorado team to quickly execute the contract with the selected vendor once the decision had been finalized.
5. **The evaluation process reveals key insights about vendor culture, responsiveness, and project management style.** Use this time to suss out how the vendor responds to feedback and requests as well as how their style aligns with your own.
6. **A vendor relationship goes two ways.** The Colorado team tried to proactively communicate with vendors throughout the process to ensure they were being equally good partners from the beginning. This led to a collaborative partnership throughout the entirety of the project.
7. **Sometimes timelines are tight. But, if it’s possible, then give yourselves and your vendors as much time as possible.** Colorado needed this procurement to respond quickly to the pandemic. So, they were forced to give vendors extremely tight timeframes for them to participate. However, had there been more time, then more vendors may have been able to participate.

Resources

Resources/Templates From the Vendor Bake-Off

- [Usability test process](#) [with LPHAs]
- [COVID technology solution user stories](#)
- [Service blueprint](#)
- [Vendor events schedule](#)
- [Proof of concept write up](#)
- [Evaluation criteria + guidance](#)
- [Vendor form for questions and answers](#)
- [Vendor form to submit deliverables](#)
- [Product roadmap](#)

Other Helpful Resources

- [Demos not memos](#), 18F
- [De-risking custom technology projects](#), 18F
- [City of Boston Procurement Office](#)
- [State Software Collaborative](#), Beeck Center at Georgetown University
- [The TechFAR Handbook](#), U.S. Digital Service

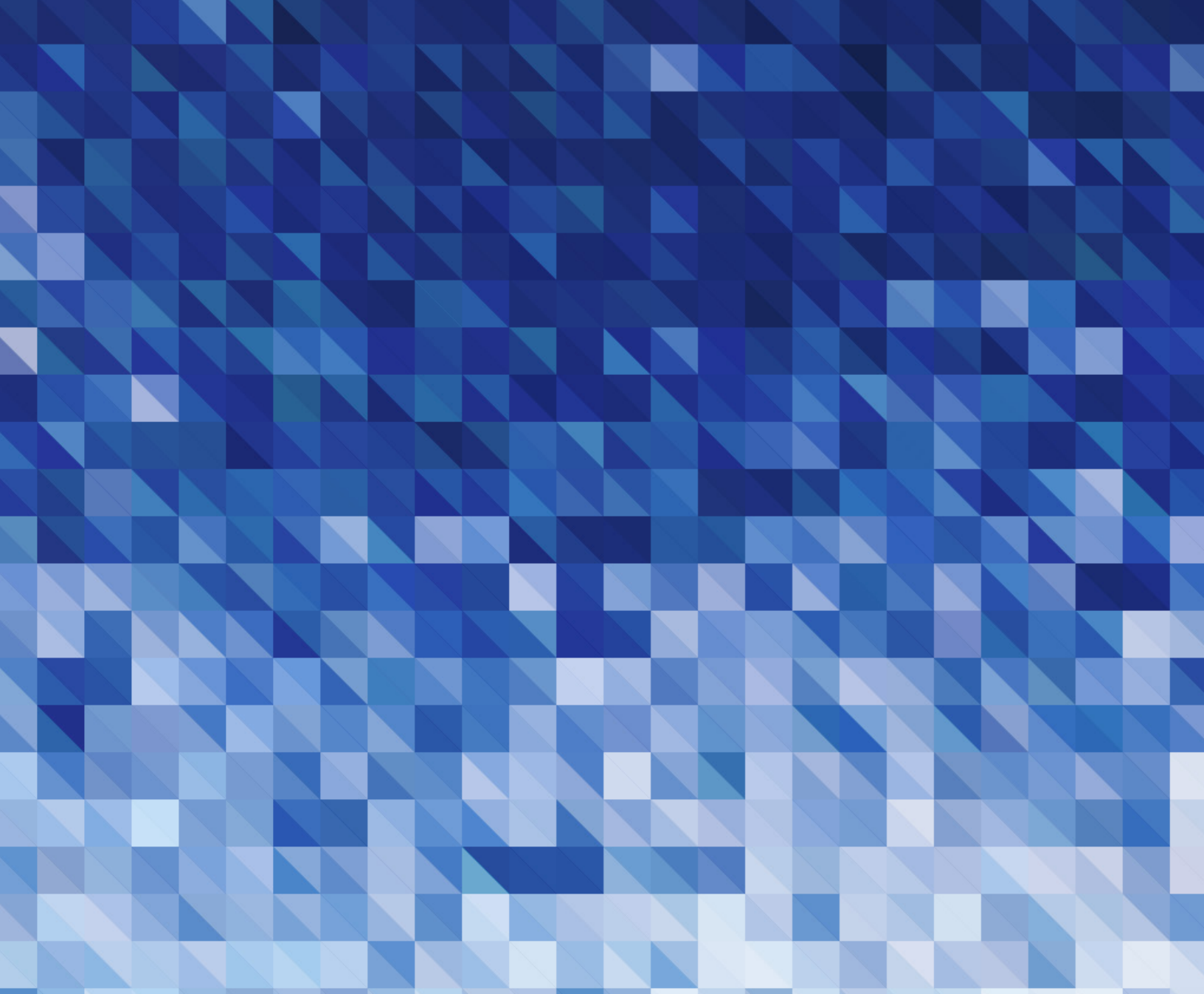
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