



## Evaluation - Towards a Community Learning Network to Advance Economic Mobility

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February 23, 2021

**Funding:** This evaluation was conducted as part of the Bill & Melinda Gates Foundation Grant, INV-003671

**Acknowledgements:** We would like to thank the Cooperative Extension System professionals, stakeholders, and faculty who completed surveys and participated in debriefings. We would also like to thank Lori Conerly, Administrative Assistant, Biocomplexity Institute, University of Virginia, who helped prepare the surveys and project documentation and John Buzzard, Ph.D., Assistant Director for Marketing and Corporate Outreach, Professional and Continuing Education, Oregon State University

**Citation:** Shipp, S., Thurston J., Lambur, M., and Dorius, C. (2021). Evaluation - Towards a Community Learning Network to Advance Economic Mobility. Proceedings of the Biocomplexity Institute, Technical Report. TR# 2021-021. University of Virginia. <https://doi.org/10.18130/p4np-qc43>



## Abstract

Through the pilot project – *Towards a National Community Learning Network* – we demonstrate that the Cooperative Extension System (CES) can be used to infuse data insights into local communities and accelerate the advancement of economic mobility across three states (Virginia, Iowa, and Oregon) through use of the Community Learning through Data Driven Discovery process. The project encompassed three bodies of work, including: (1) developing a rural community-based research culture to promote economic mobility; (2) empowering CES to serve as a distribution channel to advance understanding of economic mobility; and (3) demonstrating the utility of CES as an effective distribution channel for advancing economic mobility efforts across diverse geographies. Despite challenges presented by the ongoing COVID-19 pandemic, the project was successfully executed through five partner universities. Three public goods were produced that are capable of scaling nationally: (1) local communities were empowered to use their own data-rich and human-centered capacity for ongoing, community-directed problem solving; (2) CES professionals were equipped with the skills and knowledge to effectively engage with communities in identifying and applying data-driven insights; and (3) a data commons was developed that can be utilized to accelerate the advancement of community-based projects that support economic mobility.

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## Evaluation: Towards a Community Learning Network to Advance Economic Mobility

### Introduction

Across the United States, local governments are responsible for addressing the everyday societal needs of their residents from protecting public safety to providing critical health services to fostering economic development and mobility. The emerging data revolution has provided decision-makers at all levels new opportunities to extract data insights to meet their residents' current and future needs. Capitalizing on this opportunity, however, requires communities to implement new approaches to decision-making that utilize the full array of available data. Many communities—especially small and rural ones—need assistance to build their capacity to access data and leverage the statistical, computational, and social science expertise necessary to manage and analyze data and interpret the results. Which raises the question: does a mechanism exist to infuse data science into local decision-making?

To answer this question, the University of Virginia, Biocomplexity Institute's Social and Decision Analytics Division received funding from the Bill & Melinda Gates Foundation Economic Mobility & Opportunity Program in December 2019 (Award #GF14748; project number 163205; "Towards A National Community Learning Network") to explore the use of the USDA Cooperative Extension System (CES) as a key distribution channel for introducing data science into local communities. A collaboration between public and land-grant universities in Virginia, Iowa, and Oregon was created to pilot the Community Learning through Data-Driven Discovery (CLD3) process<sup>1</sup> utilizing CES as a key distribution channel for integrating data science into local communities to advance economic mobility.

A Three-State Community Learning Network of five public and Land Grant Universities – the Iowa State University, Oregon State University, Virginia Polytechnic Institute and State University (Virginia Tech), Virginia State University, and the University of Virginia – was established to demonstrate that the CES is an effective existing network that can be leveraged for the development and dissemination of community-driven, data science-based approaches for advancing economic mobility. The project unfolded across three bodies of work:

- Develop a rural community-based research culture around advancing understanding of economic mobility across Virginia, Iowa, and Oregon.
- Empower CES to serve as a distribution channel to advance understanding of economic mobility.
- Demonstrate CES as an effective distribution channel for advancing understanding of economic mobility.

This 13-month pilot demonstration would be aggressive under the best of social, economic, and research circumstances. The COVID-19 pandemic introduced challenges no one expected. However, the strength of the three-state network and the clear opportunities for enhancing rural prosperity won out and a path for bringing data science into local communities to advance economic mobility has been established. This report shares the journey and provides an evaluation of the outcomes, including summarizing the activities, outputs, and outcomes accomplished in achieving our objectives. The report integrates feedback from surveys and interviews with CES professionals and local community stakeholders. The three bodies of work are then synthesized to address the evaluation questions:

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<sup>1</sup> Keller, S., Lancaster, V., & Shipp, S. (2017). Building capacity for data driven governance: Creating a new foundation for democracy. *Statistics and Public Policy*, 4, 1–11. <https://doi.org/10.1080/2330443X.2017.1374897>

- Can CES serve as a key distribution channel for infusing data science into local communities to advance economic mobility? If so, is the CLD3 process, training, and supporting resources effective for moving CES in that direction?

In short, the answer is yes to both questions. The pilot successfully demonstrated that the CES can serve as an effective distribution channel for advancing economic mobility. This report presents evidence to support this finding. The implementation of the economic mobility projects and survey findings indicate that CES are comfortable in looking for and requesting data and using it to review, explore, and summarize data and indicates their potential to build their data science capacity.

This pilot is especially impressive given the last-minute adjustments required by the COVID-19 pandemic, such as needing to pivot from in-person meetings to remote engagements. As expected for any pilot, there were challenges. Identifying and addressing these challenges will set the stage for the CLD3 process to be adopted by other states and to become normal practice for the CES.

### **Complementary Funding**

In parallel, the University of Virginia, Biocomplexity Institute's Social and Decision Analytics Division received funding from the US Department of Agriculture, National Institute of Food and Agriculture (NIFA), Agriculture and Food Research Institute (AFRI), Food and Agriculture Cyberinformatics Tools (FACT) program (USDA NIFA Award 2019-68017-29934 "FACT: Three-State Data Science for the Public Good Coordinated Innovation"). This project targeted the infusing of data science into agriculture research, workforce development, and CES activities across Iowa, Oregon, and Virginia. CES alone does not have the technical capacity to make rapid and data-driven progress on these issues without the support of university-based research teams. At the heart of this project was the implementation of Data Science for the Public Program (DSPG) Young Scholars programs in three states. These programs were able to ensure rapid deployment of the selected CLD3 pilot projects initiated by CES. The CLD3 project teams vertically integrated undergraduate and graduate students, post-docs, research faculty and staff, CES professionals, and community stakeholders, and horizontally integrated expertise across diverse fields of study. DSPG Young Scholars programs adapted to the variations in CES professionals and organizational structures the across the three states. The goal was to document the methods and implementation of the DSPG Young Scholars programs for other states to mount similar programs.

The two projects were complementary, both supporting the use of CES to bring data science to local decision making. The Bill & Melinda Gates Foundation-funded research focused on the role of CES working with communities and university researchers to advance economic mobility. The research leveraged the DSPG Young Scholars programs to implement economic mobility projects. Both focused on deploying CLD3 to multiple states working with CES as the connector between communities and university researchers. This evaluation focuses on the Bill & Melinda Gates Foundation-funded goals and does not evaluate the USDA-funded program,<sup>2</sup> except for the intersection with economic mobility projects.

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<sup>2</sup> For the USDA NIFA-funded program, the Evaluation Team conducted four surveys – two focused on training and two on seeking input and feedback from students at the beginning and end of the DSPG projects.

## Existing Infrastructure That Supported Pilot Project

There are four infrastructure components that supported and provided the *raison d'être* for this pilot effort. The components are the Public and Land Grant Universities, CES, CLD3, and the DSPG Young Scholars programs.

A **Land Grant University** is an institution designated by its state legislature or Congress to receive the benefits of the Morrill Acts of 1862 and 1890. The Morrill Acts were enacted under the beliefs that a democratic government requires an educated citizenry and a practical education with direct relevance to daily life should be available to all people, including women, minorities, and the working class. Signed into law by Abraham Lincoln on July 2, 1862, the first Morrill Act gave states public lands to be sold or used for profit to establish at least one college that would teach agriculture, mechanical arts (engineering), military tactics, and traditional classical education. The Morrill Act of 1890 forbade racial discrimination in admissions policies for colleges receiving federal funds and provided funds to establish land grant institutions for African Americans in the south.<sup>3</sup> In 1994, the Equity in Educational Land-Grant Status Act designated tribal colleges and universities (TCUs) as land grant institutions.

In 1914, the Smith Lever Act established the **Cooperative Extension System (CES)** to translate and disseminate the evidence-based science produced by state Land Grant Universities to the public. With the passing of the 1914 Smith Lever Act, the land grant institution tripartite mission of teaching, research, and extension was established. The CES emphasizes taking knowledge gained through research and education and bringing it directly to the people to create positive changes. University faculty members, who are disciplinary experts, translate science-based research results into language appropriate for targeted audiences. County-based educators work with local citizens and interest groups to solve problems, evaluate the effectiveness of learning tools, and collect grassroots input to prioritize future research. By living and working in communities, county educators can rely on existing relationships to respond to local needs, build trust, and engage effectively with citizens. The CES is a cooperative activity between the federal government, through the USDA's NIFA; the states, through the land grant institutions; and the local government, through a network of county extension agents.

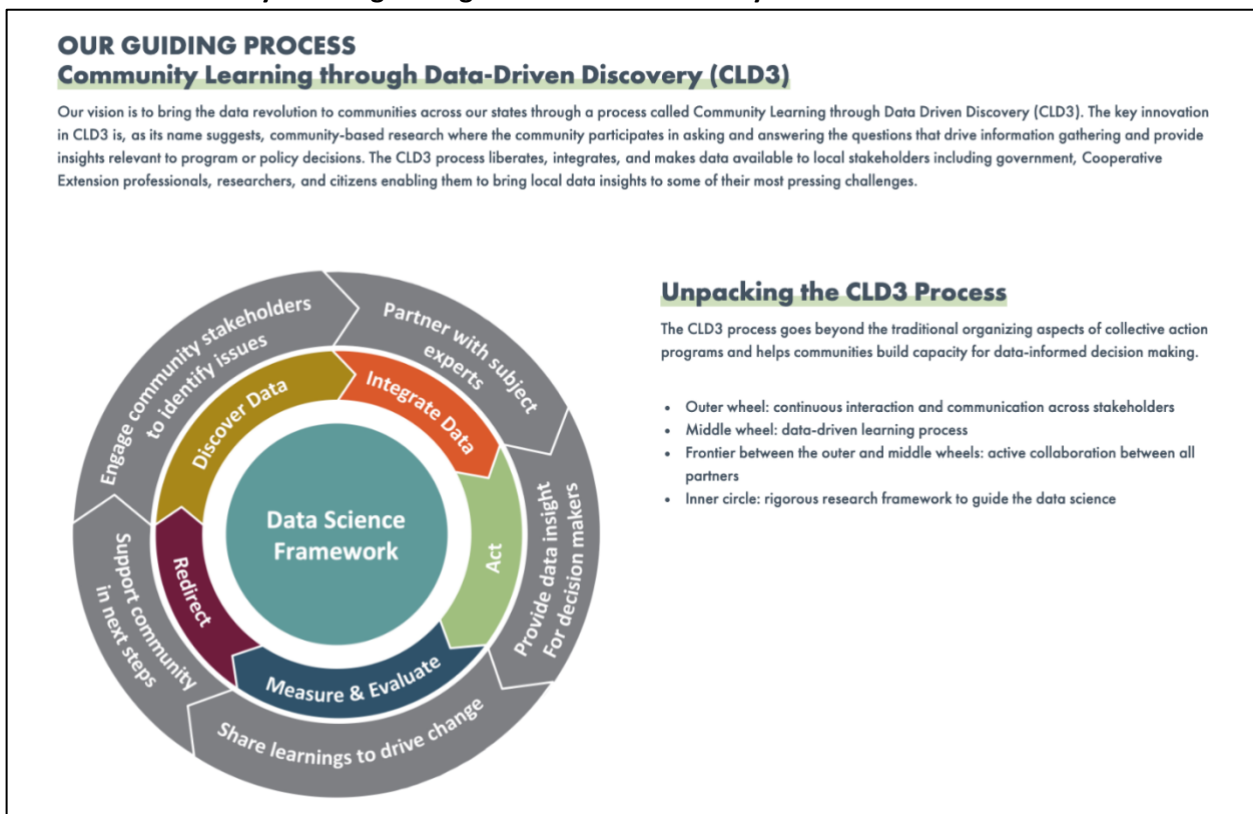
**Community Learning Through Data Driven Discovery (CLD3)** is a process to engage in community-based research where the community participates in asking and answering the questions that drive information gathering and provide insights relevant to program or policy decisions (<https://datascienceforthepublicgood.org/economic-mobility/research-framework>). The CLD3 process, "liberates, integrates, and makes data available to local stakeholders including government, CES professionals, researchers, and citizens enabling them to bring local data insights to some of their most pressing challenges." (see Exhibit 1).<sup>4</sup>

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<sup>3</sup> National Research Council (1995). *Colleges of Agriculture at the Land Grant Universities: A Profile*. Committee on the Future of the Colleges of Agriculture in the Land Grant University System. Board on Agriculture. National Academy Press. Washington, D.C.

<sup>4</sup> Keller, S., Nusser, S., Shipp, S., & Woteki, C. E. (2018). Helping communities use data to make better decisions. *Issues in Science and Technology*, 34(3), 83-89. <https://issues.org/helping-communities-use-data-to-make-better-decisions/>

## Exhibit 1. Community Learning through Data Driven Discovery Process



The **Data Science for the Public Good Young Scholars program (DSPG)** is an immersive summer program developed by the University of Virginia's Biocomplexity Institute's Social and Decision Analytics Division (<https://biocomplexity.virginia.edu/data-science-public-good-young-scholars>). Entering its seventh year, the program engages undergraduate and graduate students from across the country to work together on projects that address state, federal, and local government challenges around critical social issues relevant in the world today. DSPG young scholars conduct research at the intersection of statistics, computation, and the social sciences to determine how information generated within every community can be leveraged to improve quality of life and inform public policy. The program runs for 10 weeks for undergraduate interns and 11 weeks for graduate Fellows in the summer. The teams are composed of DSPG Fellows and interns, postdoctoral associates, research faculty, CES professionals, and project stakeholders. The DSPG Young Scholars program provides the infrastructure to quickly initiate economic mobility projects in rural areas.

### Impact of COVID-19

An important facet underlying the work were the effects of the COVID-19 pandemic that took hold in March 2020, producing unforeseen adjustments in the project activities. Universities had moved to virtual instruction and local communities were in crisis, increasing both the need and challenges of participating in the CLD3 process. The Three-State Community Learning Network pivoted quickly to move the program to virtual engagements. This included CES and project team training for faculty and students being conducted online within each state.



## **Different implementation model in each state**

CES is organized differently in each state, reflecting the needs and aspirations of each states. The organization of the CLD3 projects and teams reflects this diversity.

In Virginia, there was involvement at the local level, benefiting from previous interactions between the universities involved. CES is instantiated in Virginia as the Virginia Cooperative Extension (VCE). VCE is located in the Virginia Tech College of Agriculture and Life Sciences and includes nine academic units. Partnering with the Department of Agriculture and Applied Economics, VCE leadership solicited local CLD3 project ideas from CES professionals in the field and selected a subset for implementation. These covered topics including health care access, incarceration, intergenerational poverty, food insecurity, industry and workforce attraction, and evictions. The DSPG students supporting the CLD3 project teams were a combination of students from Virginia Tech, Virginia State University, and a cohort selected from a national search.

CES in Iowa falls under Iowa State University Extension and Outreach. This includes leadership and CES professionals in three colleges – Agriculture and Life Sciences, Design, and Human Sciences. Iowa originally planned to follow the Virginia model to implement CLD3 projects in local communities, but when the effects of COVID-19 started, the CES leadership decided that they should have their DSPG young scholars conduct research for state-wide programs, such as identifying locations for alcohol and substance abuse recovery centers, modernizing CES hotlines, piloting ‘Systems of Care’ data infrastructure to inform a health information platform, and other initiatives that would provide local benefits across the state. The DSPG students supporting the Iowa CLD3 teams were from Iowa State.

In Oregon, CES has formal partnerships across Oregon State University with seven of the 11 colleges. They typically tackle issues on application-based problems, gleaned from local interactions. To identify economic mobility-related projects, Oregon sought out CES professionals who are early adopters in the use of data and data science. They focused on cross-cutting, theme-based projects that affect the livelihood of their residents. For example, their projects focused on the health effects of poor air quality, water quality requirements for fresh produce growers, regulations affecting the ability to work and live in Eastern Oregon, the impact of pollution on fisheries, and food insecurity in an area that has lost significant manufacturing and forestry industries. Oregon was also intentional in staffing the project teams, when possible, with students from rural areas.

## **Project Organization**

The project organization is given in Exhibit 2. The University of Virginia (UVA) team took the lead in guiding the overarching project and the three bodies of work. The UVA team developed, implemented, and refined the CLD3 process through years of research projects for the public good. They also have a history of interaction with CES. Cross-university teams comprised of representatives from multiple universities coordinated efforts that affected the entire Three-State Community Learning Network. Most cross-university teams met on a weekly or bi-weekly basis. The Leadership team – comprised of the project PI, Co-PIs, senior leadership from each university, and other cross-university team leaders and representatives – met monthly. The CES engagement and training team included representatives from each of the three states. The DSPG Young Scholars program co-leads from each of the universities provided input to the creation of the CLD3 project teams.

Additionally, a National Advisory Panel was formed to advise the Leadership team on planning and implementing the three-state pilot, disseminating information about the effort, conducting outreach, and scaling the program to the national level. See <https://datascienceforthepublicgood.org/economic-mobility/about> for the panel membership.

## Exhibit 2. Three-State Community Learning Network Organization

Community Learning Network- Iowa, Oregon, Virginia		National Advisory Panel
5 Universities: Iowa State University, Oregon State University, University of Virginia, Virginia Tech, Virginia State University		
Leadership	Coordinated by the University of Virginia Principal Investigator with support from leadership at each of the universities	
CLD3 EM Projects	CLD3 Projects Teams were composed of CES, stakeholders, faculty, and students to conduct Economic Mobility projects.	
EM Infrastructure	Cross-university team created EM state-wide summaries, county-level data infrastructure, and CLD3 case studies	
CES Engagement and Training	Cross-university team oversaw the training and outreach collectively and within each state	
Knowledge Portal	Cross-university team created website to describe the project and present EM Data Infrastructure, case studies, and training materials	
Evaluation Team	Cross-university team designed the assessment tasks from observation of activities, documentation of outputs, development and implementation of surveys and debriefing discussions.	

## Assessment Methods to Evaluate the Three Bodies of Work

A logic model was developed to evaluate and guide the progress of the project as it unfolded across the three bodies of work (see Exhibit 3). A logic model identifies the objectives, inputs, activities, outputs and outcomes planned to achieve a project's goals. It helps to conceptualize the expected change, as well as plan, implement, and evaluate a project,<sup>5 6</sup>. Our logic model focused on the following activities, which reflect the organization of the project and the foci of the cross-university teams:

1. **CLD3 Economic Mobility Projects:** Executing economic mobility projects in Iowa, Oregon, Virginia through Data Science for the Public Good project teams.
2. **Economic Mobility Infrastructure:** Creating community snapshots and data products to support projects and teams in the short run and to support CES in the longer run.
3. **CES Engagement and Training:** Planning, Training, and Direct Engagement with CES.
4. **Knowledge Portal:** Developing the knowledge portal to disseminate the economic mobility research, CES training videos, and to capture foundational materials useful for scaling to a national CLD3 network for advancing economic mobility.

<sup>5</sup> McLaughlin, J. A., & Jordan, G. B. (2004). Using logic models. Handbook of practical program evaluation, 2, 7-32.

<sup>6</sup> Bill & Melinda Gates Foundation (BMGF). (2010). A Guide to Actionable Measurement. <https://docs.gatesfoundation.org/documents/guide-to-actionable-measurement.pdf>. This guide proposes creating an Actional Measurement Matrix, another name for the Logic Model.

<b>Exhibit 3. Logic Model: Towards a Community Learning Network to Advance Economic Mobility</b>			
<b>Objectives</b>	1) Develop a rural community-based research culture around advancing economic mobility across Iowa, Oregon, Virginia	2) Empower the CES to serve as an effective distribution channel to help advance rural mobility <ul style="list-style-type: none"> <li>• CES training</li> <li>• Knowledge Portal</li> </ul>	3) Evaluate the feasibility of instantiating CES as a distribution channel to advance economic mobility
<b>Inputs</b>	<ul style="list-style-type: none"> <li>• DSPG project teams</li> <li>• CLD3</li> <li>• CES</li> <li>• Public and Land-grant universities</li> </ul>	<ul style="list-style-type: none"> <li>• Timeline and plans:</li> <li>• CES Engagement</li> <li>• CES Training</li> <li>• Knowledge portal</li> </ul>	<ul style="list-style-type: none"> <li>• Logic model</li> <li>• Baseline and Post-Surveys</li> <li>• Debriefing discussions</li> <li>• National Advisory Panel charter and membership</li> </ul>
<b>Activities</b>	<ul style="list-style-type: none"> <li>• Conduct economic mobility projects in local communities via CLD3 project teams</li> <li>• Compare Iowa, Oregon, and Virginia guided by Chetty et al.'s Opportunity Atlas and 2020 Economic Tracker</li> <li>• Review Urban Institute economic mobility indices</li> <li>• Chose Community Capitals Framework to create indices to align with rural assets</li> </ul>	<ul style="list-style-type: none"> <li>• CES outreach to seek economic mobility projects</li> <li>• CES training</li> <li>• Knowledge portal requirements and implementation</li> </ul>	<ul style="list-style-type: none"> <li>• Created and implemented</li> <li>• Logic model</li> <li>• Baseline and Post-Surveys</li> <li>• Debriefing discussions</li> <li>• Observations of process</li> <li>• 3 National Advisory Panel meetings</li> </ul>
<b>Outputs</b>	<ul style="list-style-type: none"> <li>• Advancing Economic Mobility CLD3 case studies</li> <li>• Three-State Comparison</li> <li>• Economic Mobility Data Infrastructure using Community Capitals Framework</li> </ul>	<ul style="list-style-type: none"> <li>• Outreach presentations</li> <li>• Training videos and presentations</li> <li>• Knowledge portal</li> </ul>	<ul style="list-style-type: none"> <li>• Quarterly reports to sponsor</li> <li>• Survey data</li> <li>• Interview notes</li> <li>• Process observations</li> <li>• National Advisory Panel recommendations</li> </ul>
<b>Outcomes</b>	<ul style="list-style-type: none"> <li>• Case study summaries</li> <li>• Analysis of demographic and other trends across the three states</li> <li>• County-level composite indicators using Community Capitals Framework</li> </ul>	<ul style="list-style-type: none"> <li>• CES learn about:</li> <li>• Community Learning through Data Driven Discovery</li> <li>• Examples of projects</li> </ul>	<ul style="list-style-type: none"> <li>• Evaluation report</li> </ul>

An Evaluation Team for this assessment was formed. The team included membership from each university and was led by the University of Virginia. The Evaluation Team completed the University of Virginia Institutional Review Process (IRB) for the evaluation (IRB 3474). We observed and documented the activities and outputs associated with setting up the overall Three-State Community Learning Network infrastructure (leadership, CES engagement and training, seeking project ideas and forming project teams, creation of the Economic Mobility Data Infrastructure, documenting and showcasing work via a knowledge portal, and establishing and meeting with a National Advisory Panel).

The Evaluation Team developed and implemented two surveys and conducted debriefing discussions to seek CES and stakeholder input.

The **Baseline Partner Survey** was conducted in the early weeks of the DSPG Young Scholars programs. It primarily focused on CES professionals and stakeholders<sup>7</sup> interest and experience in using data and their CLD3 project goals. The specific topics covered were:

- Goals and expectations for DSPG project and whether goals were met
- Confidence goals will be met
- Methods used to seek inputs, data, and other information from stakeholders
- Use of data in current work
- Comfort working with data
- Expected uses of data and data-driven insights in work

The **Post Project Partner Survey** was conducted after the DSPG Young Scholars program ended and focused on CES and stakeholder interest and experience with data, their satisfaction with the progress toward the goals of the CLD3 project including economic mobility data insights, and future intentions to use data science in their work. The specific topics covered include:

- Satisfaction/Dissatisfaction with DSPG project
- Original goals for DSPG project and whether goals were met
- Project outputs usefulness
- Planned uses of project outputs
- Additional training needed
- Process for working with community effectiveness
- Surprises about working with the communities and/or other stakeholders in conjunction with the project team
- Methods used to seek inputs, data, and other information from stakeholders
- Use of data in current work

The Evaluation Team conducted **debriefing discussions** with CES, stakeholders, and selected CLD3 project faculty at the universities after the DSPG summer program to seek their overall thoughts about their CLD3 project, their interactions with the university members of the CLD3 project team, what worked well, the challenges they faced, surprises they did not anticipate, how they will use CLD3 project outputs, recommendations, and familiarity with the Community Capitals Framework and Economic Mobility Data Infrastructure that had been implemented by the time the discussions were held. The specific topics covered include:

- Role of the interview
- Perspectives on the project - What went well? Were there any surprises? What challenges were there (if any)?
- Stakeholder and CES involvement in project
- Student-Faculty interactions
- Methods used to seek inputs, data, and other information from stakeholders
- Use of local data
- Planned uses of project outputs
- Additional training needed
- Next steps needed
- Recommended changes to the program

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<sup>7</sup> For the purposes of the survey and IRB terminology, all respondents (CES, community members, selected project faculty, and other stakeholders) were referred to as “partners.”

- Familiarity with Community Capital Framework
- Feedback on Economic Mobility Data Infrastructure

## **A Review of Activities and Outputs to Accomplish Objectives**

This part of the report assesses the three bodies of work put forward to demonstrate that the CES is an effective existing network that can be leveraged for the development and dissemination of community-driven, data science-based approaches for advancing economic mobility.

### **1. Developed a rural community-based research culture around advancing understanding of economic mobility across Virginia, Iowa, and Oregon**

*Expected outcome:* In partnership with CES, academics, and community leaders, capture and evaluate community economic mobility measures in Community Snapshots and conduct initial fast-paced research projects to support advancing economic mobility. The planned outputs to achieve this included the creation of Community Snapshots and Pathways and Barriers to Economic Mobility report, both informed by the communities, experts, and the Economic Mobility Data Infrastructure team. Three products were produced that incorporate the concepts proposed in the planned outputs.

- ✓ Advancing Economic Mobility CLD3 case studies - <https://datascienceforthepublicgood.org/economic-mobility/community-insights/em-data-infrastructure>
- ✓ Three-State Comparison – <https://uva-bi-sdad.github.io/three-state-comparison> (link is on the *Community Insights* page)
- ✓ Economic Mobility Data Infrastructure - <https://datascienceforthepublicgood.org/economic-mobility/community-insights/em-data-infrastructure>

#### **Advancing Economic Mobility CLD3 case studies.**

The Economic Mobility CLD3 projects were conducted between May-August 2020. The outputs from the 17 Economic Mobility CLD3 projects covered a wide-range of projects, including two directly identified as related to the effects of COVID-19 on the community and 15 others that focused on local issues. One CES professional noted, “*The most surprising thing was just how similar the issues were across communities: how to promote economic development, intergenerational poverty, retaining population, maintaining, and improving human capital. These overarching themes seemed to unite all the counties across the urban-rural continuum.*”

Many of the project outputs will prepare communities to recover from COVID-19 and others will contribute to economic vitality and hence mobility. Other projects created a baseline for communities that they can use to apply for grants or seek local, state, and federal resources to create change. Each project produced a website or dashboard to document the work, including methods used, data sources, maps created, and analyses conducted (see <https://datascienceforthepublicgood.org/economic-mobility/community-insights/case-studies>).

A few projects have already produced changes in policy and practice, notable given the short timeframe. For example, in Patrick County, VA, the project team worked with the community to identify their social determinants of health related to access to healthy lifestyle choices and medical care. The findings are being used to implement telehealth services at the rescue squad stations in Patrick County and the analytic research is being extended to counties across Southwest Virginia to create a similar data-driven

baseline. The CLD3 process is designed for continuous learning. Projects do not end or complete but continue iteratively through the CLD3 process.

In Oregon, the CES professionals worked with the produce-growing community to develop a dashboard to monitor water quality. The US Food and Drug Administration learned about the dashboard and the team is now expanding this to a national dashboard covering all states. The livelihood and economic mobility of produce growers depends on meeting federal standards, so the uptake of this is important.

In Iowa, the call volume for the state's helplines increased over 1000% because of COVID-19. The hotlines are run and maintained by CES professionals. The CLD3 project teams worked together to develop tools and programs to capture customer service data and automatically generate reports at the end of each day and week that included a summary of the types of calls (using sentiment analysis) as well as automated the tabulation of the numbers and types of calls (previously done by hand). The outcome of this work improved the management of the hotline, allowing hotline workers more time helping Iowa residents who call in and less time filling out paperwork. For another project, they web scraped all peer support recovery programs in the state and put this information together in one tool so users could choose a day and time of day to access services. The state funded the team to move this tool forward.

### **Three-State Comparison**

This is a descriptive comparison across Iowa, Oregon, and Virginia guided by Opportunity Insights' Opportunity Atlas and their 2020 Economic Tracker.<sup>8</sup> The description uses Raj Chetty's<sup>9</sup> five core neighborhood characteristics that correlate with economic mobility – these include less residential segregation, less income inequality, greater social capital, greater family stability, and high-quality primary school education. The description is useful in providing a comparison across the states using the five core neighborhood characteristics as the common denominator. This analysis provided a starting point for the conceptual development of the Economic Mobility Data Infrastructure functionality (see <https://uva-bi-sdad.github.io/three-state-comparison/> – link is on the Community Insights page).

### **Economic Mobility Data Infrastructure**

The Economic Mobility Data Infrastructure team first examined the Urban Institute's The Mobility Metrics Working Group.<sup>10</sup> These indicators moved the focus from individual to community economic mobility with a focus on three areas: (1) strong and healthy families, (2) supportive communities, and (3) opportunities to earn and learn. However, the Urban Institutes framework is oriented towards urban environments and seems strained when trying to apply it to rural areas. Consequently, the team researched alternatives and ultimately chose to use the Community Capitals Framework,<sup>11</sup> which identifies seven assets that make rural areas successful and also works in urban areas. These assets are financial, human, natural, social, cultural, political, and built capitals. The Community Capitals Framework provides a way to understand and focus these attributes and how they spiral up to create new opportunities. The framework was developed by CES professionals and is widely used by CES and

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<sup>8</sup> See <https://opportunityinsights.org/>

<sup>9</sup> Chetty, R., Hendren, N., Kline, P., & Saez, E. (2014). Where is the land of opportunity? The geography of intergenerational mobility in the United States. *The Quarterly Journal of Economics*, 129(4), 1553-1623.

<sup>10</sup> See <https://www.urban.org/policy-centers/research-action-lab/projects/boosting-upward-mobility-poverty/mobility-metrics-working-group>

<sup>11</sup> Flora, C. B., Flora, J. L., & Gasteyer, S. P. (2016). *Rural communities: legacy and change*. Fifth edition. Boulder, CO: Westview Press.

scholars to assess and understand rural places. Stakeholders noted that the Community Capitals can also be used to define Recovery Ready Communities (<https://uva-bi-sdad.github.io/three-state-comparison/>).

The Community Capitals Framework supports understanding community change from a systems perspective by identifying a community's assets in each capital and the types of capital a community has invested in. Although the framework defines assets through qualitative indicators, by marrying the framework to data science insights we were able to support the development of quantitative indicators. The framework provided a taxonomy, which guided the creation of multiple composite indices for each capital. The construction of each index followed a systematic process informed by the CES and described on the website. For example, Financial Capital is composed of five indexes, each selected to represent domains of rural financial life, including commerce, agriculture, economic (industry) diversification, well-being, and employment.

CES and stakeholders are familiar with the Community Capitals Framework, noting that the framework is, *"an excellent lens through which to view rural community assets,"* and it will be, *"helpful in our smaller communities to be able to use the framework as a metric for comparison to other communities."*

### **Summary**

The Economic Mobility CLD3 case studies and Economic Mobility Data Infrastructure provide specific examples of how this initiative has accelerated development of a rural community-based research culture by facilitating CES CLD3 outreach to rural communities.

- CES and stakeholders were enthusiastic about the use of the Community Capitals Framework:
- One CES agent said that she is, *"excited to see the Community Capitals Framework [used],"* and that she has used it before, finding it helpful for communicating about complex subjects such as social determinants of health and racial injustice.
- A stakeholder stated that, *"Taking an asset-based approach is brilliant and right on for what we need to do here to focus on our natural and cultural capital to address food insecurity."*
- Another said that *"the info will be useful at the start of projects to help introduce students to the state and walking them through unique demographic and cultural makeup of the state and its different regions and/or rural areas."*
- Yet another said it is, *"an excellent framework to conceptualize work."*

Recognizing this is a pilot infrastructure, suggestions for future iterations of the Economic Mobility Data Infrastructure are provided:

- Rural counties can be very large, particularly in western states, and county averages may not reflect the diversity of the county nor adequately capture the distribution of resources across subcounty geographic areas. More geographic detail showing a distribution of assets at the subcounty level will be useful.
- Create indicators to summarize challenges, not just assets, e.g., not just proximity to child care *but* length of wait lists, not just proximity to grocery stores that accept WIC and SNAP benefits *but* also hours the stores are open.
- The focus is on social, demographic, and economic data, but there is also a need to provide local data relevant to specific communities being served, e.g., water quality, air quality, regulations. One community stakeholder indicated, *"I would like to be able to combine the data with more environmental and health data (e.g., flood risk, land use, wildlife, COVID risk) and do some math"*

*myself.*” Others said they would like to be able to add in their local data and to compare across areas.

## **2. Empowered CES to serve as a distribution channel to advance understanding of economic mobility**

*Expected outcome:* Train and build capacity of CES professionals to facilitate data science-driven CLD3 and deploy resources to support CES and community learning networks around economic mobility. The planned outputs included the creation of CES training modules usable for a variety of delivery methods, e.g., in-person, webinars, podcasts, and engagement through planned meetings and one-on-one interactions.

CES engagement and training began in January with presentations at CES meetings on campuses and throughout the states. By March, COVID-19 had changed in-person presentations to online presentations. One advantage of virtual/online engagement and training is that transportation to and from remote areas was no longer a deterrent to attending meetings; more CES and stakeholders could and did participate.

The Three-State Community Learning Network introduced the CLD3 process to the CES in the Spring through a mix of one-on-one training, presentations, and workshops. They developed curriculum around CLD3, data discovery, and data science literacy

### **Virginia Cooperative Extension (VCE) Engagement and Training**

In Virginia, the team engaged with VCE through their semi-annual conference in January 2020, their First Friday monthly discussion in March, a state-wide meeting with the CES professionals planning to participate on CLD3 project teams, and through individual meetings with each of the CLD3 project teams in the field during the Spring. At the January and First Friday meetings, the CLD3 process was introduced, a description of how it aligns with the VCE programming model presented, and the role of data discovery along with two to three examples provided. The presenters encouraged VCE professionals to share project ideas and volunteer to work with stakeholders and university faculty and students to implement a CLD3 project. The follow-up meetings (described in more detail below) with the CLD3 teams and VCE professionals included sharing more information about the process. An excerpt from this information sharing follows:

Developing Community Snapshots and initiating a collection of rural economic mobility research projects is not enough to fully activate the CES network as a key distribution channel for infusing data science into local communities to advance economic mobility. To make this work, we need to equip CES with new skills, specifically training on the CLD3 process and data science literacy. This will enable CES to take a more data-centric community-based research role and empower local leaders to begin to address community problems that they simply cannot effectively do without deep local data insights.

Additionally, through this pilot we have the opportunity to motivate CES to focus specifically on issues around economic mobility in their communities and to instantiate their data science activities around the research problem areas described above, versus say, precision agriculture, fisheries and forests, etc. We will also need to create an



integrated set of resources to support CES in their development and dissemination of data, tools, and best practices.

During the Spring, CES submitted 12 project ideas, and the VCE-lead selected eight. In April, the VCE project liaisons were asked about their data science (training) needs. In May, the VCE-lead, with input from University of Virginia, presented a Data Discovery overview webinar with the eight project liaisons for each project team. In June, individual project team data discovery sessions were held. During the summer, the VCE-lead stayed in touch with the VCE project liaisons participating in projects and conducted debriefing discussions with them when the projects ended. In the fall, the VCE-lead set up four webinars, invited CES, stakeholders, and faculty across Virginia, and had two project teams present each time. These were attended by about 25 attendees, primarily CES professionals, each time.

#### **Summary VCE Engagement and Training**

- ✓ CLD3 introduction to VCE – January 2020
- ✓ VCE First Friday discussion – March 2020
- ✓ VCE Data Science Needs Assessment - April 2020
- ✓ VCE Data Discovery Overview - May 2020
- ✓ VCE Project Team Data Discovery Workshops - June 2020
- ✓ VCE CLD3 Project Debriefings - August 2020
- ✓ VCE CLD3 project Webinars– October – November 2020
- ✓ Community Catalyst Training Series for CES October-December 2020

#### **Iowa State University Extension and Outreach (E&O) Engagement and Training**

Like Virginia, the Iowa team introduced the CLD3 process and request for economic mobility projects at the Iowa Extension and Outreach semi-annual conference on January 15, 2020. They also met with external stakeholders, such as the Iowa League of Cities and had many one-on-one meetings with CES professionals at the university. At the end of February, they advertised and presented a webinar on why CES professionals should champion a summer project and how to apply. The team identified potential CES professionals to work with in developing project proposals. They interviewed and discussed projects with seven CES professionals who submitted a proposal to participate.. By the end of March, plans changed due to the COVID-19 stay-at-home orders. Iowa switched their model to work with CES professionals on campus versus in the field and to focus on state-wide projects with the goal to build an on-campus Extension & Outreach data science culture. They engaged with CES professionals through data science training events and participation in CLD3 projects.

#### **Summary Iowa State University (E&O) Engagement and Training**

- ✓ CLD3 introduction to Iowa Extension & Outreach (E&O)– January – February 2020
- ✓ One-on-one discussions with Iowa Extension & Outreach– February-March 2020
- ✓ Data Discovery Overview to Iowa CES - May 2020
- ✓ CLD3 Project Debriefing - August 2020
- ✓ CLD3: Data Discovery Workshop–October 2020.
- ✓ Community Catalyst Training Series for CES October-December 2020

#### **Oregon Extension Engagement and Training**

In Oregon, outreach and project recruitment and training was done one-on-one with faculty (both those with and without CES appointments) and OSU CES professionals in the field. They were able to connect

with faculty in the spring so they knew they'd be working on Economic Mobility projects, and were therefore able to start coordinating early. Oregon also engaged with CES at the state, regional, and national levels through conferences, meetings, and one-on-one. Oregon prepared many of the training materials and videos that are shared on the Economic Mobility Website, providing reach to the three states and beyond. They implemented the Community Catalyst Training Series, described below.

### **Community Catalyst Learning Ecosystem for CES Professionals**

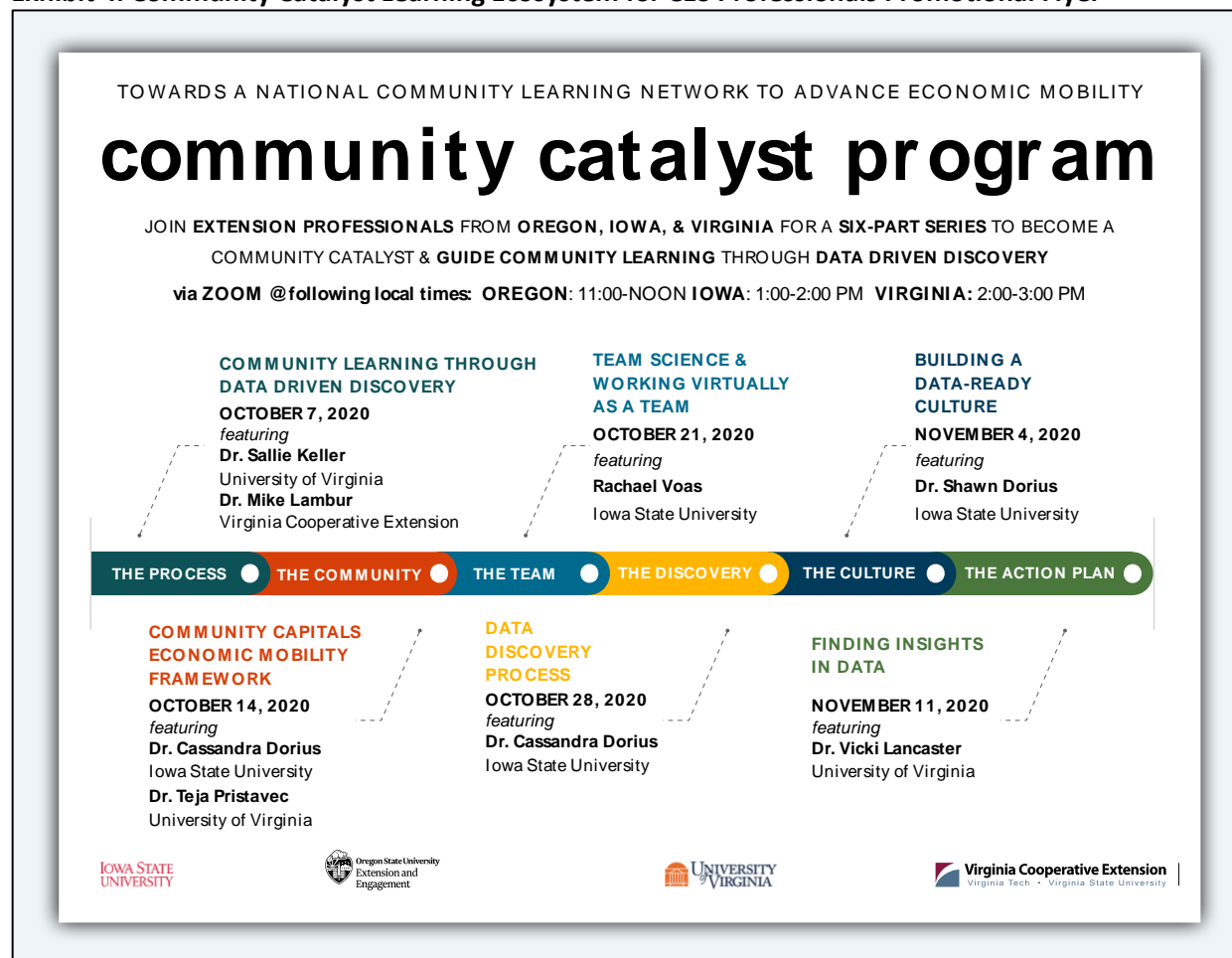
CES professionals indicated a desire for more training around the CLD3 process. Based on this feedback, the cross-university CES Engagement and Training team conceived the idea to create the Community Catalyst Learning Ecosystem for CES Professionals and to present it nationally to CES and others interested in the CLD3 process (see Exhibit 4).

The goal for the training is to build momentum and educational assets for online, self-paced training. The team developed and held six training sessions between October and December 2020. Each session was attended by 75 to 135 people from across the United States and territories with many more registering for the sessions so they could watch the training later.

The Community Catalyst Learning Ecosystem for CES Professionals sessions covered the following topics (see <https://datascienceforthepublicgood.org/economic-mobility/training>):

- The Process: Community Learning Through Data-Driven Discovery
- The Community: Community Capitals Economic Mobility Framework
- The Team: Team Science and Working Virtually as a Team
- The Discovery: Data Discovery Process
- The Culture: Building a Data Ready Culture
- The Action Plan: Finding Insights in Data

#### Exhibit 4. Community Catalyst Learning Ecosystem for CES Professionals Promotional Flyer



#### Summary

The Three-State Community Learning Network engaged and trained CES professional to implement the CLD3 process and to develop core competencies around data-informed problem solving. The training provided project examples to teach concepts, such as problem identification, data discovery, and incorporating ethical decision-making into the CLD3 process. It also introduced team science and the challenges of working virtually as a team, creating a data ready culture, and finding insights in the data. As one CES professional noted: *"To have someone come in without a stake in the game, outside of the community, this helps a lot with reading data."*

#### 3. Demonstrated CES as an effective distribution channel for advancing understanding of economic mobility

*Expected outcome:* Evaluation of the pilot program instantiating a three-state community learning network (Virginia, Iowa, and Oregon) capable of bringing together communities, CES, and university partners to deploy the CLD3 process in rural decision-making around issues of economic mobility and opportunity.

## **Evaluation Limitations**

This is a process evaluation that focuses on implementation of activities and outputs to measure action and progress towards a goal. The evaluation reflects one year of program implementation. The pilot project objectives were met in terms of activities, outputs, and some short-run outcomes. However, it is too soon to evaluate longer term outcomes and impact.

Surveys are valuable for seeking feedback in a systematic way but often face poor response rates. The Partners Baseline Survey had 18 respondents and the Post Project Partners Survey had 19 respondents out of 53 sent the survey. We supplemented the survey process with 21 debriefing discussions with CES professionals, stakeholders, and university faculty. The issues raised in the discussions were consistent with the survey results and provided context. There were 27 unique respondents: 5 who responded to both surveys and the request for a debriefing discussion; 15 who responded to two out of three data collection modes; and 7 who responded to one of the three data collection modes.

## **Evaluation**

Based on input from CES and stakeholders described above, we focused on addressing the following questions:

- What is their level of satisfaction with the program overall and economic mobility projects specifically?
- What is their experience and comfort using data?
- What worked well? What challenges and surprises occurred?
- What are their future intentions to adopt the CDL3 process?
- What other evidence supports creating a CES to deploy the CLD3 process in rural decision-making around issues of economic mobility and opportunity?

### ***What is their level of satisfaction with the program overall and economic mobility projects specifically? What worked well? What were challenges?***

Overall satisfaction, summarized in Exhibit 5, was high (89% very satisfied or satisfied). Of those very satisfied, they highlighted the usefulness of the data, especially learning about new data sources, and the creation of data tools and new perspectives to support their goals. The satisfied group focused on the use of the data to provide data insights to stakeholders. One CES professional said that the data and statistical orientation of the project and the use of data to provide evidence and incorporating the community into the problem solving were positives. Overall, most stakeholders were enthusiastic in their satisfaction.

<b>Exhibit 5. Satisfaction Summary</b>		
<b>Satisfaction</b>	<b>Percent</b>	<b>Quotes</b>
Very Satisfied	42%	<i>"(I was) surprised to see how much publicly available local information was available in many of these communities."</i>
Satisfied	47%	<i>"The program was a success. We would like to continue working with the team if there is an avenue to do this. We have funding to continue this work."</i>
Not satisfied	11%	<i>"After the initial stakeholder Zoom meeting, there was little follow up from the students or the faculty guides about student progress or direction."</i>

The dissatisfied group said that they anticipated more collaboration with the faculty and students and noted that after initial meetings, there was little to no follow-up. Challenges mentioned across groups were the constraints imposed by the pandemic, scheduling, and interactions. Others would have liked an overview of the program, including expected deliverables and frequency of interactions, at the outset.

Most (80%) said that the process of working with the communities and/or other stakeholders to inform the project work was effective in taking, *“conversations to another level that helped develop better strategies.”* Many noted that more interactions across the CES, university faculty and students, and stakeholders would have been useful. This was a recurring theme, highlighting the need for more training about team interactions and establishing expectations in coordination and frequency of interactions.

At the beginning, CES and stakeholder goals reported can be categorized into three broad categories: (1) finding new data sources to improve work; (2) finding data to support current projects; and (3) establishing relationships through data. At the end of the project, their goals sharpened and evolved as their experiences with the data-driven learning process evolved. The goals included seeking information to improve their community’s access to services, (e.g., health care, food access), changing the role of CES in working with county government, and contributing to policymaking.

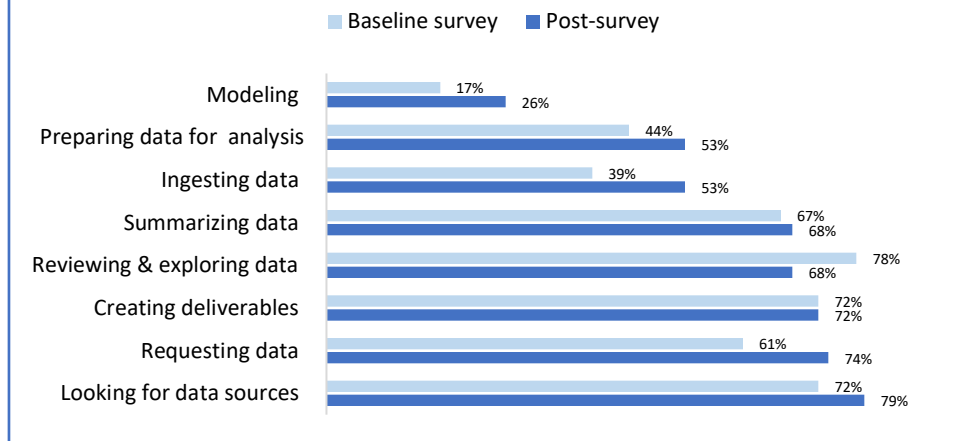
When asked how communities would use the data, the answers focused on improving the quality of life, noting that, *“community partners are hungry for good data, particularly about health and social determinants of health,”* as well as, *“to apply for grants to end the cycle of poverty”* and *“to conduct scenario analysis.”* CES said that they would present the data products to stakeholders, funders, and their county Board of Supervisors, and to apply for grants. Another said that presenting the results visually allowed them to understand complex data at multiple scales. A recommendation made is to provide training on how to use some of the state level databases and to determine how statistically reliable they are at the county level (particularly for counties with low population density). About 40% said more training would be helpful to use the data products.

#### ***What is their experience and comfort using data?***

CES and Stakeholders are comfortable in looking for and requesting data and using it to create deliverables. They are also comfortable in reviewing, exploring, and summarizing data. There are opportunities for expanding skills to ingest, prepare data for analysis, and modeling (see Exhibit 6).

The methods that CES used to seek input, data, and information from communities and stakeholders included one-on-one conversations, email, small group meetings, focus groups, open-source data, strategic plans, and Community Health Plans. In their current work, data are used in varying amounts depending on the type of decision-making (see Exhibit 7 in Future Intentions section below).

## Exhibit 6. CES and Stakeholder Comfort Engaging with Data



Source: 2020 Partners Pre (Baseline) and Post Surveys – Frequency of Using Methods  
(Number of Respondents: 18 for Baseline Survey, 19 for Post-survey, out of 53)

In the baseline survey, CES professionals and stakeholders were motivated to use data to improve project outcomes. They reported interest in following activities:

- “Learn where to find new data sources”
- “To acquire data that is useful in identifying indicators”
- “Comparing data from similar areas in the US
- “To have fresh eyes to find data”
- “Be able to ... crunch data into something that is palatable”
- “Helping our coalition group with current projects”
- “Find data to shed light on root causes”
- “Illustrate a new means of evaluating current plans”
- “Find data to support financial backing for solutions”
- “Communicate our findings to various stakeholders”

These motivations were supported in what they reported in the post project survey. These motivations also informed the development of the Community Catalyst Training modules.

### ***What worked well? What challenges and surprises occurred?***

Surprises were mostly positive in that the partners were pleased that CLD3 economic mobility projects continued despite COVID. Many also said that the faculty and students did well addressing the concerns of diverse stakeholders, finding new information to address the communities’ needs, and making new connections with stakeholders. As noted above, there was also surprise with how similar the issues were across communities.

CES professionals and stakeholders reported in the baseline survey that:

- *“I liked that our project was very grounded in a stakeholder need. The project will continue to make a real difference in a rural community.”*
- *“...it will help show where gaps exist that communities can work to fill...”*
- *“It was great. I do wish there was more time for community interaction...”*

- *“The website (EM Data Infrastructure) will be very helpful to finding resources. There is nothing currently available like that in the state.”*
- *“There is a great deal that other local communities can learn from these projects.”*

CES professionals and stakeholders reported in the post project survey and debriefing discussions:

- *“Working with the team was wonderful” and “(we were) thrilled to be able to hone in on economic mobility in this area.”*
- *“This experience has been amazing. I have so many new ideas for other projects. My only struggle is that I personally don’t have these skills, so I will still need support or training to be able to continue this type of work for future projects.”*
- *“We now have proof of what we have seen in the community.”*
- *“I think I learned how powerful data is in telling a story, I wish I could use more data in my work especially in areas I don’t have expertise.”*

There were also challenges with some project teams. One stakeholder noted that the CLD3 project team was, *“challenged to understand the value of relating to the communities initially, some seemed to increase their ability to do this,”* over the course of the project. The challenges highlight the need to establish expectations for coordination and communication across the CLD3 project team (university members, CES, and stakeholders). Other challenges related to finding data at the geographical level (e.g., subcounty) needed to inform the issues; defining clear questions that would address or inform the stakeholder’s issues; and a desire to continue to work with the university faculty and students but uncertainty about how to make this happen.

For others, the logistics of the interactions were not clear to the university faculty and students. Some attributed this to COVID-19.

- *“Due to the constraints of COVID, the team was not able to meet in person with the various stakeholders. I believe this impacted the relationship needed to gather data efficiently and effectively.”*
- *“My role was pretty minimal over this summer, but I did get to listen and ask questions at the end of the summer event/presentations.”*

Communication is crucial for coordinating multi-state and multi-organizational teams. In some cases, activities occurred in parallel between states and universities, which allowed for greater flexibility in scheduling. In conjunction with building evaluation into regular program activities, a schedule for participants to provide feedback – whether that is via weekly meetings, pre- and post-surveys, and post-project debriefings – should also be included to help ensure sufficient information is provided to make adjustment during the program and to provide a summary evaluation of the program when milestones are reached.

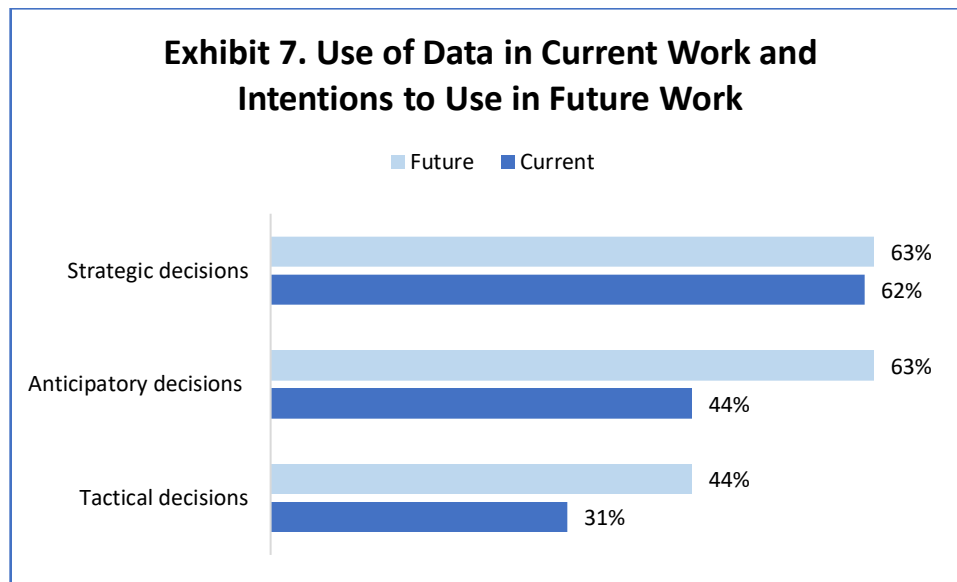
#### ***What are their future intentions to adopt the CDL3 process?***

CLD3 adoption is tightly linked to the willingness to embrace data. Thinking about the future, two-thirds plan to use data for every strategic and anticipatory decision. Almost half plan to use data for some current or tactical decisions but not all. They plan to use data more often for future decision-making when compared to their current work (see Exhibit 7). A CES professional noted ::

*“[This experience helped remind me to ground our community work in data driven decision making and ensure that we are using data to guide our work. Data will also allow us to*

*show greater impacts of our work because we can compare baseline data to intermittent check points. As I have noted before, I will be working through the website to learn more and would anticipate using that data as I am able.”*

CES and stakeholders highlighted the power of data in telling a story and, “*the importance of incorporating both quantitative and qualitative data in working to help communities make decisions.*” There is interest in learning new ideas to present data using graphs, tables, and figures in compelling ways. Many indicated they would like training to improve their analytic skills.



Source: 2020 Post Project Partners Survey– Current Work and Future Intentions  
(Number of respondents: 19 out of 53)

**What other evidence supports creating a CES to deploy the CLD3 process in rural decision-making around issues of economic mobility and opportunity**

Other evidence provides support that the program met its goals:

- (1) media and other interest in the program, and
- (2) steps towards sustainability.

***Media and other interest in the program***

The program received publicity from university and local press and non-profit organizations. These articles provide summaries of the program and details about program initiation, implementation, training, and accomplishments. (See selected publications <https://datascienceforthepublicgood.org/economic-mobility/training>; others are listed in the Appendix.)

One of the University of Virginia CLD3 project team leads, collaborating with Virginia Cooperative Extension, received an eXtension New Technologies for Agricultural Extension (NTAE) grant to extend their research on “Community Learning Through Data Driven Discovery: Barriers to Rural Health” to southwestern Virginia. Awardees are expected “to explore new methods & models for program scale & implementation.” They are expected to share outcomes and learnings of their work with CES



professionals and receive professional development centered upon these topics and models (<https://impact.extension.org/ntae/> )

The Iowa team media included local and state stories about CES and faculty participation highlighting the CLD3 and data discovery process in the context of the Iowa Economic Mobility projects. They also participated in National Data for Good Program Organizer Network Meeting, to the Iowa Department of Public Health, and Iowa State Day at the Capital. The Iowa University News highlighted the four CLD3 projects and how they translated their data into action to advance and enhance CES activities in Iowa.

The Oregon CES lead engaged the Three-State Community Learning Network with the national organization, eXtension, resulting in an invitation to participate in their National Action Dialogue – Extension Futures event (<https://impact.extension.org/2020/08/national-action-dialogue-extension-futures-summary-report/> ) and documented in their report. The “National Community Learning Network” is one of the five topics discussed through a series of breakout sessions with CES professionals from across the country. Key findings focus on the use of rapidly increasing amounts of data that can be used to inform decision-making; the role for CES to build community capacity to acquire, evaluate, and use these data to make better decisions at the local level; how to make sense of data and to use it as a guide, not something that automatically makes decisions that involve the well-being of the community and people in the community; and training CES to use data in an engaging way leading to positive community changes.

### ***Program Sustainability***

The National Advisory Panel was established in Fall 2019 for three years to provide advice about program sustainability. Membership includes representatives from the Association of Public and Land Grant Universities (APLU), CES and other leadership at the four Land Grant Universities in Oregon, Iowa, and Virginia, organizations that represent cities and counties, and others interested in the CLD3 program. The Panel is led by a former undersecretary for USDA’s Research, Education, and Economics mission area that oversaw Extension at USDA. (See <https://datascienceforthepublicgood.org/economic-mobility/about>).

The National Advisory Panel has noted great enthusiasm and interest for this program beyond the three states and five universities that participated in this pilot. To move the program forward, a comprehensive plan to create a long-term, sustainable program is necessary. One means to this end is to incorporate language into the 2023 Farm Bill to solidify the CES role as a vehicle for delivering data science to rural communities.

Three meetings were held during 2020 (April 30, August 25, and November 10). At these meetings, the National Advisory Panel provided ideas, recommendations, and contacts to develop an external communication plan. This has also led to discussions with APLU’s ECOP (Extension Committee on Organization and Policy) and the APLU-CLP (Committee on Legislation and Policy). The APLU-ECOP and CLP are now engaged in advancing the vision and to instantiate a data-science CES into the 2023 Farm Bill.

### **Conclusions**

**Can the Cooperative Extension System serve as a key distribution channel for infusing data science into local communities to advance economic mobility?** In a pre-pandemic world, it would have been no small feat to organize and execute a three-state pilot project involving five universities and hundreds of

CES professionals, university faculty and staff members, graduate and undergraduate students, and residents from some of the most rural and underserved communities in the United States. To have done so virtually, during a global pandemic, answers this question with an emphatic, “Yes.” It also demonstrates that the underlying process, Community Learning through Data Driven Discovery, is an effective strategy for achieving this goal. As documented in this report and summarized in Exhibit 8, the National Community Learning team completed the three bodies of work producing outputs and outcomes that demonstrate this.

<b>Exhibit 8: Tasks, Activities Completed, and Outputs</b>		
<b>Tasks</b>	<b>Activities Completed</b>	<b>Outputs</b>
<b>National Advisory Panel</b>	Meetings: April 30, August 26, and November 20, 2020 Engagement with APLU’s ECOP (Extension Committee on Organization and Policy) and the APLU-CLP (Committee on Legislation and Policy) to advance a data-science CES in the 2023 Farm Bill	Invitations; charge for 3-year term; roster of members, agendas. Presentations, meeting summaries, communications plan and vision statement shared with APLU-ECOP and APLU-CLP.
<b>Economic Mobility Community Insights and Knowledge Portal</b>	Soft launch – June 2020; Community Capitals Framework adopted – July 2020 Launched Economic Mobility Data Infrastructure – Sep 2020; Final version – Dec.2020	Towards a National Learning Community Learning Network and video Community Capitals Framework: Three-state comparison Composite indices and underlying data for 7 capitals assets Economic Mobility data infrastructure
<b>COVID-19 Impact on Communities</b>	Data Insights (Interactive data tools) for Virginia and Iowa	Impact on Virginia High School Seniors & College Students (Virginia, Iowa) Connectivity Infrastructure as Barrier to Remote Work, Education & Mental Health Care (Virginia, Iowa, Oregon)
<b>CES Engagement Strategy</b>	Community Catalysts 6-part CES training series and self-paced interactive training CLD3 & Data Discovery Workshops at Cooperative Extension meetings APLU-ECOP showcased CLD3- the future for CES	CLD3 Workshops with CES across 3 states - 30+ presentations from May 2020-Feb. 2021. National Action Dialogue - July 13 & 14, 2020 Community Catalyst Webinars: Oct. 7-Dec. 2, 2020
<b>Economic Mobility Projects</b>	15 Economic Mobility case studies with CES involvement across Iowa, Oregon, Virginia	Symposiums held on August 7 & 21, 2020
<b>Media</b>	Videos, tweets, interviews, news articles	National Community Learning Network video; tweets, interviews, 30+ news articles, presentations and recordings
<b>Recognition</b>	CES eXtension New Technologies for Agriculture (NTAE) selected CLD3 as 1 of 8 projects for acceleration mentoring	Proposal accepted - Community Learning Through Data Driven Discovery: Barriers to Rural Health in Southwest Virginia
<b>Research Outputs</b>	Documented Economic Mobility project outputs in other venues.	Sage MethodSpace Economic Mobility Project Briefs (to be published Spring 2021) 21 data science task sheets available on the Iowa State University Extension and Outreach Publication Store
<b>Evaluation</b>	Baseline and Post-Project Surveys, Debriefing Discussions	Evaluation report

Success did not come without challenges. Responding to COVID-19 and pivoting to a completely virtual program touched every part of the process. The impact was most often seen in comments by team members who regretted not having an opportunity to meet everyone face-to-face and collaborate in a communal workspace. It is impossible to know how great an impact it had, because there are no

comparable measures for comparison, but the pandemic likely exacerbated many of the issues noted in this report. In overcoming these challenges, avenues to improve the program revealed themselves (e.g., clarifying team interaction expectations across the teams). These adjustments will set the stage for the initiative's expansion and successful adoption of the CLD3 process by CES in other states.

To that end, this effort should press forward. No matter the challenges, nothing was insurmountable. Not even a global pandemic. Across three states, CES professionals helped connect teams of people, many of whom were students from rural areas not unlike the ones they were serving, to communities struggling with economic concerns. In many cases, these issues were even more pressing due to COVID-19. The teams leveraged the tools of data science, the expertise of CES professionals, and the asset-based approach of the Community Capitals Framework to identify, collect, integrate, and analyze data and propose community-driven solutions for advancing economic mobility.

## **Appendix. Media and Research Outputs**

### **Virginia Media**

1/21/20 Dusseau, G. Biocomplexity Institute Awarded \$1 Million Grant To Expand Data-Driven Governance And Advance Economic Mobility In Rural Communities.

<https://biocomplexity.virginia.edu/news/biocomplexity-institute-awarded-1-million-grant-expand-data-driven-governance-and-advance>

6/24/20 National Community Learning Network video,

<https://www.youtube.com/watch?v=uKDdgY1E42s>

10/5/20 Dusseau, G. Economic Mobility Project Team Designs New National Community Learning Network. <https://biocomplexity.virginia.edu/news/economic-mobility-project-team-designs-new-national-community-learning-network>

### **Oregon Media**

7/30/20 Branam, Chris. OSU data science initiative addresses issues in Oregon's rural communities, Corvallis, Oregon, <https://today.oregonstate.edu/news/osu-data-science-initiative-addresses-issues-oregon-s-rural-communities>

8/25/20 Carlson, Brad. OSU Researchers build app to monitor irrigation water quality. Capital Press.

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