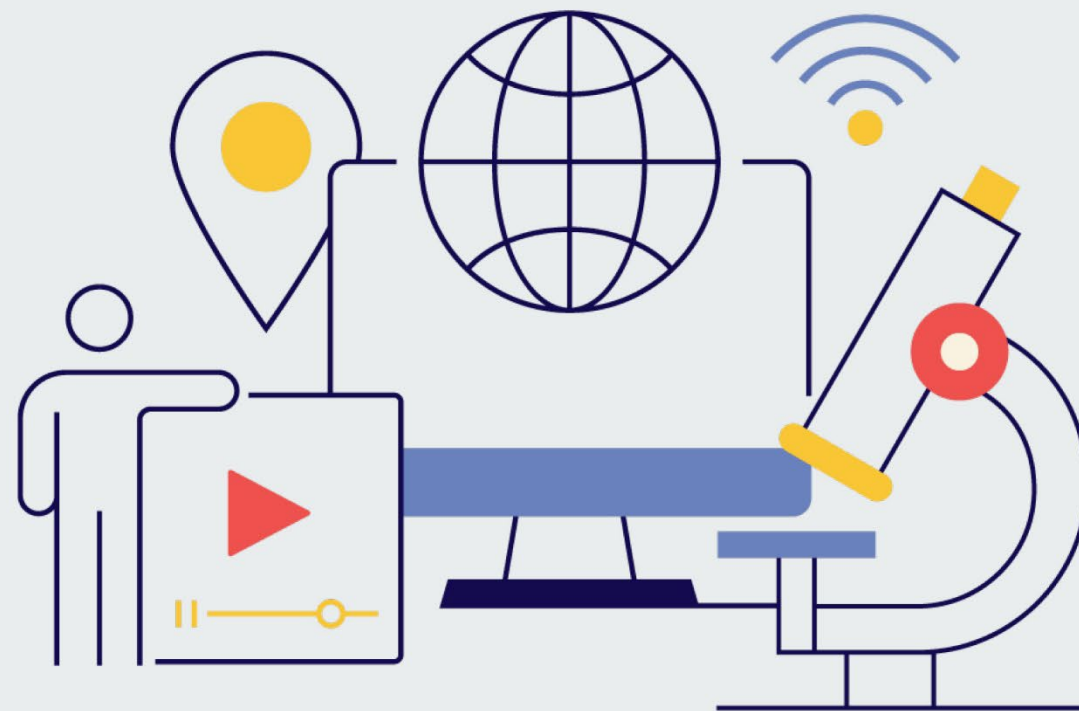


October 12, 2023

# DIGITAL OPPORTUNITIES COMPASS

STRATEGY, PLANNING, AND  
MEASUREMENT



Dr. Colin Rhinesmith  
Dr. Pierrette Renée Dagg

Dr. Colin Rhinesmith



Founder and Director of Digital Equity  
Research Center, **Metropolitan New York  
Library Council**

Research Fellow, **Quello Center  
for Media and Information Policy,**  
Michigan State University

Dr. Pierrette Renée Dagg



Director, Technology Impact  
Research, **Merit Network**

Digital Opportunities Fund Fellow, **Benton  
Institute for Broadband & Society**

Research Associate, **Quello Center  
for Media and Information Policy,**  
Michigan State University



## Agenda

- **Beyond the Access Triangle -**  
Proposing a Holistic Picture of Digital Inclusion
- **Presentation Goals**
- **Development of Digital Opportunities Compass Discussion Framework**
- **Potential Applications and Benefits Overview**
- **Levels of the Digital Divide**
- **Compass Components and Indicators**
  - How do these align with current strategies?
  - How might your thinking and strategy expand in meaningful ways?
  - Which components are relevant to this expansion?
- **Using the Compass in Practice**
- **Pilot Projects**

## Beyond the Access Triangle - Proposing a Holistic Picture of Digital Inclusion

- **The Digital Opportunities Compass is a measurement framework to guide state and local policy at a moment of unprecedented investment in broadband infrastructure and digital equity nationwide.**
- **Builds on over 25 years of research and experience related to how broadband and device access, affordability, and digital skills relate to digital equity and broader social and development outcomes.**
- **This body of research or experience suggests that digital equity can be achieved more sustainably if the entire broadband ecosystem is considered.**



## Presentation Goals

- **Explore ways to expand your thinking about digital equity and its relationship to your community or institution's goals**
- **Provide a basis for assessment, opportunity identification, or strategy development at the state, community, or organization level**



## Acknowledgements

The authors of this paper would like to acknowledge the contributions and input from the following collaborators:

Roberto Gallardo, *Purdue Center for Regional Development*

*for Broadband & Society*

Anna Read, *Pew Broadband Access Initiative*

Hernan Galperin, *University of Southern California*

Alexis Schrubbe, *Merit Network*

John Horrigan, *Benton Institute for Broadband & Society*

Sharon Strover, *University of Texas at Austin*

Megan Knittel, *Department of Media and Information, Michigan State University*

Jake Varn, *Pew Broadband Access Initiative*

Brian Whitacre, *Oklahoma State University*

Revati Prasad, *Benton Institute*

*for Broadband & Society*

DIGITAL OPPORTUNITIES COMPASS | FEBRUARY, 2023



## DIGITAL OPPORTUNITIES COMPASS:

Metrics to Monitor, Evaluate, and Guide Broadband and Digital Equity Policy

quello center

merit

NDIA  
NATIONAL DIGITAL INCLUSION INITIATIVE

DERC  
Digital Equity Research Center



# Digital Opportunities Compass

## Metrics to Monitor, Evaluate, and Guide Broadband and Digital Equity Policy

By Colin Rhinesmith, Pierrette Renée Dagg, Johannes M. Bauer, Greta Byrum, and Aaron Schill

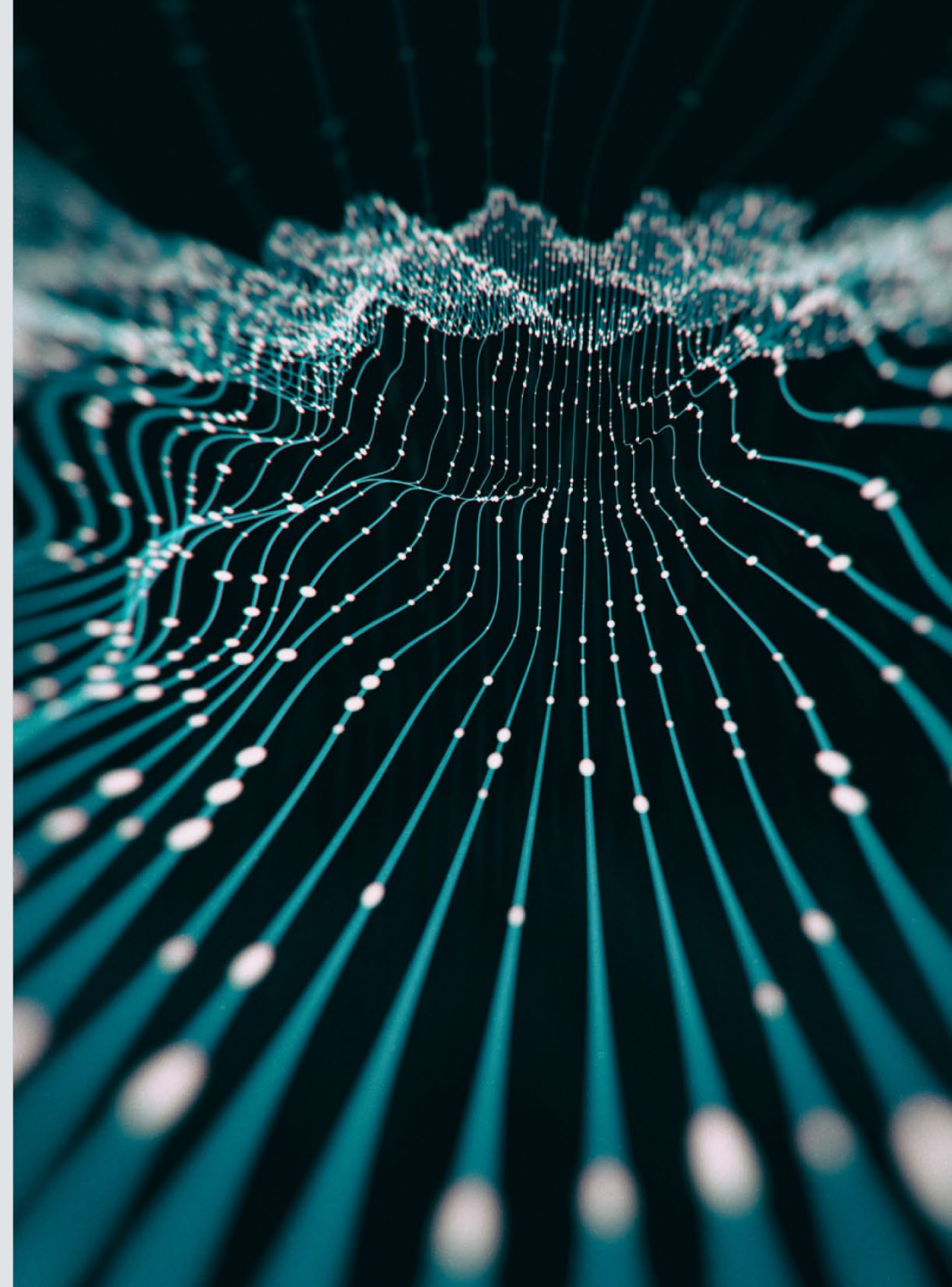


**DOWNLOAD THE WORKING PAPER**

# Potential Applications and Benefits Overview

## **The Compass Framework and practitioner tool can be used to:**

- Identify key groups of factors that influence digital equity efforts and outcomes
- Measure and assess digital equity efforts and outcomes over time
- Utilize a standardized core set of metrics that can be expanded and customized to meet state and community needs
- When possible, build on existing data and indicies
- Augment existing data with new (qualitative and quantitative) data
- Innovatively design infrastructure to help automate data collection (e.g., quality measurement in routers)
- Evaluate grant applications
- Support the development of grant narratives and measurement approaches

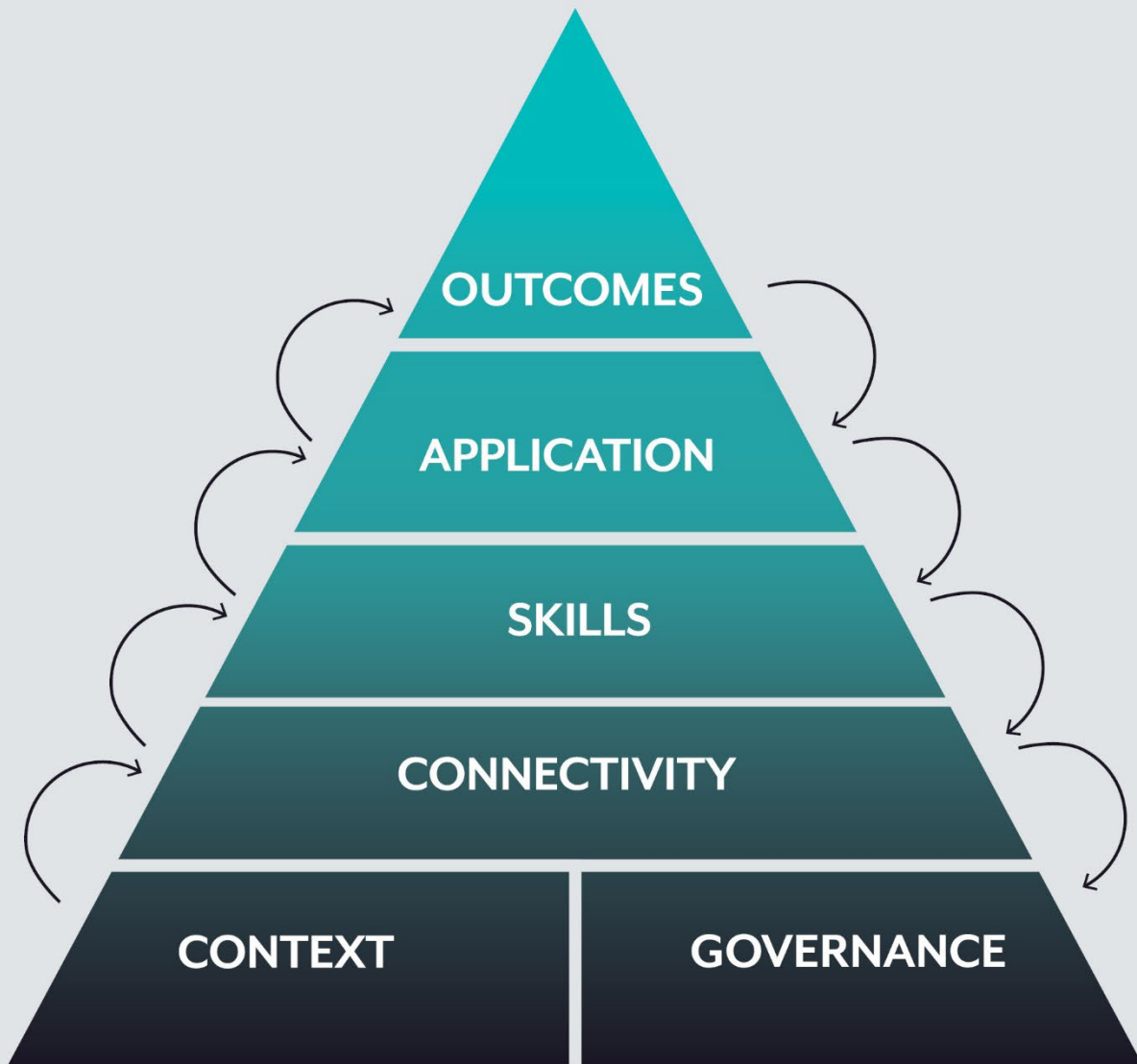




## Levels of the Digital Divide

- **Network and device access** (first level)  
Necessary but not sufficient to realize benefits of digital connectivity, requires alignment of local, state and federal policies
- **Digital skills and literacy** (second level)  
Necessary to utilize available technology for individual and social benefit, requires changes across all education systems, from K-12, post-secondary, and lifelong education
- **Uses and outcomes** (third level)  
Requires human-centric design of digital solutions, legal and institutional adjustments to change practices of health care, education, ...





## Six Components and Indicator areas

### #1 Contexts

- Indicators related to sociodemographic, economic, and community level factors

### #2 Governance

- Indicators related to local, state, and federal policy, governance, and power

### #3 Connectivity

- Indicators related to the existence of necessary network infrastructure, as well as the accessibility, affordability, and adoption of internet service and network-enabled devices

# Contexts

## Existing Tools

### Broadband and Socioeconomic Data

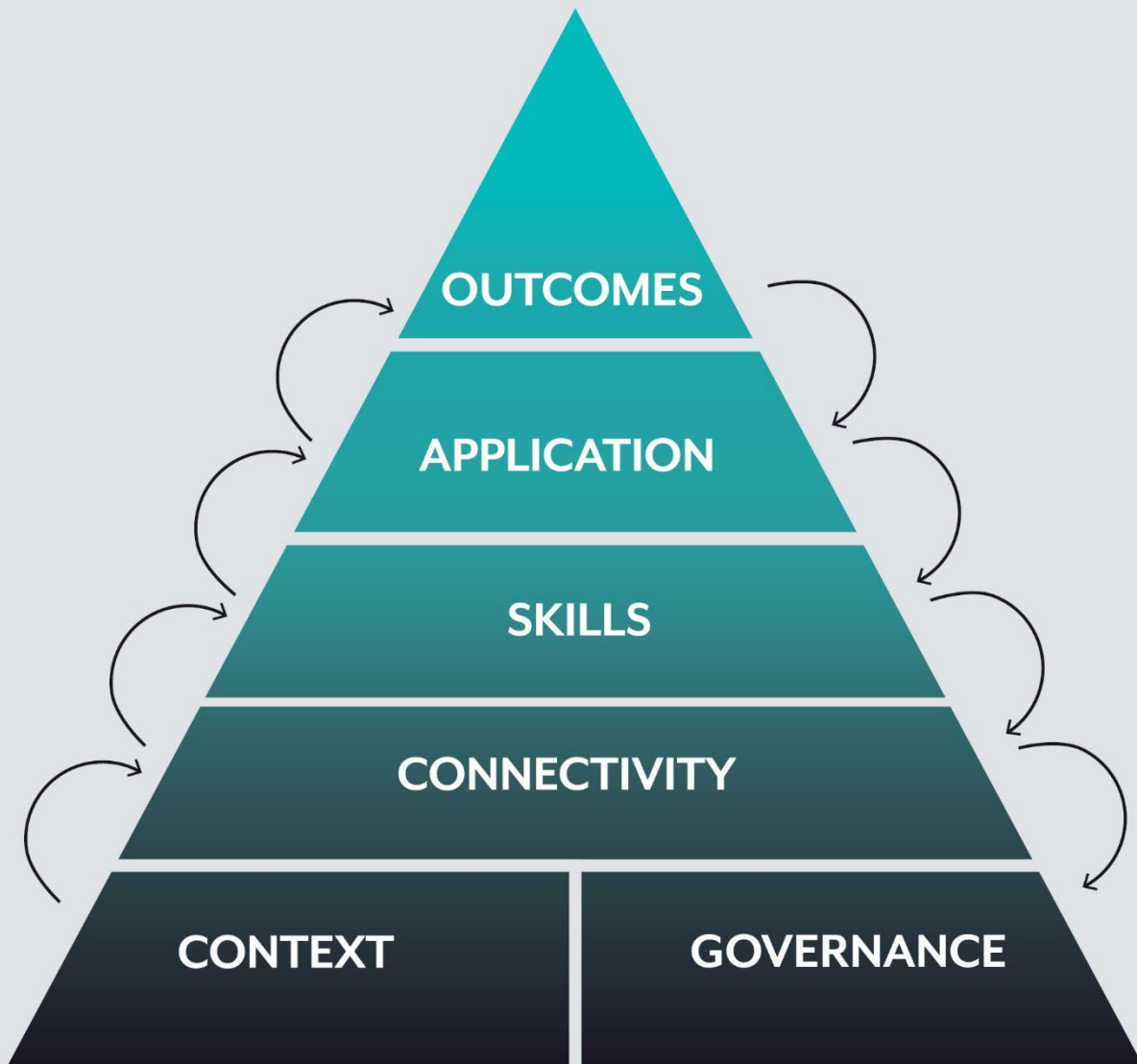
- Municipal Digital Advancement Index  
<https://www.digitaladvancement.org/>
- The Digital Divide Index  
<https://pcrd.purdue.edu/2019-digital-divide-index-ddi/>
- American Community Survey <https://www.census.gov/programs-surveys/acs>

### Socioeconomic Data

- Opportunity Atlas  
<https://www.opportunityatlas.org/>
- Economic Tracker  
<https://www.tracktherecovery.org/>
- Bureau of Labor Statistics  
<https://www.bls.gov/data/tools.htm>

### Community-Based Approaches

- ABCD Framework <https://resources.depaul.edu/abcd-institute/Pages/default.aspx>
- NDIA Asset Mapping for Digital Inclusion  
<https://www.digitalinclusion.org/asset-mapping/>
- Digital Inclusion Coalition Guidebook  
[https://www.digitalinclusion.org/wp-content/uploads/2022/02/NDIA\\_Coalition-Guidebook\\_vFINAL\\_RGB.pdf](https://www.digitalinclusion.org/wp-content/uploads/2022/02/NDIA_Coalition-Guidebook_vFINAL_RGB.pdf)
- Digital Equity Ecosystems Measurement Framework [https://metro.org/digital\\_equity\\_ecosystems](https://metro.org/digital_equity_ecosystems)
- DCTP Teaching Community Technology Handbook <https://detroitcommunitytech.org/?q=content/teaching-community-technology-handbook>
- Achieving Digital Equity In NY (<https://www.nysl.nysed.gov/libdev/DigitalEquityNY.pdf>)



## Six Components and Indicator areas

### #4 Skills

- Indicators related to a broad range of activities centered around digital literacy (including secure online practices), training, and skills attainment

### #5 Application

- Indicators related to the uses and application of digital connectivity and skills, while considering additional sociotechnical contexts

### #6 Outcomes

- Indicators related to the broader effects of improved digital equity on individuals, communities, and states

## Questions

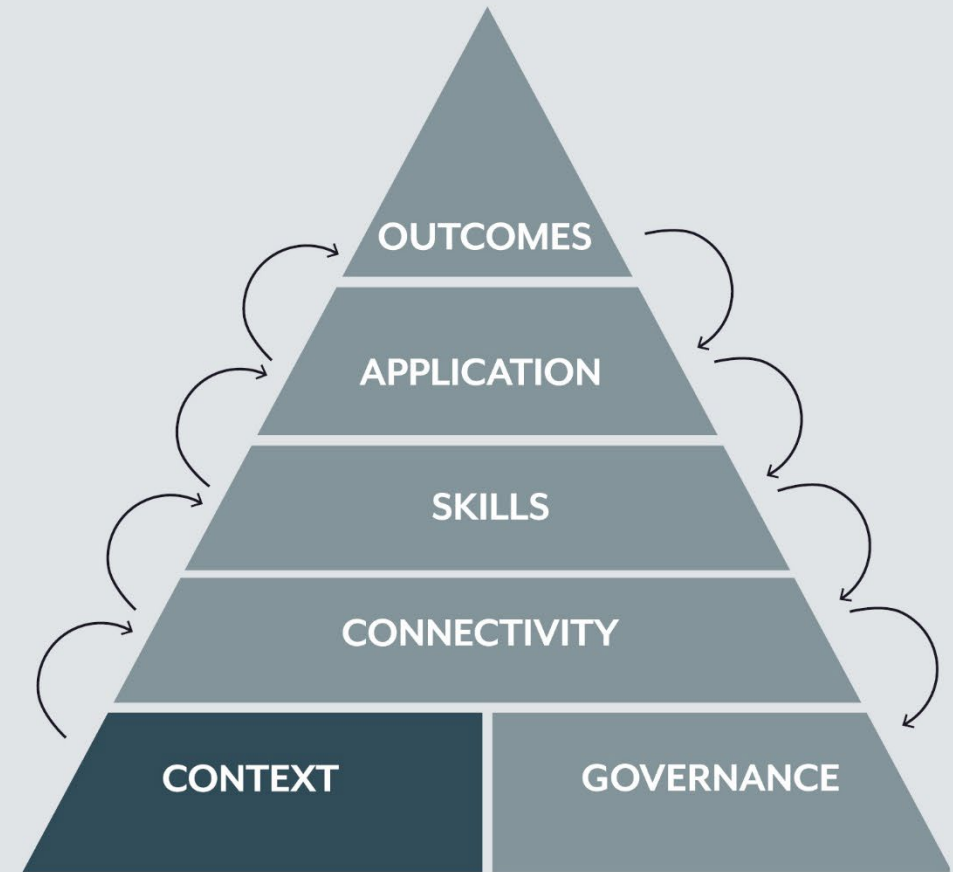
- How do these align with current strategies?
- How might your thinking and strategy expand in meaningful ways?
- Which components are relevant to this expansion?
- What existing data is already collected?
- What new data might be beneficial to gather?



## Contexts

### **Socio-demographic factors, economic opportunity, and community development**

- Socio-demographic factors
- Economic factors
- Business digital readiness
- Community health and wellbeing
- Community assets
- Everyday experiences
- Structural inequalities
- Barriers addressed
- Equity centered
- Geography



# Contexts

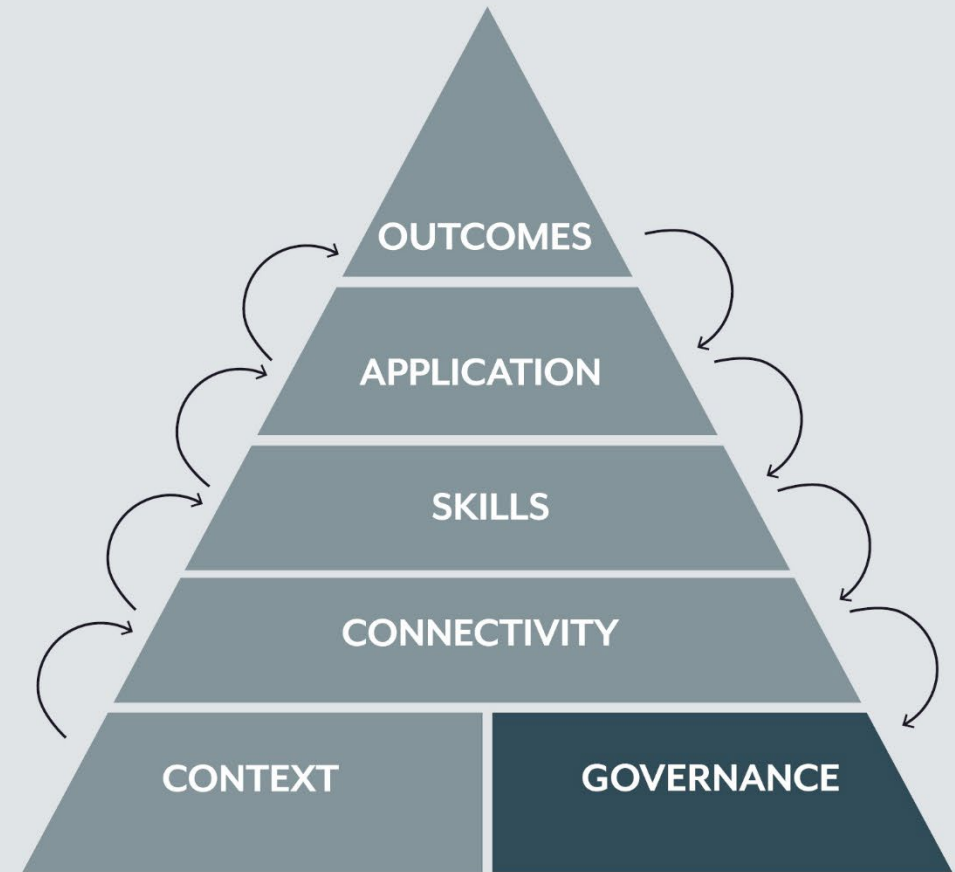
## Considerations for Data Collection

- Data should be collected to be inclusive of all of the “covered populations” listed in the Digital Equity Act, as well as other historically marginalized populations.
- Local communities will need to be engaged and consulted on the categories included in this component, as well as the data that need to be gathered based on these indicator areas.
- Indicators in this component need to be supportive of an individual community’s theory of change.
- Indicators could be gathered within an “ecosystem framework” to include micro (individual-level), meso (population-level), and macro (community-level) measures
- Some data exist for some of the indicators; other indicators do not have any data yet; and other indicators need additional ways of thinking about measurement to help stakeholders better understand the influence of these contexts on digital equity initiatives.
- Rural and tribal communities need to be represented in the data gathered across these indicators areas.
- Power can be measured across several indicator areas, particularly in understanding where there are barriers to any of the indicators being measured or realized.
- Measurement considerations must be included at different geographic levels (community, city, county, region, etc.)

## Governance

### Local, state, and federal policy, governance, and power

- Appropriate programs are implemented
- Coordinated policies
- Community participation and ownership
- Collaboration with education institutions
- Holistic approach
- Local coalitions
- Backbone organizations
- Policy support
- Inclusive digital service
- Champions in local government
- Public-private partnerships
- Funding





## Governance

### Considerations for Data Collection

### Relevance to IIJA/DEA requirements

- Stakeholder coordination plan
- Implementation plan
- Vision

- 
- This component is the connective tissue between the other 4 components of the Compass.
  - Community capacity and agency will be needed after IIJA ends
  - Interagency coordination and alignment with agency/state/municipal objectives; integration of policy measures into ongoing legislative/policy measures
  - Capacity of state/local government (as opposed to fed govt) needed to design and implement broadband and digital equity programs.
  - Philanthropy can help both with supporting new and existing policy positions, as well as helping to influence policy and governance structures to advance digital equity
  - Multiple indicators can be used to measure how and where governance and power are understood.
  - Qualitative data are needed to gain a deeper understanding of the existing landscape and to inform future planning efforts.
  - Measurement considerations must be included at different geographic levels (community, city, county, region, etc.)

# Governance

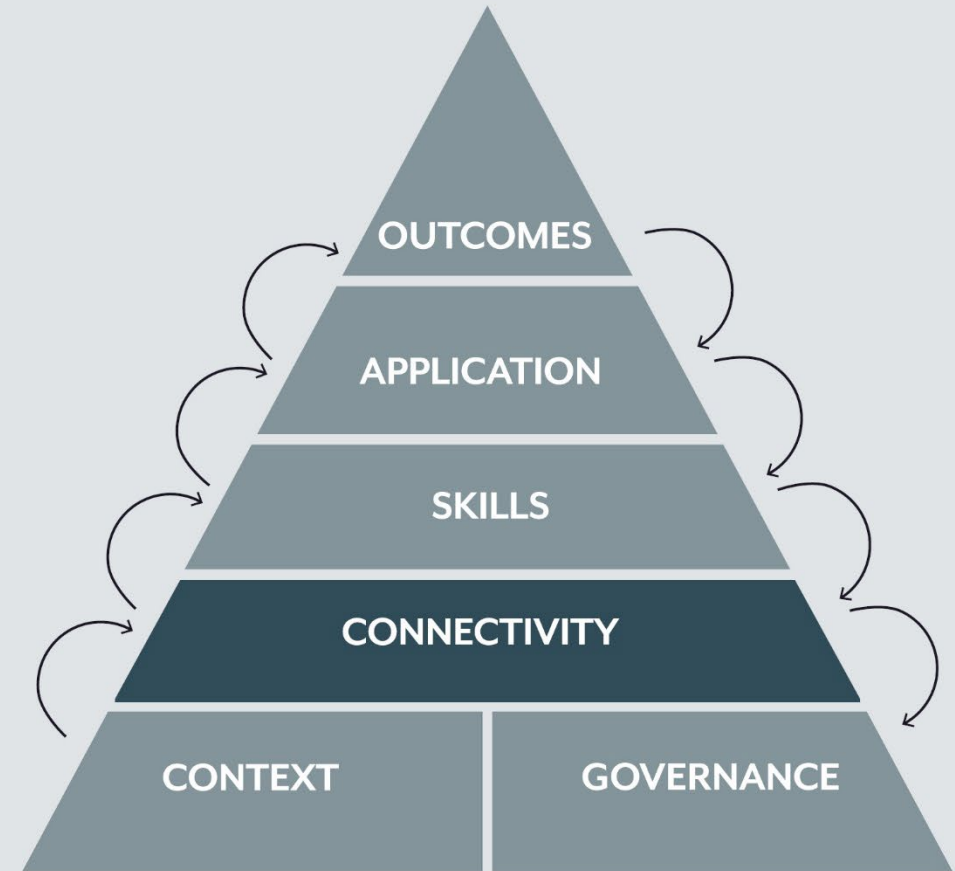
## Existing Tools

- State Digital Equity Scorecard: <https://digital-skills-map.digitalinclusion.org/>
- PolicyMap: <https://www.policymap.com/>
- Digital Inclusion Trailblazers: <https://www.digitalinclusion.org/digital-inclusion-trailblazers/>

## Connectivity

### **Network infrastructure, broadband access, device access, affordability, technology adoption**

- Broadband availability
- Broadband affordability
- Broadband adoption
- Device availability
- Device affordability
- Device adoption
- Service plan availability
- Quality of network services
- Adequate broadband for CAIs
- Complementary assets



## Connectivity

### Considerations for Data Collection

- It is important to keep in mind that each indicator has strengths and limitations. The FCC broadband map will likely suffer from accuracy challenges during the challenge and revision period
- In addition to measuring device adoption (outcomes), need supply side measures for device availability & provision

- Speed tests and hardware based devices should be used to determine speed and quality of service
- Device distribution - need data to support coordinated support within the device ecosystem
- Data should be gathered on general purpose devices and specific applications, such as medical devices

### NTIA Measurable Objective Categories

- The availability of, and affordability of access to, fixed and wireless broadband technology
- Availability and affordability of consumer devices and technical support for those devices

- Hardware-based testing devices are needed to measure network quality
- Crowdsourced tools should be included to measure indicators and provide opportunity and guidance on how to use additional/alternative data sources
- Measurement considerations must be included at different geographic levels (community, city, county, region, etc.)

# Connectivity

## Existing Tools

### Broadband Mapping

- FCC Broadband Map <https://broadbandmap.fcc.gov/home>

### Speed Tests

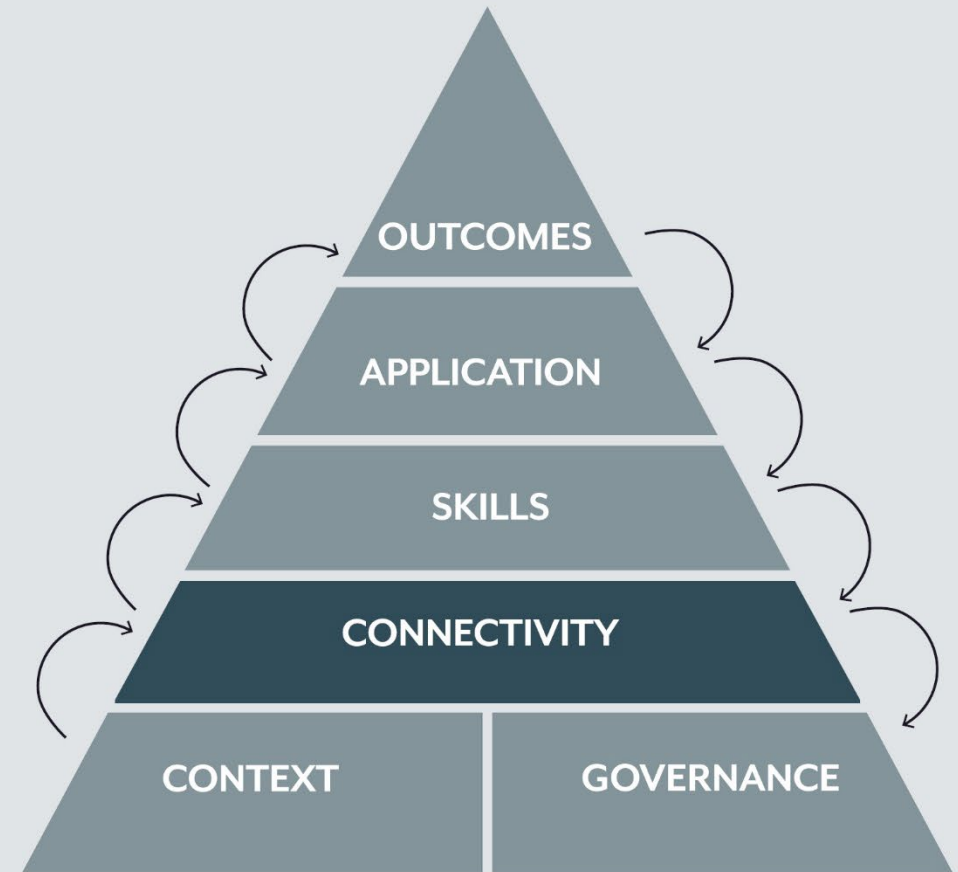
- M-Lab Speed Test <https://speed.measurementlab.net/> (+ Ookla, + Netrics, or others?)

### Digital Equity Indexes

- Maryland Digital Equity Scorecard Index Map <https://communitydevelopmentmd.org/digital-inclusion>
- The Digital Distress Index <https://pcrd.purdue.edu/ruralindianastats/broadband/distress.php>

### Frameworks and Reports

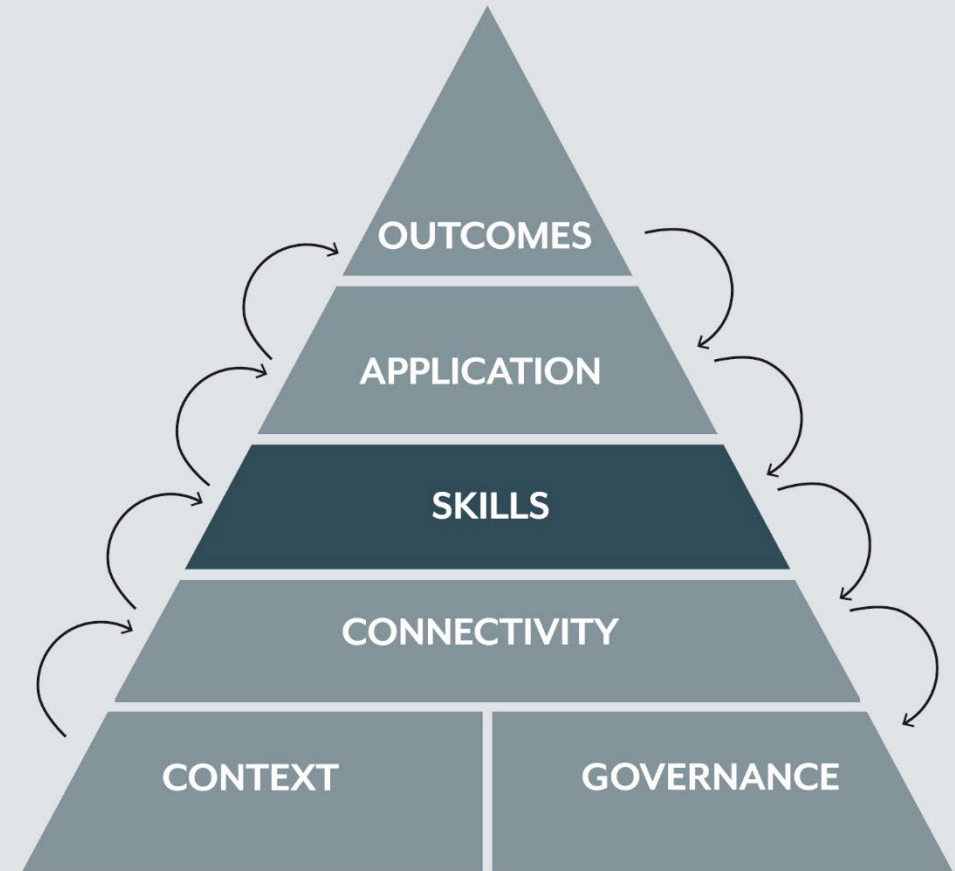
- Building Digital Communities: A Framework for Action <https://www.ims.gov/publications/building-digital-communities-framework-action>
- Digitunity - Exploring Community Connectedness: <https://digitunity.org/our-programs/exploring-community-connectedness/>
- Rural Communities & Digital Device Ownership: [https://drive.google.com/file/d/18wELBOA41k3BUpVUmoLAttj7ZiuK04\\_/view](https://drive.google.com/file/d/18wELBOA41k3BUpVUmoLAttj7ZiuK04_/view)



## Skills

### Training, skills, digital literacy

- Digital skills assessment
- Culturally relevant pedagogies
- Multilingual/multimodal training
- Coordinated support
- Embedded digital skills training
- Lifelong learning
- Learning together
- Digital skills
- Digital literacy
- Information and media literacy
- Adult literacy



## Skills

### Considerations for Data Collection

- Safety & protection data including:
  - Mental health
  - Dis- & mis-information
  - Surveillance, predation
  - Harassment
  - Cybersecurity
- Develop navigation/wayfinding systems to help different populations move through learning achievement/outcome journeys

### NTIA Measurable Objective Categories

- Digital literacy
- Awareness of, and the use of, measures to secure the online privacy of, and cybersecurity with respect to, an individual

### DEA covered Digital Inclusion Activities:

- Digital literacy
- Awareness of, and the use of, measures to secure the online privacy of, and cybersecurity with respect to, an individual

- 
- Crowdsourcing specific tools to measure indicators, and provide opportunity and guidance on how to use additional/alternative data sources
  - Measurement considerations must be included at different geographic levels (community, city, county, region, etc.)

# Skills

## Existing Tools

### Skills Development & Assessment

- DigitalLearn.org: <https://www.digitalllearn.org/>
- ISTE Standards: <https://www.iste.org/standards/iste-standards-for-students>
- NICE Workforce Framework for Cybersecurity: <https://niccs.cisa.gov/workforce-development/nice-framework>
- State Digital Equity Scorecard: <https://digital-skills-map.digitalinclusion.org/>

### Data Tracking

- DITTO: <https://www.connectedinsights.org/ditto>
- NDIA Digital Navigator Data Platform

### Broader Frameworks

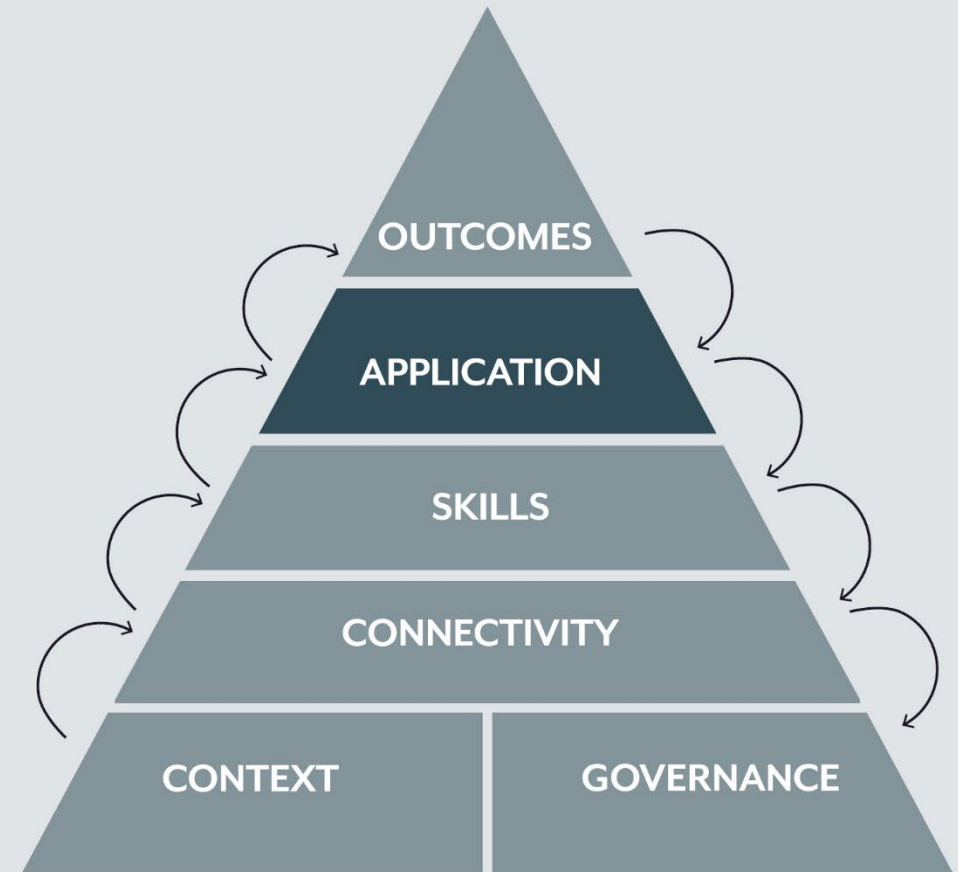
- Building Digital Communities: A Framework for Action <https://www.imls.gov/publications/building-digital-communities-framework-action>  
Rural Communities & Digital Device Ownership: [https://drive.google.com/file/d/18wELBOA41k3BUUpVUmoLAttJq7ZiuK04\\_/view](https://drive.google.com/file/d/18wELBOA41k3BUUpVUmoLAttJq7ZiuK04_/view)



## Application

**Cultural relevance, equitable design, workforce development, education, healthcare, public safety, civic engagement, social connections**

- Cultural considerations and secure systems
- Equitable and accessible design
- Tech training support
- Job-seeking assistance
- Private
- Patient portals
- Online civic engagement
- Local cultural preservation
- Accessibility and assistive tech



# Application

## Considerations for Data Collection

## NTIA Measurable Objective Categories

- The online accessibility and inclusivity of public resources and services
- Awareness of, and the use of, measures to secure the online privacy of, and cybersecurity with respect to, an individual

---

### • **Types of digital resources/services that states and localities can shape:**

- Procurement policies
- Policies re: municipal resources
- Fundable products of Capacity/Competitive grants
  - For ex, multiple languages, accessibility standards
- Develop a gradient (i.e., assessment)

through which policymakers can be measured regarding the online accessibility and inclusivity of public resources and services (what they can directly influence and what they are able to indirectly influence)

- What are the existing government resources to develop/change?
- What can be influenced through policy?
- What can be influenced through encouragement?

- **Crowdsource specific tools to measure indicators, and provide opportunity and guidance on how to use additional/alternative data sources**
- **Measurement considerations must be included at different geographic levels (community, city, county, region, etc.)**

# Application

## Existing Tools

## Frameworks

- Building Digital Communities: A Framework for Action  
<https://www.imls.gov/publications/building-digital-communities-framework-action>

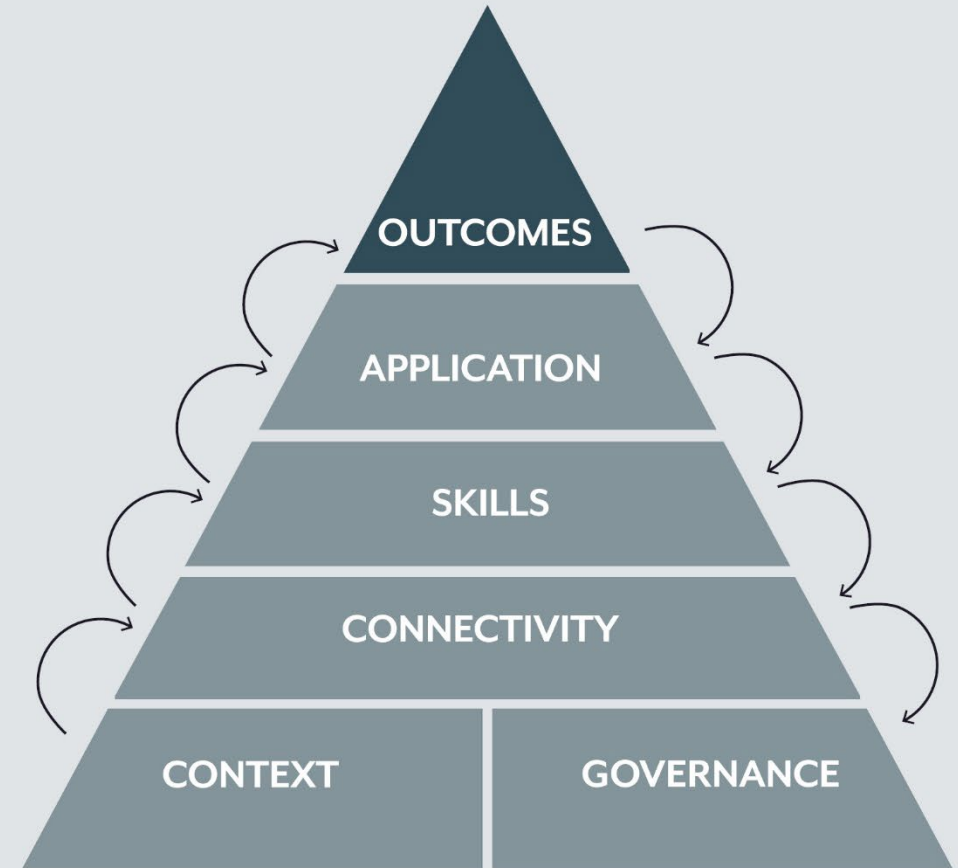
## Standards

- Ranking Digital Rights: <https://rankingdigitalrights.org/>
- Consentful Tech Project: <https://www.consentfultech.io/>
- Our Data Bodies: <https://www.odbproject.org/tools/>
- Surveillance Self-Defense: <https://ssd.eff.org/>

## Broader Outcomes

### Indicators related to the broader effects of improved digital equity on individuals, communities, and states

- Economic Development: Jobs, income, start-ups, growth
- Social Development: Quality of life, safety, happiness, mental health, social peace
- Physical Environment: Water quality, air quality, housing, transit
- Civic Participation



## Broader Outcomes

### **Broader effects of improved digital equity on individuals, communities, and states**

- Number of new jobs generated
- Median household income, poverty
- Number of start-ups attracted
- Community economic and population growth
- Health outcomes
- Indicators for community safety
- Mental health data
- Indicators for the physical environment
- Indicators for civic engagement and participation

## Broader Outcomes

### Existing Tools

- Data from the U.S. Bureau of Labor Statistics, e.g.
  - U.S. Bureau of Labor Statistics, County Employment and Wage:  
<https://www.bls.gov/news.release/cewqtr.toc.htm>
  - U.S. Bureau of Labor Statistics, Metropolitan Area Employment and Unemployment,  
<https://www.bls.gov/news.release/metro.nr0.htm>
- County Health Rankings and Roadmap, University of Wisconsin, <https://www.countyhealthrankings.org/explore-health-rankings/county-health-rankings-model>
- Data from the Centers for Disease Control, e.g.,
  - Household Pulse Survey:  
<https://www.cdc.gov/nchs/covid19/health-care-access-and-mental-health.htm>
  - Behavioral Risk Factor Surveillance System: <https://www.cdc.gov/brfss/index.html>
  - Youth Risk Behavior Surveillance System: <https://www.cdc.gov/healthyyouth/data/yrbs/index.html>  
[https://www.cdc.gov/healthyyouth/data/yrbs/index.html#18wELBOA41k3BUUpVUmoLAttJq7ZiuK04\\_/view](https://www.cdc.gov/healthyyouth/data/yrbs/index.html#18wELBOA41k3BUUpVUmoLAttJq7ZiuK04_/view)
  - Multiple private indices are available to assess happiness and the quality of life
  - U.S. Census Bureau civic Participation surveys

## Intended Framework Uses

- **Assist digital equity stakeholders with the development and assessment of intervention strategies**
  - Support grant narratives
  - Measure efficacy of programs or investment
  - Create a common framework for inter-institutional discussion
  - Develop digital equity strategies
  - Assess existing efforts and discuss future opportunities
- **Can be applied to location/entity's needs and vision**
  - Utilize publicly available information when available
- **Indicators can be interpreted as cardinal measures or ordinal measures of achievement**
  - Create standardized, comparable scores (n-point or Likert)
    - Flexible scoring among relevant dimensions



# Putting it all into Practice: Community-level practitioners

- **Practitioner feedback: simple user guide, guided consultation, online self-help application**
- **A pilot project with three communities in Michigan is underway**
  - Two county governments and one tri-county planning commission
- **Goals of the pilots**
  - Develop research-backed holistic digital opportunities strategy
  - Understand long-term assessment of programs and strategies
  - Create a roadmap of next steps
    - (e.g. infrastructure planning, sentiment analysis, measurements of digital literacy and educational needs, etc.)
  - Provide foundation for grant narratives
  - Shape future tools for digital equity practitioners
  - Better understanding of how communities and practitioners perceive, experience, and envision the development of sustainable, comprehensive digital equity strategies
  - Study the ways in which broadband task forces, organizations, and communities use these data to broaden their perspectives while devising strategies



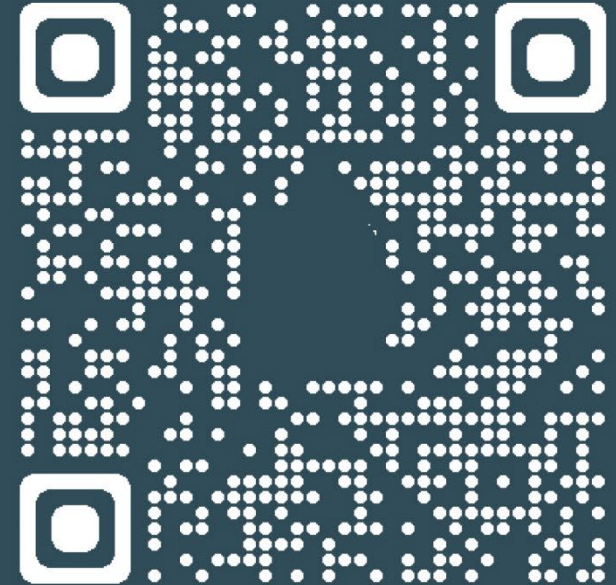




# Digital Opportunities Compass

## Metrics to Monitor, Evaluate, and Guide Broadband and Digital Equity Policy

By Colin Rhinesmith, Pierrette Renée Dagg, Johannes M. Bauer, Greta Byrum, and Aaron Schill



**DOWNLOAD THE WORKING PAPER**