

PuebloConnect: Expanding Internet Access and Content Relevance in Tribal Communities

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The Problem and Intellectual Merit: Native American communities have the lowest Internet broadband access rates in the U.S. The focus of our work is to quantify and contextualize the lack of access, develop new technical solutions appropriate for Internet access in remote and sparsely populated regions, and increase technical literacy in Northern New Mexico pueblo communities.

Selected technical contributions to-date:

- Developed LoRaX (LoRa eXtends the Internet): system that uses low-bandwidth messages to extend access to critical service APIs
 - Prototype connected to Etsy APIs to enable people living in remote areas to manage their Internet-based storefronts
- Developed CellWatch: crowdsourcing platform and app for Internet coverage and measurement
- Developed digital tools for networking equipment asset tracking and assisted with equipment installation on NM tribal lands
- Characterized limitations of broadband measurement data collection methodologies (incidental and intentional crowdsourcing, and provider-reported)



Selected social science contributions to-date:

- “Full Circle Model” to support community-centered network augmentation; published in CHI’21
- Chapter in Networked Feminisms on social and political goals of Native women working towards broadband advancement
- Research on knowledge ecologies compounding Covid-19 in Indigenous North America, including lack of adequate Internet access
- Increased awareness of the social landscape shaping Indian Country adoption of digital technological innovations
- Strengthened networks of academics, policy-makers, and community educators supporting digital technology and data justice work in Indian Country

Broader impact:

- Internet Measurement curriculum developed and piloted with fifth grade teaching team
 - teaches participants how to collect Internet measurements in their community
- 24 Native American students trained and certified in fiber optics, testing/maintenance, and splicing through collaborative Fiber Optic Technician bootcamp pilot
- Digital equity and broadband resources for individuals, families, communities, and tribes in New Mexico curated and shared through www.digitalequitynm.com
- Students educated on socio-technical research techniques; multiple dissertations and graduate degrees produced
- Participated in launch and facilitation of NM Broadband Collective: workshops, tribal equity grants
- Built survey and facilitated two years of broadband survey deployment to gather connectivity insights for Native students and staff
- Paid student internships for Native communities and youth
- Collaborated with Santa Fe Indian School and Connect NM Council to host New Mexico Tribal Broadband Connectivity Convening

Sustainability:

- Tech workforce expanded; local capacity built
- New Mexico Broadband Collective established; supporting local grants
- www.digitalequitynm.com developed
- CellWatch app will be hardened and broadly launched
- Computer Science-based curriculum for Native American-serving schools under development
- Multiple new grants to continue socio-technical contributions

Next steps:

- Fully develop CellWatch app; additional funding obtained
- Conduct interviews and focus groups in partner communities to study (i) effects of Internet deployments and infrastructure policies and (ii) how well existing broadband measurement tools meet needs
- Complete ethnographic analysis examining ARRA Internet deployment effects in partner communities