Points of View

Towards pluriversal community informatics:

Connecting Indigenous communities in Borneo and Canada across time and space

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Abstract

In this article we reflect on pluriversal connections for Community Informatics (CI), drawing from our collective experiences working with Indigenous Peoples in Borneo and Canada. Building on Michael Gurstein's foundational work and situating it in relation to contemporary debates around digital equity and inclusion, we present summaries of collaborative, iterative, locally-grounded participatory action research projects that illustrate the enduring methodological, ethical and conceptual questions raised in CI. Through our interactions and shared experiences, these examples also demonstrate Gurstein's (2012) focus on connecting across geographic and cultural boundaries in ways that respect the self-determined nature of place-based communities.

Keywords: Indigenous Peoples; Participatory Action Research; Pluriversal Design; Broadband Development; Digital Inclusion; Digital Literacy; Community Networks; Borneo; Northern Canada

Introduction

> "*The role and objective of CI research thus is to document such areas of struggle, identify those areas of small victory (where autonomous community-enabling activities and objectives are realized), and, on the basis of this research, identify strategies that have achieved success and suggest means for replicating, reproducing, and extending them*" (Gurstein, 2012, p. 49).

In this article we reflect on pluriversal connections for Community Informatics (CI), drawing from our collective experiences working with Indigenous Peoples in Borneo and Canada. Building on Michael Gurstein's foundational work and situating it in relation to contemporary debates around digital equity and inclusion, we present summaries of collaborative, iterative, locally-grounded participatory action research projects that illustrate the enduring methodological, ethical and conceptual questions raised in CI. Through our interactions and shared experiences, these examples also demonstrate Gurstein's (2012) focus on connecting across geographic and cultural boundaries in ways that respect the self-determined nature of place-based communities.

On his first visit to the Penan community of Long Lamai in Malaysian Borneo in 2010 (see Figure 1), Michael Gurstein used a metaphor of bringing the Internet to Pandora (a reference to the film *Avatar*), capturing the challenge and novelty of introducing the Internet to such a geographically remote and self-sustaining community.

Figure 1: Michael Gurstein during his first visit to Long Lamai in 2010, pictured with Tariq Zaman and Gary Loh Chee Wyai (January 2010). Photo credit: Tariq Zaman.

Gurstein's reflections after his Long Lamai visit encompass three key aspects of CI. First, he emphasized the importance of digital applications, focusing on how communities can effectively shape and use digital technologies to meet their unique local needs. In Long Lamai, the community's approach to digital development was grounded in their cultural context and realities. Following early adoption of social networking applications and email, after 2010 the community established new venues for effective use of digital technologies. These include creating digital archives and virtual platforms to preserve and manage Indigenous knowledge, and to safeguard their linguistic and cultural heritage (Zaman, Yeo, & Jengan, 2016).

Long Lamai's digital innovations are driven by the community's specific desires. Email and social networking helped maintain connections among youth who had moved to urban areas for education and work. Inspired by the successful eBario project (Harris, Ramaiyer & Tarawe, 2018), the community saw the Internet as a tool to support local economic initiatives, such as developing a homestay program to attract tourists (Gurstein, 2010a). This approach ensured that digital development was not imposed externally but was instead a reflection of the community's own aspirations and developmental goals.

Third, Gurstein highlighted Long Lamai's developmental inspiration as "a new Internet-enabled form of 'development' — a 'community informatics' enabled development" where the development process is guided by participatory design approaches and local governance and decision-making protocols (Gurstein, 2010b, para 7). All decisions regarding Long Lamai's telecentre were made through a consensus-based process, involving extensive community discussions. This approach aligned with the community's values and needs, helping with the sustainability of ICT initiatives. The telecentre itself was managed locally, with operations financially supported through community initiatives such as the sale of affordable phone cards, which generated a small surplus for telecentre maintenance. Today, the Long Lamai project

stands as a testament to the potential of community-driven digital initiatives in fostering self-sufficiency and resilience in remote communities.

Michael also worked with First Nations in Northern Canada, similarly stressing the importance of placing control over digital development in the hands of people located at (so-called) geographic peripheries (Gurstein, 2012). This work (framed as the "First Mile" in a 2014 special issue of the *Journal of Community Informatics*) argued that "market-based and centrally-driven solutions…do not apply in communities located at the end of the road" (McMahon, Gurstein, Beaton, O'Donnell, & Whiteduck, 2014, p. 253). Recognizing how processes of Indigenous resurgence and revitalization resist ongoing structures of colonialism, including in ICT development, CI offered a conceptual framework and methodology to encourage and enable Indigenous ownership and control of digital infrastructures and services. An exemplary project is the regional First Nations service provider KO-KNET, set up in the 1990s by a tribal council of six geographically remote Oji-Cree, Cree and Ojibway First Nations located in what is now northern Ontario, Canada (Beaton & Campbell, 2014). Through a community-driven technical design process grounded in values of cooperation and Indigenous sovereignty, KO-KNET emerged as an early innovator in Canada's Internet system, sparking First Nations online education and e-health services, as well as a non-profit precursor to commercial social media called MyKnet.org (Budka, 2019; Fiser & Clement, 2012). KO-KNET continues operating today as a success story of Indigenous-led digital innovation.

These stories converged when authors Rob and Tariq met at the 2019 e-Borneo Knowledge Fair (eBKF), hosted in the village of Ba'Kelalan near the Kelabit Highlands in Borneo. The eBKF concept grew from the e-Bario project that generated a network of community telecentres across Malaysia. The first eBario Knowledge Fair was held in 2007 in Bario village, where Michael Gurstein delivered a keynote. Over time, it became more inclusive, broadened its focus, and extended its reach across Borneo, eventually evolving into the eBorneo Knowledge Fair. At eBKF, the typical dynamics of 'researcher' and 'researched' are inverted: the community hosts the conference while community partners and academics both present and participate in the sessions. To address the challenge of a lack of diversity in the traditional academic knowledge dissemination cycle, the knowledge fair adopts a more equal and pluralistic approach. Instead of being confined to closed rooms, sessions are organized and set in natural environments, reflecting themes such as learning from flourishing local initiatives in areas including organic rice farming, culture and language teaching, and local ICT development. This aligns with Escobar's concept of a pluriversal world — a 'world where many worlds fit' — promoting the coexistence of diverse perspectives and the coming together of different worldviews (Escobar, 2018).

Conversations that began at eBKF continued, identifying and solidifying our shared desire for research and practice in Canada and Borneo to "go beyond simple access to ensure that the ICTs are useable, useful, and being used - in support of personal and community-based objectives" (Gurstein, 2012, p. 37). During regular video chats we discussed our affinity for core CI concepts: effective use, community networks, policy engagement, co-design, participatory action research, Indigenous-led technology initiatives, and the essential role of community leaders and champions. Tariq spoke of "being participated" (Winshiers-Theophilus, Kuria, Kapuire, Bidwell & Blake, 2010) and interaction protocols designed by Longa Lamai community

(Zaman et al., 2016), which strongly connected with Rob's experience negotiating Indigenous cultural protocols in Piikani First Nation and through the First Mile project (McMahon, 2020). Despite our different geographic and cultural environments, CI offered values and methods that could be adapted and applied to diverse local contexts. Over time, these conversations manifested in a series of visits to Borneo and Canada from 2021 to 2024.

Fostering digital inclusion: Pluriversal examples of supply-side, demand-side, and policy-side challenges (and solutions)

Today, questions raised by CI are present in the burgeoning field of digital inclusion, which similarly argues for a shift towards the efforts of individuals, groups, and communities in leading their own solutions to entrenched digital inequalities (Reisdorf, & Rhinesmith, 2020; Robinson et al., 2020). This includes a recognition that the design, development, adoption and effective use of digital ICTs must be grounded in self-determined development processes led by involved communities; otherwise, development risks exacerbating economic, political, social and cultural inequalities. To address these gaps, we articulated a series of factors shaping digital inclusion initiatives. Supply-side challenges refer to factors controlled by organizations providing access to ICTs, such as the availability of infrastructure or cost of services. Demand-side challenges consider the role of end users - including various communities - and include factors such as digital literacy. Policy-side challenges are related to inappropriate and unclear (and sometimes absent) policies and hindrances for digital inclusion.

Efforts to address these challenges — framed as interventions in policy and practice — are outcomes of participatory opportunities involving like-minded organizations and individuals. Following the core principles of CI (Gurstein, 2012), these interventions emerge through repeated iterations, during which participating organizations and individuals share capacity, gaining experience and understanding of the issues under consideration. This work ties to a development trajectory grounded in Indigenous societies that existed and prospered long before the advent of digital ICTs available today, and the formal institutions set up by state governments to regulate their development. The next section of this article presents two examples of such interventions from Borneo and Canada, highlighting how they have mutually influenced and benefitted one another.

Community networking literacies: Finding culturally appropriate forms of digital literacy

Our first example attempts to demystify infrastructural design through a hands-on exercise demonstrating how people in small, rural/remote Indigenous communities can balance connectivity challenges and digital innovations with land-based living specific to place and community (McMahon et al., 2024). First prototyped with the Dinji Zhu (Gwich'in) First Nations in 2018, this exercise involves participants building a table-top model of a community network by placing 3D printed pieces (environmental factors like fish and caribou, houses, anchor tenants like nursing stations and schools, and infrastructural elements like towers and points-of-presence) on a map of their community. Next, participants are invited to 'make the net-work'

through connective pieces of yarn (to simulate DSL, cable or fibre optics) or flat plastic discs (demonstrating wireless footprints). The process is interspersed with discussion points and guided exercises that highlight how infrastructural design encodes different forms of access and control, as well as concepts like resilience, redundancy, and nodal design. To allow for local adoption and adaptations to this exercise, all digital files (curriculum, 3D print designs, flow of instruction, etc) are open access to encourage others to innovate.[1]

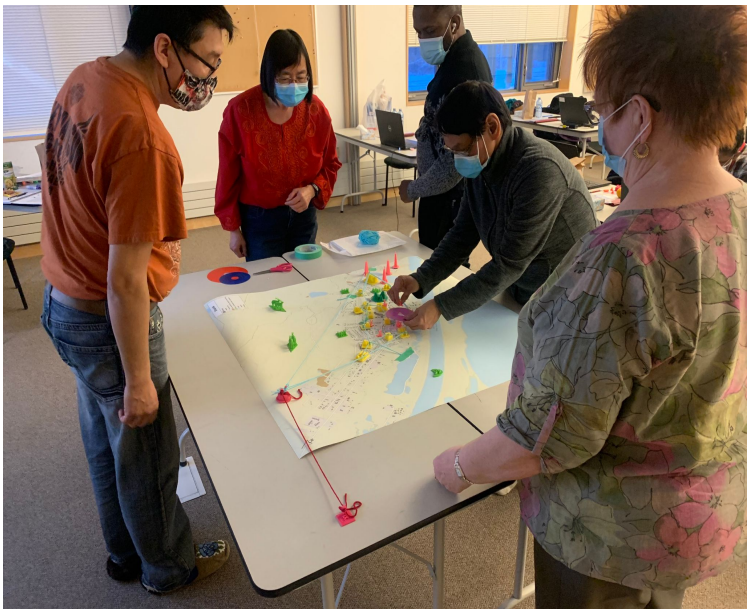

Figure 2. Make the "NetWork" Guided Learning Activity in Inuvik, NT (December 2021). Photo credit: Daniel Dokunmu

Tariq's team in Borneo adapted this work, bringing it to a community to co-design a Community Network infrastructure. The locally-modified 3D models are used as design probes to engage local community members in co-design workshops as well as in reflection exercises. Over time these concepts were further refined as Indigenous design probes, which inspired a co-designed Community Network in the Iban community of Bawang Assan (Loh Chee Wyai, Zaman, & Hamid, 2022).

Indigenous knowledge management: Co-designing digital archives

Our second example considers how cultural protocols guide forms of digitizing Indigenous Knowledge Management. In Borneo, Tariq worked with the Long Lamai community in sketching interaction protocols for guiding collaborative ICT projects (Zaman et al., 2016). These interaction protocols guided the process of developing eToro, an Indigenous botanical knowledge

[1] Download materials here: https://www.digitalnwt.ca/openly-licensed-adaptable-course-materials

management system, as well as the digitization process of the Penan Oroo' sign language and, very recently, the development of Virtual Reality applications for Molong (Indigenous system of sustainable resource management) and Inga Telikit', an Indigenous Penan hunting game (Zaman et al., 2023).

During a 2024 visit to Piikani First Nation in Southern Alberta, Tariq presented this work during a co-design workshop held to mark the start of the Piikani Digital Archive project. (See Figure 3). The day began with a formal ceremony, during which Aapátohsipikáni (Northern Piikani) Elders, educators and students from Peigan Board of Education and Piikani Nation Secondary School, and university-based researchers spoke about their intentions for the project during a formal smudging and pipe ceremony. Aapátohsipikáni community members spoke passionately about their hopes for digital documentation of invaluable language and cultural knowledge, as well as the importance of securing and maintaining community ownership and control over the archiving process. Many highlighted the essential role of youth; the future leaders of the community tasked with stewarding knowledge and practices through digital media projects.

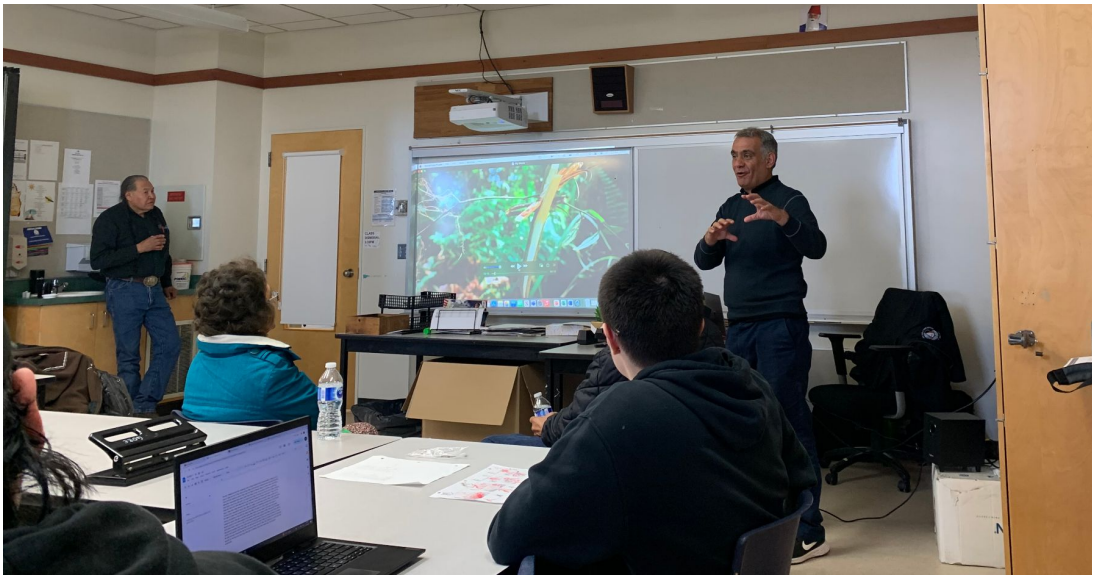

Figure 3. Tariq presenting the Long Lamai project to Elders, educators and youth in Piikani First Nation (March 2024). Photo credit: Rob McMahon.

That afternoon, lead Elder Herman Many Guns explained his vision to design a digital archive based on the Winter Count — a pictorial system historically used by the Piikani people to record important events through symbols painted on tanned buffalo hide that are interpreted through stories stewarded and shared by Elders (Raczka, 1979). Next, PNSS teachers Ken Williams and Brett Weighill discussed the role of the school — and students in particular — in bringing these ideas forward through an archive and the digital media it houses. The context of these presentations recognizes the historically extractive nature of institutional research relations

with Indigenous peoples, and the emphasis that partners stress should be placed on community-led approaches. In Piikani, these issues are explained through concepts like Niitooii (translated as 'the same that is real', or paralleling) (Noble, 2002). Practicing Niitooi means that Indigenous team members — 'community champions' in the language of CI — serve as leaders and guides in projects that generate reciprocal benefits for both communities and researchers (Crowshoe & Manneschmidt, 2002). This work builds on the insights Tariq shared about his experience working with the Penan of Long Lamai.

Conclusion

While grounded in very different cultural and geographic environments, these two examples demonstrate how the application of CI principles, methods and practices generated locally-specific interventions while also allowing for innovation and adaptation across borders. Today, we continue to find new ways to share ideas in partnership with communities, including during the summer 2024 Participatory Design Conference, which is being hosted at the University of Technology Sarawak. This year the conference includes a special community track — led by Indigenous Elders including Garen Jengan from Long Lamai and Herman Many Guns from Piikani — as well as a workshop focused on bridging the gap between Internet infrastructures and community-centred design. These events provide opportunities to continue exploring pathways towards pluriversal forms of community informatics.

Acknowledgements

We acknowledge and thank the many people who have engaged with and supported this work over the years, including community members, project partners, and colleagues. We also thank the funding agencies that have supported our work, including the Internet Society, the Canadian Internet Registration Authority, the Social Sciences & Humanities Council of Canada, and the Mastercard Foundation's EleV Program.

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