Beyond Technological Fundamentalism: Peruvian Hack Labs, "Inter-technological" Futures, and ICT4E in the Andes

Sugarcamp Hackathon organized by Escuelab hack lab in Lima, Peru. November 2011.

In 2012, the first large-scale study of one of the most high-profile global education initiatives to promote new information and communication technologies (ICTs) as national policy – the MIT-launched One Laptop per Child Program (OLPC) -- was released by the Inter-American Development Bank. Highly anticipated by education, technology, and policy experts worldwide, the study focused on pedagogical impacts in Peru (one of the first nations to commit to the nationwide adoption of laptops in public schools), but had implications for similar initiatives that deployed over 3 million OLPC laptops in 42 other nations. And much like emerging studies on Massively Open Online Courses (MOOCs) growing across US campuses, the report raised significant questions on the educational impacts resulting from high institutional investments. It stated, "OLPC aims to improve learning in the poorest regions of the world… The investments entailed are significant given that each laptop costs around $200, compared with $48 spent yearly per primary student in low-income countries and $555 in middle-income countries. [Yet], there is little solid evidence regarding [its] effectiveness." It continued: "Although many countries are aggressively implementing the OLPC program … [n]o evidence is found of effects on enrollment and test scores" (Cristia et al. 2012). Similar findings have emerged too around MOOC platforms like Udacity, which have enrolled hundreds of thousands of students in low-cost courses worldwide, but which studies found produced lower pass rates of 20% to 44% for university courses that had typically seen 75% student pass rates. (Anders 2013)

Such sober findings notwithstanding, it's become increasingly clear that investing in new ICTs and the discursive framings of elite global engineers and digital entrepreneurs continue to fundamentally impact national policies, particularly in relation to education. Educational technology analysts note the continuing expansion of ICT for education (ICT4E) initiatives worldwide that claim to prepare diverse learner populations for a competitive, 21st Century

information-centered economy through extending new digital technologies (Bajak 2012; Cristia 2012; Cristia et al. 2012; Oppenheimer 2012; Severin and Capota 2011; Trucano 2012). A range of nations – 17 documented in Latin America alone as of 2011, and 20 others in African, Asian and Eastern European countries - had launched large scale ICT4E programs that generally claim to extend digital "inclusion," connect the nation, and enhance future productivity by drawing presumably "disconnected" learning sectors – particularly at risk, minority, indigenous, and economically marginalized populations -- into global circuits of exchange (Oppenheimer 2012; Severin and Capota 2011). Tech industry analysts too note how new developments in low-cost, student-centered computing products were spurred, with IT firms like Intel adding some 7 million of its own student-tailored Classmate PC to schools across the Americas (Cristia 2012; Severin and Capota 2011). As IDB policy analyst Julián Cristia wrote, it was evident that OLPC was *"just the tip of the iceberg"* (2012) in the global spread of ICTs as 21st century "learning solutions."

Indeed, there's little doubt that growing investments in new digital education projects continue - in rates that defy critical findings from recent studies, and despite emerging arguments for more balanced approaches. Moreover, the uptake of such programs can exceed existing infrastructures for producing research. Indeed, their enthused, often un-cautious adoption seems to operate on the accelerated timescales of commercial IT developers than on the deliberative pace of academic researchers. They often betray an uncritical buy-in into the technological framings of the elite engineers and IT designers. Often based in "centers" of IT innovation, such actors' unshaking faith in the *irrefutably* transformative power of ICTs express what technology studies scholars have cautioned as a "techno-fundamentalism" (de la Pena 2006; Vaidhyanathan 2006). One that in the 21st century, frequently traffics beyond design circles.

This paper explores the means by which such "techno-fundamentalist" framings of educational technology initiatives gains such traction beyond engineering and design circles, such as to enable the rapid and expansive investment and buy-into widely-scaled programs. The dynamics and structures that enable such rapid uptake, I argue, requires more study, given how quickly such framings can gain purchase and be transformed into national policy before any critical debate among key sectors of the public or stake holder populations can take place. And given too the disproportionate scale of investments, which as the IDB report underscored in the case of OLPC: "are significant given that each laptop costs around $200, compared with $48 spent yearly per primary student in low-income countries and $555 in middle-income countries. [Yet], there is little solid evidence regarding [its] effectiveness."

This paper looks too into the foundations and dynamics surrounding the Escuelab Puno collaborations in Puno, Peru – perhaps one of the most surprising spaces from which a hack lab collective and new experiments in techno-cultural collaborations would emerge. As Peru's southern most province, Puno is known both nationally and internationally as the nation's folklore capital, for its large indigenous populations, cold stretches of Andean altiplano, and traditional quinoa, potato, and alpaca wool production. Yet it was from Puno that recent critiques started to emerge around the hyper-accelerated investments of the state in its expansive ICT4E initiatives, and the contradictions in the government's framings of "local inclusion" as a core objective of its digital education programs. Years before the release of the IDB reports and their critiques on the OLPC project in Peru had been released, rural hack lab networks -- that brought together open technology and free software advocates as well as public school teachers who had been working with new digital technologies in classrooms through multi-disciplinary hack lab collaborations like Escuelab Puno -- had started to develop their own programs for reform and

critical local lenses around "techno-fundamentalist" underpinnings to ICT4E deployments.

This paper aims to explore how and why such a collective was able to develop such a much-needed but rare critical counter-balance to the engineering-centric ethos that frequently unpins ICT4E initiatives– taking a key look into the cultural and educational investments of Puno that informed local framings of new technological deployments. Their critiques would make visible how models of techno-fundamentalism still operate in many ICT4E projects, including OLPC, and do so by framing deployments as events that extend perfectly operating and designed digital technologies, rather than as tests of unfinished technologies and the new design concepts of the developers behind it. They reveal too how key to the techno-fundamentalist ethos is the idea that "rural" actors and their connections to the outside world are objects that technological deployments must target for change and "updating" – even while state actors and developers can maintain their own static notions of technology and local connection.

Indeed, despite OLPC's promotion by highly resourced and high profile Western engineers and design circles –that at one point included support from such powerful IT corporations as Google, Red Hat, and the chip maker AMD (Andersen 2011) – as well as by the Peruvian state, it was not received with an uncritical embrace among Puno's rural technology collectives and local hack lab networks. Neither, however, did their orientations whole-heartedly reject OLPC as an unworkable option for provincial communities. Rather, the work of rural hack lab spaces like Escuelab Puno aimed to create more balanced, multi-disciplinary partnership around ICT4E deployments. Activities that included co-organizing annual workshops local teachers, other FLOSS advocates, and indigenous language activists to discuss XO integration into local schools, then sought to bring OLPC into closer interface with local communities and experts. Their work, that is, aimed to counter the selective and narrowly construed set of neoliberal narratives around technological access that disproporionately underscore the "key" role of large corporate investments operating in "strategic alliance" with state projects – while underplaying to ignoring other kinds of agents and actors working around new technological deployments. They underscore too how central to what hack labs can extend to local communities is not simply access to new technological resources, but access to *cultural resources* that aid the social organizing and extension needed to ground such resources in community life.

Global Encounters: Prospective Futures and Techno-Fundamentalist Interfaces

Since OLPC's arrival in Peru, a vision of technological access and global connectivity as both key to the nation's future and essentially dependent on transnational corporate collaborations has grown in prominence. Such a framing of new technology initiatives as means of not simply modernizing – but both internationally connective and nationally integrative – marked the ethos behind the Interactive Technology Camp that Peru's Ministry of Education organized in March of 2012 in collaboration with the World Bank, US Embassy, and the University of Lima. With funding from the World Bank, Microsoft, Intel and Telefónica -- the two-day event drew over 1000 participants to hear education experts, policy makers, *and* corporate IT reps present on the latest innovations in educational technologies, and to –as the conference website stated, offer participants the chance to "experiment with (new IT) applications and platforms" now available to "promote learning." Such efforts demonstrate, as the conference organizers declared, too in the "Conclusions" they published online for the event, how "the opportunity of education with technology" lies in generating "strategic alliances" -- whether between the public and private

sectors, local and global actors, or urban and rural interests. Officially, that is, digital education initiatives and ICT4E investments were touted as evidence of not only forward-thinking, future-oriented approach to education in Peru, but ones whose goals were about national inclusivity, the closing of global "digital divides," and the creation of new interfaces and "strategic alliances" between diverse sectors of the nation.

Such unapologetic, faith-infused framings of the XOs, of course, circulated globally prior to OLPC's arrival in Peru. From the project's beginning, Nicolas Negroponte, chairman of the OLPC Foundation, and founder of MIT's Media Lab, made his pointedly missionary zeal for the project readily known. At the XOs debut at the World Information Society Summit in Tunis in 2005, he boldly predicted that some 100 to 150 million XOs would be distributed across the world by 2008. Kofi Annan likewise hailed the machine as both "inspiring" and "an expression of global solidarity" (Twist 2005) – praise that won instant international headlines after Annan demonstrated the XOs self-powering by a wind-up crank before a rapt audience of international policy makers.
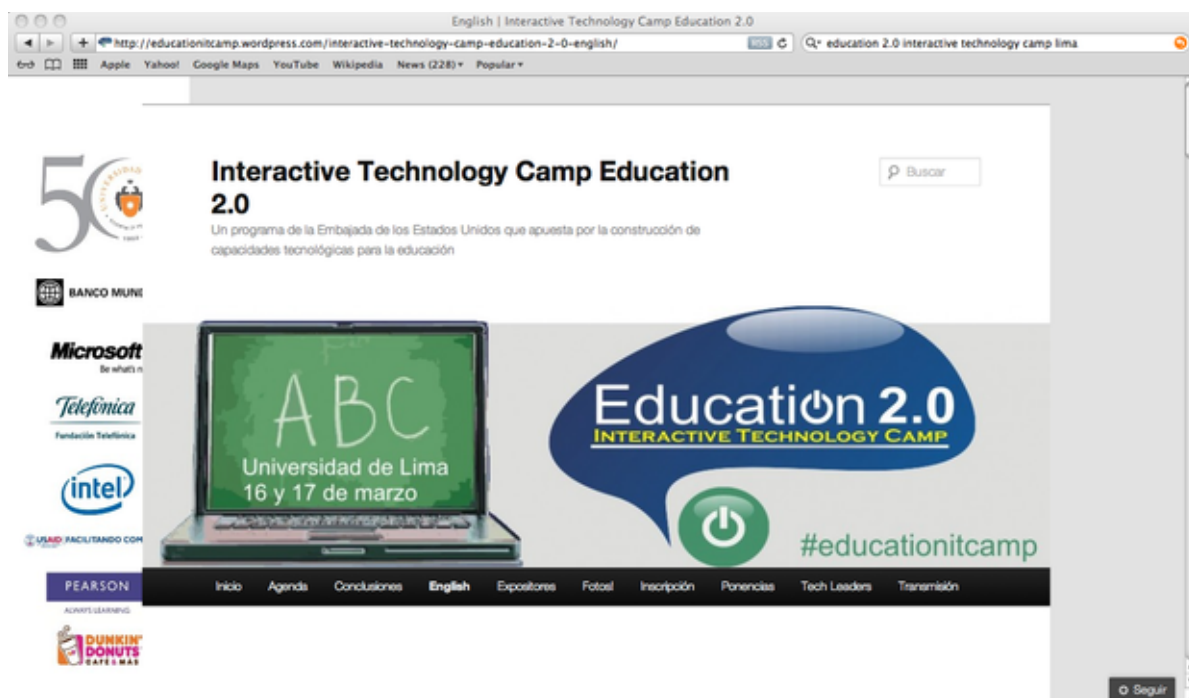
Website for "Interactive Technology Camp: Education 2.0" organized by Peru's Ministry of Education in March 2012.

While OLPC continued to expand partnerships worldwide – reaching its current distribution in more than 42 nations of 3 million mobile computers -- academic studies began to emerge around the initiative critiquing Negroponte for his unflinching "techno-determinism" (Toyama 2010 2011; Warschauer & Ames 2010), and a chronic resistance to learning from the lessons of local implementations. Such criticisms, while invaluable, nonetheless had only modest impacts in slowing the persistent growth of global ICT4E initiatives (Oppenheimer 2012; Severin and Capota 2011). Their continued expansion, despite such long-standing skepticism, vividly animates an underlying logic embedded within an array of other global ICT for development projects. Aside from asserting a *technological determinism* – that frames technology as the essential driver of history (Smith and Marx 1994, Winner 1989) – the sustained appetite for un-

or under-tested projects like OLPC makes explicit a framework of universalism, one where the same technology (be it the Internet, a mobile phone, or, in this case, a globally-purposed laptop) can be seen as serving the universally applicable solution for *all* manner of user, in whatever local context imaginable. Or as the Peruvian education scholar Eduardo Villanueva described it: "OLPC still believes in the power of one technological solution transforming realities as varied as Afghanistan or Uruguay." (Villanueva 2011)

Entry page of OLPC's Website: laptop.org

American studies scholars Siva Vishyanathan (2006) and Carolyn de la Pena (2006) underscore that key to "techno-fundamentalist" framings is the insistence that any human problem – even those caused by technologies themselves -- are best solved by newer ones. But OLPC's emphasis on the promise of digitality has as much to do with the singular wonder and power of IT, as it does with extending to the "third world" specifically another crucial invitation: that of at last being able to join the global circle of humanity. That through digitality, adopters would be able to SHARE a common global space, and partake in the universal operations of humankind – ones rendered further away absent the XO presumably. Or, as Negroponte puts it: "Access to a connected laptop or tablet is *the* fastest way to enable universal learning." (Negroponte 2010)

Such insistence that laptop access was "the only" relevant question for remote sites pointedly suggested that existing education-centered actors from local teachers to local

communities leaders – were virtually negligible and could be regarded as external to deployments.[i] That such actors were even suggested to be impediments to "real" learning, was reflected in OLPC's five "core principles," which specified in detail the conditions in which laptops should be adopted ⬚ indicating that i) children be laptop owners, ii) beneficiaries be aged 6 to 12, iii) every child and teacher receives a laptop, iv) connectivity through a local network or the Internet, and v) software be open source and free. Other local actors' roles in project deployment, however, remained conspicuously un-addressed – a point that local teachers critiqued in OLPC's early years in Peru's rural zones (Chan 2011 2014). Their concerns were echoed by IDB reports that similarly cited the stark imbalance between OLPC's abundant information supply on student XO adoption and the neglect of other "essential" education factors: "[OLPC's] underlying vision is that students will improve their education by using the laptop and through collaboration with their peers. However, the OLPC portal provides limited information about how to integrate the computers provided into regular pedagogical practices, the role of the teachers and other components essential for the successful implementation of the model" (Cristia et. al. 2012, 6).

A long-time adherent to Seymor Papert's constuctionist learning model, that viewed children as radically individualistic, self-directed learners and innate self-teachers, Negroponte further dismissed the need for project evaluation, stating in a September 2009 IDB forum speech: "That somebody in the room would say the impact [of the XO] is unclear is to me amazing— unbelievably amazing… There's only one question on the table and that's how to afford it... There is no other question" (Negroponte 2009; Warschauer & Ames 2010). Indeed, the efficacy of such argumentation in influencing the education policy makers in Peru was demonstrated in the growing expansion of the program – from 400,000 XOs in 2009 to nearly 1 million by the end of 2012 -- even after pointed critiques around the program began to emerge from IDB studies.

Yet despite OLPC leadership's insistence that laptop access was "the only" relevant question to improving education outcomes in partner nations like Peru, outside its capital, attempts to construct more balanced, multi-disciplinary partnership around new educational technology deployments were emerging – and from international hack lab sites no less. Ongoing collaborations among local teachers and engineers based in Puno had begun to formalize into the creation of Escuelab Puno -- a non-profit, civic association and hack lab focused on developing pedagogical and engineering support for educational technologies' classroom use. For three years prior to Escuelab Puno's founding, Puno had been the site of annual workshops organized by local teachers, engineers, FLOSS advocates, and indigenous language activists to discuss XO integration into local schools. Such activity resulted in gatherings that drew more than 400 teachers from across the villages and towns of Puno in the 2011 workshop; and culminated in the launching of Escuelab Puno by a mixed team of five local teachers and FLOSS advocates (Chan 2011 forthcoming).

Neyder Achahuanco, the young systems engineer and part-time teacher who helped cofound Escuelab Puno with fellow Puneneans he'd gradually come to meet throughout his experiments with FLOSS technologies as a teenager. His investments in FLOSS projects began when he still in high school and volunteered to help local teachers migrate schools and universities from Windows to FLOSS platforms. Although only 26-year-old now, his first hand observations on Peru's "digital education" initiatives ⬚ and the growing interactions they've entailed between education and engineering specialists ⬚ already span a decade's worth of various local, national, and now (with OLPC) globally scaled cases.[ii] With some 30,000 XOs

deployed in Puno, he makes little attempt to veil the critique he's formed after witnessing various models that privileged engineering expertise and marginalized teachers' input repeatedly unfold over the years. As he stated flatly in an interview: "Having an engineer in front of someone [for training workhops], at the front of a room with a group of teachers just listening just does not work. It doesn't work because engineers weren't interested in understanding teachers, and teachers are not interested in becoming engineers."

He's clear too that part of Escuelab Puno's mission is to caution against the risks of "techno-fundamentalist" orientations that reify the "self-evident" need for rural transformation without envisioning parallel reform potentials in other sites, and that amplify the discrete solution-making capacities of IT and urban technology experts. He specifies that among the factors that distinguish Escuelab Puno's deployment approach is its recognition that such techno-fundamentalist urges and their dependence on narratives of new technologies as forms of "imported magic" (Medina, da Costa Marquez, and Holmes forthcoming) are part of the problem, rather than the solution: "We've become very critical of this idea embraced by many technology projects that the only thing that will save education, [or] improve society, is to throw technology at it. To say, 'Here, take this technology, your magic wand to escape from poverty! Here are your green laptops, your magic wand to improve students… [We forget] there's a huge, complex, diverse, and highly multi-disciplinary process in what we call education."

He explains that part of Escuelab Puno's philosophy is reflected in its aims to foster spaces of dialogue between engineering and pedagogical experts by balancing such representation in its leadership. And he explains that one of the primary objectives that inspired its founding was to facilitate multi-disciplinary collaborations around XO deployments specifically through a "Partnership Program" the collective proposed to regional and national ministry officials – that would create one-to-one teacher-engineer partnerships in classrooms to collaboratively design local XO instruction techniques and materials. The idea, he specifies, was one that emerged only through the involvement of non-engineers in Escuelab Puno's projects: "The idea of the `Partnership Project´ didn't suddenly just dawn on us overnight. It was the outcome of almost a year of collaboration with educators, sociologists, Aymara and Quechua representatives discussions around multiple interests, daily work, and work in rural site."

He insists, moreover, that the partnership model they've promoted would operate as much to the benefit of engineers, and their means of deriving solutions through technologies, as much as to local teachers: ¨Our goal we realized, was to improve a social problem [rather than a technological one]. Under the direction of just engineers, [we would never] have seen that the problem could be engineers. [Since] engineers always think of themselves as bringing solutions . . . [But] through having multidisciplinary input . . . we realized that the problem was with us, in how we thought, and in what we said was the miracle solution and magic wand that would resolve everything. We realized we were creating more problems than solutions for teachers." Pausing for a moment, he underscores how the process of technological translation might in fact operate as much towards the de-centering and reform of technologist' consciousness, as it works towards the localization of technological artifacts, adding: "But we only achieved this after we sat around the table with everyone together. Only then could we *really see* what we were all doing . . . as engineers, teachers, sociologists, linguists, or ordinary people."

Entry page, Ministry of Education' website for its One Laptop for Child Program.

National Encounters: Intercultural Resources and Interfacing with the Present

A visit to the Ministry of Education's website for the OLPC initiative, which pushed forth one of the earliest national framings of computing at the periphery makes plain, too, its vision of technological fundamentalism for online audiences. After entering the site via a page that features a single profile of a young student with her gaze fixed on her XO laptop, visitors can follow a "Testimonials" links to further accounts of rural students with their newly minted XOs. A photo of two girls seated on a grassy slope working with theirs, appears beside the quote, "Today we dream of a future, tomorrow, we'll achieve it." Another image is paired with the statement, **"**Today I discover, tomorrow I'll innovate." And a final image in the column, where seven smiling students raise laptops triumphantly over their heads, is accompanied by the statement: "Today we have our OLPCs, tomorrow we'll be prepared for the future." The page of anonymous quotations supplies no further information on where the photos were taken or when quotations were recorded – no names, no dates, no local details -- a curiosity, given the $82 million spent for nearly 1 million XO laptops for students across the nation. (Talbot 2008) The Ministry had even created a new office, DIGETE – the General Direction of Educational Technologies (Direction General de Tecnologia Eduactiva), shortly after its partnership with OLPC began in 2008 to manage such expansive resources.

      Such state-produced visualizations are reminders that the techno-fundamentalist ethos of projects like OLPC aren't sustained by foreign Western engineers alone, but have relied centrally upon the fostering of local contacts and stewards – whether governments, local universities, or national NGO -- to maintain and expand deployments. Oscar Becerra, the former Chief Educational Technology Officer for Peru's Ministry of Education and the original head of its

OLPC deployment, for instance, stressed the capacity of new educational technologies to "integrate" remote citizens in speaking to Western reporters in 2008, in the months before Peru's pilot program would expand to one of national-scale deployment. Explaining the rapid growth of the program - where some 400,000 XOs were planned for 9000 schools by the year's end – he stressed how it would allow rural children the freedom to not just imagine their own "future" – but to choose one for themselves. He said: "Our hope for [that student] is that he will have hope. We are giving them the chance to look for a different future… These children who didn't have any expectation about life, other than to become farmers, now can think about being engineers, designing computers, being teachers--as any other child should, worldwide." (Talbott 2008) Becerra's missive underscores a crucial point about the project: that its emphasis on the promise of digitality has as much to do with a stress on the singular power of IT, as it does with extending to "disconnected actors" the option of both global and national inclusion: That through digitality, adopters would be able to enter into the same universal operations marked as essential to all contemporary agents – that of thinking, learning, and creating with information – but which are rendered further away, presumably, without hi-tech.

While Lima's governing elite enthusiastically adopted such a framing of technological pedagogy and digital literacy, for actors who had worked around educational technologies in Peru from "peripheral" sites like Puno, they sounded less revolutionary and promisory than merely a new means of replicating dominant approaches to education. Latin American historians of education have pointed to how assimilation into the dominant social order served as the defining motive of education among rural and indigenous populations from the 18th Century onward. (Perez 2009, Lopez and Kuper 2000, Lopez and Rojas 2006) Spanish literacy - rather than *digital literacy* - then was framed as the key to incorporating diverse minority populations, and remained so even well after nations won independence from colonial rulers. And while formal education models operated to the exclusion, depreciation, and gradual erosion of indigenous languages, by the mid-20th Century, they would cunningly begin to adopt bilingual instruction strategies, designed still to assimilate minority populations.

Such assimilationist models, of course, came under ardent critique from various indigenous movements in Peru from the 1970s onward -- from el Programa de Formacion de Maestros Bilingues de la Amazonia Peruana, FORMABIAP, to la Asociacion Interetnica de Desarrollo de la Selva Peruana, AIDESEP. (Perez 2009, Trapnell and Niera 2006) Together, they articulated new inter-cultural ideals that found their way into national policy in the 1990s, and continue today to sustain critical discourses for cultural and educational reforms. As Peruvian Education Scholar Norma Fuller writes, in the best of cases, "inter-culturidad (interculturality) extends an ethical-political proposal which seeks to improve the concept of citizenship with the aim of adding recognition of the cultural rights of people, cultures, and ethics groups." (Fuller 2003, 10)

Indeed, much as intercultural activists based their critiques around education models and approaches to Spanish literacy, so too have rural education actors working with new digital technologies begun to articulate critical approaches to *digital literacy* and technology-enabled education models. Their position arguably presses for a distinct and critical intercultural consciousness around technologies – as a project for inter-tecnologidad – that like interculturalism, aims to generate new pedagogical tools and methods in technological use, beginning with the articulation of ethical-political ideals. Much like the decolonial ethics that intercultural theorist Catherine Walsh elaborates, (2004), such inter-technological ideals aim to firstly, recognize that technologies are not neutral, but have a value, colour, gender, and places of

origin; second, recover and revalue and reapply ancestral technologies; third, frame technology as a tool that can contribute to new processes of intellectual intervention; fourth, open debate about cultural (as well as technological) politics; and finally, critique the dominant assimilationist politics embedded within literacy/education policies.

Moreover, efforts in Puno had begun to earn unexpected visibility for activity around educational technology projects and XO deployments. This, despite the fact that activities there lacked official endorsement or support from either Peru's Education Ministry or OLPC leadership in the US. And this, despite the fact that Puno, Peru's southernmost province, is better known within the national imaginary for its large indigenous populations, cold stretches of Andean altiplano, and quinoa, potato, and alpaca wool production. Indeed, with the indigenous languages of Aymara and Quechua still defining presences in the region, and a high-altitude climate operating in contrast to Lima's winter-less coastal climate, Puno is often summoned as the remote, inhospitable other to Lima's modern, mestizo, capital city cosmopolitanism (Jacobsen 1993).[iii] Nonetheless, it was there that the first XO-based users manual a 100-page, teacher-centered text distributed online and translated from Spanish into English, French, and Arabic was published (Salas 2009). It was there too, that alongside efforts to organize some of the largest conferences for rural teachers' XO use, that workshops for translating XO software into Quechua and Aymara began, organized with indigenous language activists and elders, and aiming to be among the XO's first indigenous language localizations.

Rural teachers working around OLPC deployments since 2008, and who were central the founding of Puno's first hack lab collective, Escuelab Puno, were becoming especially vocal on question the state's official framings of technology and "local inclusion" in digital education initiatives. The 2011 teacher-organized conference around OLPC deployments in the Southern Andean province of Puno, for instance, drew in some 400 local teachers from across Puno's villages and towns while also drawing in a transnational team of open media and language activists from Lima, Ecuador, Bolivia, Argentina, Spain, and Finland. Eleazar Mamani Pacho, the principal of a small public school of 42 students in the Aymara village, Lacachi, spoke for the event. Although his school, Lacachi had earned a reputation for being one of the more successful regional XO cases, where teachers and students maintained routine use of the laptops, he remains a vocal critic of the lack of clear intercultural objectives in ICT4E deployments across Peru.

Visiting Pacho's school recently, students could readily be seen walking to class, each toting their own laptop and some playing mp3 files as they traveled; and XO hard drives filled to capacity with digital photo, videos on local life, and self-documetation – like much like you'd find on the mobile trappings of many Western youth, with the exception that local life included conversation in Aymara and activities recorded against the altiplano's backdrop. But Pacho refrained from making any reference to the "achievements" of these kinds of "global assimilations" in speaking to fellow teachers. He used the floor instead to underscore the deep techno-determinism that shrouded the arrival of the region's share of XOs – and recounted how laptops appeared without prior input from teachers, parents, or community leaders. As he described it: "When they arrived, there was no other option [other than to accept them]… But when [the state] gave you the computer, it was really another duty on top of all the [routine] functions that teachers already have, and we were never trained to teach with such tools before." He would later be sought out for interviews from global news outlets, including the US's National Public Radio and the Christian Science Monitor. In such interviews, he stressed how the exclusion of local teachers' participation not only reproduced existing power relations, but erased actual investments and experiments innovated by local teachers. As he put it in speaking to me,

"I know there are many teachers who work with the XOs well, people with very successful experiences in their classes. They should be brought together [and organized]… [Because] we're carrying enormous inequalities in education" and "Without rural and *intercultural* priorities [around technology], we'll keep amplifying unequal divides."

Photos pooled from participants of Sugarcamp Puno 2011.

Local Encounters: History as Resource and Interfacing with the Past

Some portion of Pacho's fellow educators and colleagues were indeed volunteering their time to participate in a software translation project – or translation hackathon - held in Puno's municipality. Over a week in April 2011, they could be found meeting several hours a day around a table that balanced an unusual mix of coca leaves, offerings to the Pachamama, and

various mobile digital gadgets, volunteers would cluster into discussion circles, tossing jokes around over the imprecise translation of terms between Spanish, Quechua, and Aymara, as they worked. Their efforts drew upon the distinct expertise of an array of actors – of local teachers and programmers from Puno, Quechua and Aymara elder and youth activists, and participants of the Escuelab hack lab network from Europe and the Americas. The gathering was held in parallel with a larger 2011 Sugarcamp Conference organized by teachers in Puno – including Eleazar Mamani Pacho and Sdenka Salas -- around use of the XO laptop in classrooms. And by the end of the smaller translation hackathon, participants hoped to make significant headway into Quechua and Aymara software translations that could be installed onto the 1 million XOs in schools nationwide -- even if the project remained independent of the state.

Laptops screens were just being opened for the workshop when Francisco Ancco Rodriguez, a native Aymara speaker, and retired public school teacher from the nearby town of Acora -- called for the group's attention. Drawing out a round bundle of cloth, he unfolded it

onto the table's surface, and spread out the dried coca leaves clustered in its center. Selecting three [iv], he arranged them into a small fan formation, and began leading a short prayer in Aymara, holding the fan of leaves – a k'intu - firmly in front of him. Just before placing the portion into his mouth, he waved the fan before him and blew a breathful of air over them[v] - and then invited the group to draw their shares from the pile.

The ritual, a ceremonial offering known in the Andes as a despacho, is one that the language activists participating in the group had seen before -- although *not one* that most of the technology activists were accustomed to paying deference to. Long performed in Andean communities prior to auspicious occasions, the despacho is still understood as a means of communicating with the natural world's spirits. In its most simplified version, it is framed as an offering to the Apu mountain spirits or the Pachamama - the female cosmic energy often translated as Mother Nature, but in the Andean world, associated as much with death as with birth and life. In whatever instantiation, however, it is practiced as a means of entering into a careful dialogue with ambivalent forces not fully controlled by man. Such powerful energy is read as running through varied objects in the Andean world, encompassing, as anthropologist Olivia Harris explains: "a whole spectrum of sacred beings: the mountains, the dead; untamed places such as gullies and waterfalls... The defining character of these [energies] is not so much evil or malice as abundance, chaos, and hunger… [They] are the source of both fertility and wealth, and of sickness, misfortune, and death." (1995, 312) Such a worldview of nature and living spirits, while dramatic to untrained ears, is indeed a form of relating that is taken rather matter of factly in the Andes: as simply a living, present feature of an environment people are already in dialogue with. Rituals like the k'intu incorporated into contexts like local hackatons, then, are means of rendering both nature and technology distinctly visible and legible, and that channel multiple logics -- moral, civic, and cosmological– simultaneously.

Following the Puno translation hackathon, participants pooled and shared photos of the event among themselves, across online social media platforms (as they typically would after any workshop). Their images vividly capture the diversity of actors involved in such events and working side by side, or often clustered in groups around a single computer screen. Including young indigenous language activists, Aymara and Quechua elders, public school teachers from Lima and the provinces, Latin American geeks, and Western hackers from Europe and the US, such images reflect the diversity of relations, encounters, and sentiments cultivated between participants. And they demonstrate the range of diverse investments made to build distinct technological futures by such actors. Some elements (like the diverse arrays of mobile gadgetry) which looked comfortably familiar for anyone identified with hacker and geek publics before (Coleman 2011 2013, Kelty 2005 2008), but many of which (like the k'intu) might not have been as familiar, and invited local translations. All, however, were visually referenced as the source of some kind of positive, generative energy that compelled participation, and that marked "inclusion" as less dependent upon interaction with a particular technology, and more instead about creating new *cultural* and inter-relational contexts that required multiple cultural and technological lenses to be legible.

It's notable that these kinds of visualizations are far removed from the dominant ones that circulate around OLPC, and ICT4E projects more broadly. In this vision of "digital inclusion," what's typically depicted is the image of the rural child in contact with a glowing laptop – often against a starkly rural or provincial landscape.[vi] Rarely referenced are the diverse agents, dispersed across rural *and* urban sites, whose global coordinations are needed to enable local deployments. Just as no mention is made of the complexities of trans-local negotiations and

cross-epistemological engagements between interest groups. Such an image of IT, prominently deployed on OLPC's website, has traveled too to the Ministry of Education's own publications, and to imagery circulated by technology-centered news outlets like <u>Wired Magazine</u>, whose June 2012 issue touted OLPC's deployment of tablets in Ethiopia as [quote] "giving kids who had never seen a computer before [the ability to] learn quickly" (Talbot 2012).

Wired Magazine June 2012 article: "Screen time: Kids who had never seen a computer before are learning quickly."

Such images operate in distinct contrast to those that Puno's hack lab participants circulate. The hybridizing aesthetics and literacies they generate indeed, are ones that echo the vanguard aesthetics and experiments in technology, literacy, and education that Latin American historian note have stretched back more than a century in Puno. Such local practices emerging from Puno's altiplano explicitly challenged the Peruvian state's turn-of-the-century vision of modernization, and the roles of educational and literacy technologies were projected play therein. Works by Vicky Unruh (1994), Cynthia Vich (2000), Juan Zevallos Aguilar (2002), Guisela Fernandez (2005), and Jose Garambel (2010) stress how in the early 20th Century, Puno was recognized as one of the most fervent areas for indigenist literary movements in the region. Between 1900 and 1940, diverse artists and intellectuals seeking to reframe the nation's relationship to Indigenous culture, wrote and published numerous works that defended indigenous populations, condemned elite landowners' usurping of lands, and insisted on new

models for education and creative production that better reflected local cultural concerns and visions for the future. Literary circles like Puno's Orkopata group, furthermore, pushed for new forms of literary expression that blended indigenous languages and narrative conventions with Castellano through the vanguard publication, <u>Boletin Titikaka</u> (1926-30) (Fernandez 2005; Unruh 1994; Vich 2002; Zevallos 2002).

Between the late teens and mid-1930s, in fact, vanguard literary activity was emerging all throughout Latin America (Unruh 1994). Much like those outside the continent, their activity included several possible forms: the emergence of small groups of writers, committed to creative innovation; the affirmation and dissemination of critical and aesthetic positions through written manifestos; experimentation with multiple literary and artistic genres to cut across generic boundaries; the publication of magazines as outlets for both artistic experiments and cultural debates; and the organization of study groups that generally fought against modernity's push for cultural homogenization. What many participants noted was unique to Latin American vanguard circles, however, was their embeddedness within local contexts of deep cultural heterogeneity, and the relative proximity they had then to enable engagements and investigations into local language, folklore, and cultural history (Unruh 1994).

Puno's Boletin Titikaka (1926-30) thus came to be known as the most lasting vanguardist magazines coming from Latin America's own peripheral zones – and from outside major cities. (Fernandez 2005; Vich 2002; Zevallos 2002) It grew in fact, to have a readership not only across Peru, but across Latin America and globally -- lasting as long as Lima's best known vanguard publication, Amauta. It was known for articles on "aesthetic Indoamericanism," and The Boletin's editor, the surrealist writer Gamaliel Churata devoted extensive attention to linguistic investigations in essays and bilingual poetry using vernacular verse. The magazine promoted the results of such studies, and indigenist orthography more generally, with the goal of making written Spanish appear visually like a more phonetic transcriptions of Quechua or Aymara. So that alternative spellings such various Spanish phrases commonly appeared. Such practices, as literary historian Vicky Unruh writes, were meant to "liberate aesthetics from chains of tradition" (1994, 210) reproduced through the politics of language and technologies of literacy. Conventions in Grammar and genre were seen as adhering to problematic politics and "blocking 'true consciousness'"… The artist's work, Unruh elaborates, was thus to "forge new creative, and technical principles for language" that were inventive as well as able to recover lost languages from national and ethnic pasts.[vii] As she continues, "Given that to write and speak well signified privilege and functioned as keys to social mobility. Thus the vanguards recuperative linguistic undertakings constitute a pragmatic rapprochement btw the language of literature and the language of everyday life and underscore language's complicity in social conflict. " (1994, 210)

Other Punenan indigenists of the era worked specifically through educational models to challenge what they saw as the state's problematic application of literary technologies and educational models as a means to reform indigenous populations. Beginning of the 20th century, the Puno educator and intellectual Jose Antonio Encinas, issued some of the earliest national proposals for a model of indigenous education rooted within native culture. (Garambel 2010) Encinas criticized the imposition of a system which he saw as operating on the principle that – as he described it: "everything native should be forgotten." He critiqued how state officials often saw indigenous dance and music to be of "poor taste" – how municipalities prohibited indigenous communities from maintaining traditional dances, and how police were allowed to punish and fine Indians that entered restricted urban areas. He thus wrote: "If we educate students about Dante and Shakespeare – why not allow them all to sing the excellences of the

races and beauties of the altiplano?" His proposals eventually helped to push forth new state policy – the first on bi-lingual education - in the 1940s that recognized that Peru's two largest indigenous languages, Quechua and Aymara, should be used in class instruction.[viii]

Finally, the artists and educators of Puno's vanguard movements of the early 20th century, influenced the founding of one of the Warisata school just outside Puno's borders, in the Bolivian town by the same name. (Gustafson 2009; Perez 1962; Salazar 1997 2005) Founded in 1931 as a collaborative project between local Aymara community leaders and progressive Andean educators, it saw itself as a radical experiment in indigenous education and education through collective uses of technology. Education at the Warisata was seen as a key means of recuperating indigenous territory and expressing collective rights. Thus, the school didn't mimic Western or Limenan models, but was based on indigenous community structures – with a council of Aymara elders – the Parlamento Amauta – that oversaw it and maintained contact with local leadership; and technologies that were applied for both educational and communal purposes, through classes structured around agricultural and community-based production in weaving and ceramics. From its beginnings too, the school attracted global attention of diverse intellectuals, artists, writers, and journalists from both in and outside Latin America. Peruvians like Gamaliel Churata would be involved with the Bolivian school from 1932 onward, bringing other writers, artists, intellectuals and journalists from the region with him.[ix] And its founding would compel the organizing of the first Interamerican Indigenist Congress in 1945. Held at the Warisata's rural site – it attracted politicians and education leaders from across Latin America, with participation from the governments of Perú, Bolivia, Ecuador, Mexico, Guatemala, Venezuela, Colombia, and Cuba[x] (Perez 1962; Salazar 1997 2005).

Today, some 17 Latin American countries (López and Küper 2000, 4) apply models of Intercultural Bilingual Education (IBE) – an achievement that builds on the beginnings of rural education activists and reformers' agendas from nearly a century ago. Moreover, the legacy of such regional education activists and inter-cultural reformers is reflected in the work of Puno's hack lab participants, whose book shelves and workshop tables routinely feature key works and publications from turn of the century intellectuals of the Altiplano, including Churata, Encinas, and Warisata's founders, and contemporary histories written on the like. Such archival practices and inter-generational references by Puno's hack lab participants demonstrate the diverse cultural resources that are used in their work to generate visions of new and "alternative futures." Their efforts delink the associations entrenched by dominant ICT4E visions of the periphery as locked within part and static traditions, and urban innovation and engineering centers (whether MIT or Silicon Valey) as the lone sites of innovation and future making. That such engagements might have escaped the historical conceptions of elite engineers and designers from global projects like OLPC – for as globally hyper-connected, information-rich, and structurally resourced as they might be, indeed -- is what is may deserve further study.

Tabletop at Sugarcamp Quechua and Aymara software translation hackathon, 2011.

Conclusion

The techno-fundamentalist ethos that commonly underpins the most ambitious of ICT4E projects is not entirely removed from the promise of Western universalism and enlightenment that Emmanuel Kant asserted in his famed treatise on Perpetual Peace centuries ago. Kant in that document framed the extension of rational, liberal individualism as what would enable a single condition of Enlightened Modernity to emerge across all humanity. (Kant 1784) Such a totalizing model of historical progress, of course, was one which post-colonial scholars later critiqued as predicated on a geographic hierarchy. One which saw the West as the epitome of evolution, and that consigned the non-Western "rest" to what historian Dipesh Chakrabarty called the "waiting room" of history (1999) Likewise, modern science's own claims to the noble pursuit and spread of the universal "truths" and the "facts" of nature, has been critiqued by science studies for neglecting the locality of practice and cultural context in scientific inquiry. As numerous science studies scholars -- from Arturo Escobar (2007 2008) and Donna Haraway (1991 1997) to Ivan da Costa Marques (2005) and Bruno Latour (1987 1993 2010), among others – have all underscored – knowledge practices are always local, situated, and social.

The practices of Peru's rural hack labs, underscore, however how we are not only left to retreat to relativistic isolation, where no means of trans-local or global connection could be imagined without its reproducing yet another function of techno-fundamentalist domination. The question they seem to pose instead is whether a more conscientious, humbled version of a universal gesture can be recovered for our networked age. Rural hack lab practices – that bridge

generations, urban and rural imaginaries, indigenous leaders with global hackers, and ethics pushing towards the future with others remembering an obligation to honor the past – push for such possibilities. The events they generate, while not urging for either outright technological revolution or rejection – might be read instead as creating spaces of "awkward engagement," as anthropolgist Anna Tsing framed the term. They signal that is the possibility of a space where distinct forces and interest meet in a "zone of cultural friction" – one where consensus and the dissolution of difference can't be taken for granted – and "where words [may] mean something different across divides even as people speak." (2004, xi)

Such mixed scenes suggest something more than a simple critique of dominant framing of technological universalism. Here, actors work around the possibility of activating what Tsing called "engaged universals" instead. (Tsing 2004, 8). Such forms acknowledge the dual opportunity and challenge they bear as bodies of "knowledge that move" (Tsing 2004, 7) across space and time. As such, they have the capacity to construct new bridges between sites of encounter –- but to also foreclose other interfaces, she warns, if not careful. And here, then, a considered treatment of local histories and the past must be surely faced, even when more than a few episodes of conflict, betrayed trust, or long standing tension are involved. Dipesh Chakrabarty emphasized this in reminding his readers that universals could be called upon to do multiple kinds of work –among them, to serve as "a necessary placeholder in our attempt to think through questions of modernity." Likewise, ICTs in their globalizing assertions might be said to be a means for us to think through questions of futuricity, unstable though such projections may be, and filled at once with pitched hopes for new prospective relations, as well as other ways to frame those past.

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i   That such actors were effectively framed as impediments to "real" learning, was reflected further in OLPC's mission statement, which contrasted images of existing classroom experiences to the change the XO experience offered: "[We aim] to create educational opportunities for the world's poorest children by providing each child with a rugged, low-cost, low-power, connected laptop with content and software designed for collaborative, joyful, *self-empowered* learning. When children have *access to this type of tool* they get engaged in their own education. They learn, share, create, and collaborate. They *become* connected to each other, to the world and to a brighter future."

ii   In the case of Plan Huascaran, the national digital education initiative in Peru launched under then President Alejandro Toledo's administration, that preceded the state's OLPC investments.

iii   Aymara is still spoken by an estimated 41 percent of Puno's 1.3 million inhabitants, and Quechua spoken by some 30 percent.

iv   The darkest, shiniest leaves that show the least signs of age, mold, or blemishing are typically selected.

v   This act, known as the pikuy, is that which is thought to allow the invocation of spiritual beings.

vi   The familiar vision the computer-ready child that modern audiences have come to recognize as indicative of future-readiness remains stable, that is, except for the rural setting.

vii   One of the most celebrated literary works of the period – the novel *El Pez de Oro*, was written by the *Boletin Titikaka*'s founder, Gamaliel Churara, and offered an exemplary model of experiments in linguistic pluralism to this end. It demonstrated a vibrant mixing Quechua, Aymara, and Spanish together to reflect the cultural heterogeneity and sometimes fragmentedness of the region.

viii   And his ideas also took form in establishing La Escuela Nueva in 1907, the first public school to be officially of indigenist orientation – in Puno. Encinas' work was in many ways built on the tradition of La Escuela de Utawilaya, founded in 1898 as a clandestine school that operated by night to teach Aymara Indians to read, and run by the Aymara community member, Manuel Z. Camacho an Camacho, after having participated in regional protests against the abuses of local landowners with Aymara leaders from nearby Puno towns – decided to create a space where peasants could acquire reading and literary skills as "instruments of freedom." (Garambel 2010) Despite the acts of violence and arrests he withstood, Camacho kept the school running until 1909. By 1918 some 45 primary schools run by Aymara Indians had formed in Plateria.

ix   Various Bolivian and Mexican intellectuals were involved with the project, as was the North American writer and anarchist Frank Tanenbaum. And Puno-based writers and educators like José Antonio Encinas were among Peru's best known friends and visitors to the project. And Gamaliel Churata's own ties to the site are reflected in the art work of El Pez de Oro, which was drawn by Warisata teacher Carlos Salazar.

x   Multiple participating nations in would develop educational polities based on the recommendations of the Congress. By 1939, some 16 additional indigenous-run schools had been founded across Bolivia alone.