



DEVELOPMENT IMPACT LAB

A USAID Development Lab
Headquartered at
University of California, Berkeley

Spring 2013

DIL's Mezuri Platform: Addressing Development's Data Scarcity Through Groundbreaking Technology and Greater Openness

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BERKELEY – Many barriers to international development are still poorly understood, and the specific impacts of most development approaches have yet to be measured. But this situation is rapidly changing. New information tools and measurement approaches, along with the democratization of data and adoption of open source frameworks, are changing how policy-makers, professionals and academics learn about development. One important advance has been more rigorous assessment of outcomes from innovative economic and social development programs. This can inform both decision-making and innovation in meaningful ways.

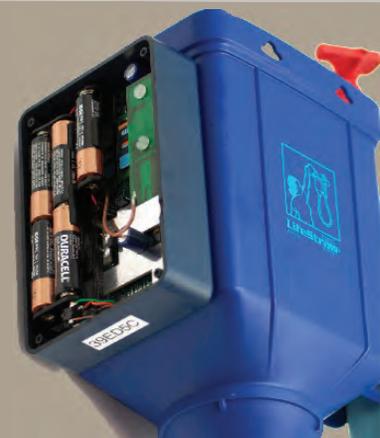
The new USAID-funded Development Impact Lab (DIL) is building on the movement toward better measurement and data

sharing. Rigorous monitoring and evaluation (M&E) strategies are critical for DIL's mission to identify, refine, and scale new sustainable technology solutions for the developing world.

Toward this end, Berkeley computer science professor Eric Brewer (who also serves as Vice President of Infrastructure at Google) is leading a group of DIL partners to create a next-generation toolkit for M&E. The toolkit includes a suite of econometric techniques, computing software, and information technologies--ranging from sensors to cellphone apps--to collect and manage large amounts of data from development projects in the field. This exciting, open source platform is named Mezuri, meaning "measure" in Esperanto. It embodies DIL's emphasis on rigorous evaluation and open data access. The platform will be made freely available to researchers and development professionals throughout the world, exemplifying DIL's commitment to include new actors in the fight against global poverty.



From left: UC Berkeley Professor Clair Brown, UW Professor Gaetano Borriello, and PSU Professor Evan Thomas discuss their work on data collection and data management at a recent DIL Launch Event at UC Berkeley.



FZWSWEETSense™ i [d]WeWeadallows for customizable, in-situ instrumented monitoring and data collection on technology performance and use. Above, the SweetSense has been designed to support and monitor SLifeStraw XFW which aims to provide purified water in developing countries.

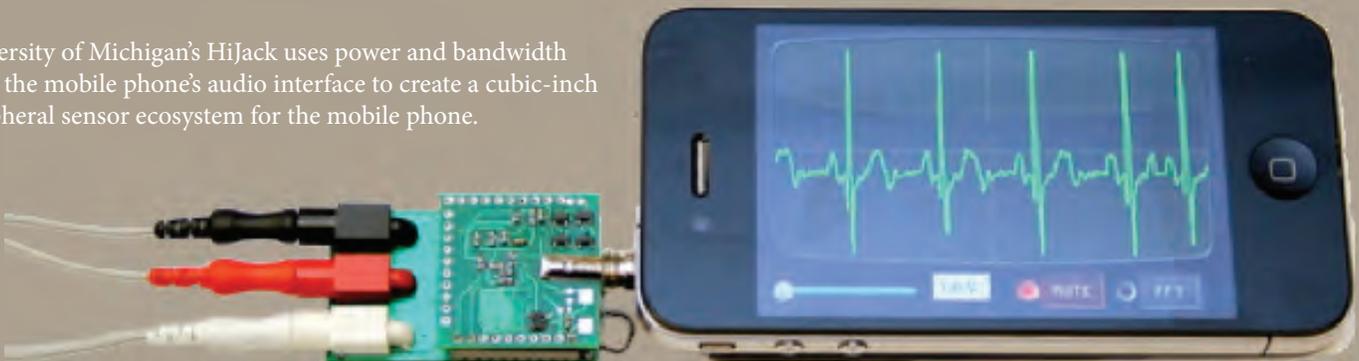
A Sensible Approach

The Mezuri team includes researchers from Berkeley, Portland State University (PSU), the University of Michigan (UM), and the University of Washington (UW). The PSU group, known as the Sustainable Water, Energy, and Environmental Technologies Laboratory (SWEETLab™), has designed a sensor that provides objective, quantitative, high-frequency data on the performance and household usage of water and sanitation technologies provided by development organizations. The tool, called SWEETSense™, is currently being piloted as part of programs that provide water filters, latrines, household solar, and rural infrastructure in Indonesia, Haiti, Guatemala and Rwanda.

Sensors can address the shortcomings of gathering data through infrequent and expensive household surveys. “We want to show how international aid is actually working,” NASA veteran and SWEETLab Director Evan Thomas said at a recent DIL Conference at UC Berkeley’s Blum Center. “As engineers, we understand the importance of rigorously using instruments to test programs.” SWEETLab™ ultimately aims to improve the quality and accountability of international development projects, allowing practitioners and researchers to better understand which products or services are valued and actually used by the poor.

UM Professor Prabal Dutta shares this aim. Dutta, who completed his PhD in the Computer Science Division of UC Berkeley’s Electrical Engineering and Computer Sciences Department, is involved in a range of projects that aim to make computing more transparent, affordable, and widespread. One such project has produced HiJack, a state-of-the-art device that allows a smartphone to easily integrate with a range of external sensors. HiJack opens the door to new applications of smartphone-based data collection, including EKG monitoring for health interventions and soil moisture testing to improve agriculture. Remarkably, Dutta’s team has refined its design to produce a version of HiJack with components that cost as little as \$2.34, maintaining low cost for researchers and practitioners working in resource-constrained settings.

University of Michigan’s HiJack uses power and bandwidth from the mobile phone’s audio interface to create a cubic-inch peripheral sensor ecosystem for the mobile phone.



Voices from the Crowd

A focus on access to development data is another exciting aspect of the Mezuri toolkit. Data from low-cost sensors and phones will be shared on an open source, flexible online platform that can adapt to a variety of M&E applications. The platform builds on the crowdsourcing revolution that has fostered web-based knowledge giants like Wikipedia. Mezuri will be able to share and disseminate data in ways that empower citizens and improve governance, nurturing a broad understanding of development as civic engagement. Just as Wikimedia – the infrastructure that runs Wikipedia – is open source (allowing people everywhere to create and manage their own wikis), DIL’s Mezuri platform will facilitate information sharing about foreign aid, economic growth, and social welfare projects, bringing new players and ideas to the forefront of development research and practice.

Another of DIL's Mezuri partners is the "Change" research group at UW, which developed Open Data Kit (ODK) in 2008 with Google sponsorship. Like HiJack, ODK exploits the ubiquity of cellphones, providing an open source suite of customizable, easy-to-use software enabling development NGOs, researchers, and others to create phone-based survey forms, collect responses from individuals or households, ferry the data to the cloud, and visualize the results in real-time. ODK offers a comprehensive package of software for designing survey forms (ODK Build), collecting data (ODK Collect), and storing and managing data (ODK Aggregate) – all via Android smartphones.

Importantly, ODK also makes data from surveys available to communities, not just researchers and program managers. Training users to become surveyors and data-generators through ODK is straightforward, and there are a wide range of helpful tips and training resources on the product's website. And because ODK software is provided under an open source license, it is free to use, disseminate, and modify to best meet on-the-ground data collection needs. ODK has been used for a wide range of purposes and settings in the developing world, from monitoring election fraud in Afghanistan to conducting epidemiological studies in the Brazilian Amazon. All of these uses have one thing in common: they facilitate the easy, open flow of data directly from its context. As part of Mezuri, ODK will facilitate the M&E of development programs by those who are directly affected.

Better Data for a Better World

"The better data you have, the more you can measure and evaluate the efficacy of a development intervention, and ultimately, the greater impact that development intervention is likely to have," explains Matt Podolsky, a staff researcher at UC Berkeley's Technology and Infrastructure for Emerging Regions research group (headed by Dr. Brewer). Podolsky, who is supporting the development of the Mezuri platform, says that data is crucial for truly understanding how technology can help people in developing countries, and how limited funding resources can most effectively be used toward that end.

Collectively, the tools and instruments built into the Mezuri platform will enable data that is relevant to development to be collected in new ways, from new people and places, and for new applications. The team is excited that academic advances—like sensors, software, and cloud computing—are now leaving the lab for real-world application. The platform's affordable and accessible "open data" tools will foster new communities of collaborative problem solvers, enabling an array of development stakeholders to experience the data revolution.



Mezuri Platform partner University of Washington has developed Open Data Kit, a free and open-source set of tools that help organizations author, field, and manage mobile data collection solutions.