



OLIVIA VELEZ

INTERVIEW

JOHNS HOPKINS UNIVERSITY
GLOBAL **m**HEALTH INITIATIVE

PRESENTS

**Women
of
Digital Health**

Women of Digital Health

Interview One

Olivia Vélez



With your background being an amalgamation of computer science, information systems, nursing and public health informatics, it seems like you were destined for mHealth. When did you start putting these tools together and begin working in mHealth; and what was the catalyst or epiphanic moment that solidified your decision to dedicate your time to mHealth?



I think I was doing it all along, I just didn't know what it was called. When I started undergrad, my intention had been to go to medical school and was a neuroscience major at the time. My freshman year I was invited to be in a program called 'Research Explorations'. It was a program to encourage women and minority students to go into science and stay in science. We rotated through different research labs, so of course I picked the neuroscience lab first thinking I was going to major in neuroscience – I spent a lot of time observing fish behaviors; which didn't seem like the most promising life path, but I figured that this is where you start and pay your dues, watching fish swim around. Then I did a rotation in chemistry, which wasn't for me, and my third rotation was in computer science. It wasn't really even a research lab, it was working with the IT lab building computers - hands on tech work. I really liked it and caught on quickly and they liked me so much I was offered a job for the semester. This was a pretty awesome deal for a freshman as we were typically required to work in the kitchens, which I had been doing until that point.

So I accepted and worked in the computer lab. While I was doing that I decided to take a programming course over the summer since I was enjoying working with computers. That course turned into another and another until I ended up as a double major in computer science and neuroscience. During my sophomore year I was offered an internship at UCSF in their Radiologic Informatics department processing imaging data.

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This was my first time doing something related to informatics, and was when I really started to think about how computers could be used in health care. The following year, with this newfound interest, I cobbled together a program to teach neuroscience – I can't quite remember the specifics, but this was really where I saw a combined application of tech and health.

The summer before my senior year, I met someone who worked at the local community health center and they expressed a need for help with the computers at the health center and asked if I would be available as a volunteer. I agreed and started working with them – this was the mid-to-late nineties by the way, the height of the HIV epidemic and there was a lot of funding around HIV and a lot of reporting that had to be done regarding HIV care. Seeing the need, I created a database to help track care between their different health centers that they were required to report for Title 3. It was a little distributed database for them, before HIPPA of course...

How did people react when they saw personal information being entered and stored into a database?



It's funny, there were a lot of the same challenges that we have now; it was mostly nurses using the system, they weren't technically savvy, but at the same time they were burdened by their reporting requirements so they were excited to alleviate some of that stress. The issue that came up was that we had built this little home-grown system that kind of worked and then a government program came along and said, "Oh we're going to make our own system." And they made a first iteration system which was terrible, and then a second iteration which was much better, but by then this was the third system people were using – it saddens me that almost fifteen years later I'm still having the same conversations.

Although, now, the technology is more mature, and while the conversation is the same, it's more sophisticated than it was, at least on the domestic side. *Continued...*



Working in a community health center in the mid-to-late nineties is very similar to working in a developing country today in terms of the clinician's technical skills. [Before the digital age] It wasn't a primary training concern during their undergrad and personal computers weren't used much in the home as they grew up without them. People were still using beepers - handheld devices and cell phones were not all that common.

This same community health center hired me after I graduated and I worked for them for a few years. Then I jumped around various jobs including health insurance companies and other community health centers developing data collection tools – at one of the health centers I ended up doing an electronic medical record installation and managing that. It was actually one of the first federally qualified health centers to have electronic medical records, it was a beta version adapted from a hospital's EMR system, so there were a lot of problems and a lot of usability issues which led me to do my own training in usability design. I spent a good deal of time shadowing the clinicians, documenting the problems they were having and trying to translate to the developers, who were based in Israel, what the problem in the software was. One of our recurring issues was getting the developers to understand that the U.S. had specific reporting requirements that needed to be built into the system. So there was a lot of back and forth and iterative design process.

After that I went to work for a leading Medicaid/Medicare insurance company in New York City who conducted large quality improvement studies – this was probably my first real entry into “mHealth.” We sent nurses out with laptops, not handheld devices, so it was relatively mobile; and they would go into doctor's offices and clinics and audit their charts and remotely upload all their data every night so we could review and assess which doctors were delivering quality care and which required interventions. This is similar to a lot of what we're trying to do now. While I really enjoyed the work, one of the issues I ran into was due to the way payors are structured in the U.S. and that Medicaid/Medicare reimbursements are based on provider quality of care, so I would have these hospital executives look at the numbers and then ask if I could re-crunch the numbers because they were really bad and costing them money. Of course, the answer was no, can't just change the numbers because of underperforming doctors.

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Improving patient outcomes was my primary concern so I grew disillusioned with the job as I really wanted to help people. At the same time, my mother, who was working at a community health center that had an exchange program with Mexican health workers brought me along on a trip where everyone was talking about how fulfilling the work they were doing was and how they were really making a difference. This left me feeling a bit like the guy from Office Space filling out ‘TPS reports’ so I knew I wanted to do something a bit more meaningful, but I didn’t want to go to medical school and have \$200k in student loans [laughing]. I had all the requirements so I thought, maybe I could go to nursing school, it was quicker, they had accelerated programs (like entry to practice), so in less than a year I found myself in a nursing program.

My original intent was to get a masters in nursing informatics as it aligned with my background and interests, but they dropped the program by the time I was accepted and I had to rethink my plan again. I chose midwifery as I really care about women’s health and thought that maybe I wanted to deliver babies. While I was studying I went on another trip to Mexico where I worked closely with the midwives there and thought it was really cool, but that I didn’t want to do it myself. I found myself back at Columbia without a clear area of study once again, but the informatics department was looking for a research assistant for a study using Palm Pilots as decision support tools for nurses training to be nurse practitioners. This was my first, real real “mHealth” gig. I started as kind of a tech support for the students troubleshooting software issues, but a month into it, their programmer left for another job, and since I had a programming background and they were worried about meeting deadlines for the study, I was able to get more involved and developed a clinical decision support algorithm for assessing depression in adults.

A lot of your work has revolved around developing and implementing decision support tools, so this must have been the turning point?



Yeah, this is where I got into it, I really liked it and felt it was a useful tool for health workers and could see... *Continued...*





...how beneficial it could be to a novice nurse who has so much to remember and so many things to keep in mind – having that little guide to help double check and boost their confidence. But it wasn't so structured that they lost their critical decision making skills, there was a lot of leeway to move things around and make exceptions as needed.

Less of a crutch and more of a guide to assist it seems.



Right, and you could document the care you provided so it was really kind of an electronic health record in the palm of your hand, it had everything you needed as a training nurse that you would need for clinical practice. It was great, I got really into it and started thinking of how it could be used in so many other ways.

Finally I became a registered nurse and started working in a pediatric HIV skilled nursing facility. Immediately after my first week of orientation, I found myself alone with 26 patients when the nurse I was supposed to be working with called out sick. I was in a panic because they had no computer system, no anything and all I could think was, "What if something happens and I don't know what to do?" There's no one here, it's the middle of the night and this is in Manhattan – I can only imagine what nurses and midwives must feel when they're sent to rural Nigeria or rural Zambia their first year out of school. I mean, I was walking distance from one of the best hospitals in the world and still panicking.

I continued studying in nursing informatics and was looking for a doctoral dissertation despite having finished all my coursework, and I met Patty Mechael at a conference in New York City where I shared my background and asked if there was anything I could be a part of. We sat down with my advisor to discuss possible areas of interest, and Patty said that she had been interested in doing something with mHealth and the nurses in Ghana and that maybe I could start by going over there and conducting a needs assessment to come up with a project idea.



My dissertation ended up being a requirements and user analysis with the midwives in Ghana and prototyping a tool and testing it with them. After I finished my post-doc in biomedical informatics I got a job with mCHIP as the senior mHealth Advisor and now I am eHealth Lead with their new maternal and child survival program.



So you've been working in and fluttering between various aspects of mHealth for a while now, have you noticed any long-term impacts of mHealth in communities you work with – whether it's the community itself, clinical settings or with the health workers. Even your earlier days in the community health centers working on databases, what are some of the impacts that you saw?



I think the main thing is that they improve the overall information flow, even though in some places it remains very fragmented, mHealth tends to bridge the information gaps. Just looking at what it's done in the U.S. in the last 15 years is amazing, now you can get your lab results online, pull up your care, even looking back at the center where I worked – I had set up an intranet between their various sites and they're still using the same one. It's kind of embarrassing because it uses Frames, but it works! It's the information that's valuable, not the technology.



What do you think of some of the newer, fancier, more complex technologies and concepts we're seeing nowadays? Are they concerned with the integrity and quality of the data? Is there a lot of fluff?



No, I don't think its fluff, I just think we're very fragmented right now and that probably comes down to financial reasons more than anything.

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The way things are funded and generate results – we don't really look at them holistically. It's hard for a country, hard for a donor, hard for an implementing organization to come in and just lay out a full scale solution, it's a big leap of faith for a lot of people and although it might be the ideal way, to start big, it's easier for people to digest change piecemeal. As long as you approach your piecemeal efforts with a holistic vision with room to grow and connect with other pieces, I think it's a good approach to take. It's a baby steps approach, but you build with that idea of future integration in mind versus 'we're only doing this one thing and we don't care if it integrates with anything else', which I see people moving away from. I don't think people were trying to be negative or restrictive with the singular model mindset, but that they were just focused on solving that particular problem.

Most countries, the U.S. included don't have a greater vision for a system that everything feeds into. Maybe the UK because they have a single payor system so they get to be way ahead, but in the U.S. it's very complicated because we have all these payors and data is viewed as a commodity and you don't share it. Though I think we're all slowly starting to realize that there's value in shared data and we're moving in that direction, but kind of feeling around in the dark trying to figure out how to get there.

What are you working on now, how far along the process are you, and what are your expectations for this project?



USAID's new flagship program the "Maternal and Child Survival Program (MCSP)." The objective of my team in relation to this program is to help countries identify how they can systematically integrate eHealth into their health systems in an equitable manner, not just at one main hospital, but really looking at how we can reach vulnerable communities. We start with an immediate need and assess if an e or mHealth solution can help and what steps need to take place to begin addressing the problem, and then identify implementing partners as the system grows to tackle more issues.

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What we're hoping to do this year is identify three countries that have a decent level of ICT infrastructure but have yet to take advantage of eHealth or mHealth in any significant way up to this point, identify in-country resources they could tap and what kind of assistance they need to make it possible. MCSP is not really an implementer, we convene around issues specific to reproductive, maternal, newborn and child health (RMNCH) and help to bring in partners or bring in funding to develop a prototype and catalyze efforts.



It sounds like you have a bird's eye view of the landscape, identifying and connecting all the moving pieces; from that high-level view what are some of the common concerns you are seeing not only from the communities, but also from the organizations that you're tapping?



One of the things is that we all want to collaborate together, but it's not always easy to collaborate no matter how good our intentions are because we have a lot of competing requirements. We want to work together, but if you have funding from one place, you're required to bid things out and you're supposed to work with accepted candidates. Building an entire infrastructure in a country requires working with so many governmental departments, not just the ministry of health, but the civil registry and so on, it's very challenging, and it also varies a lot from country to country.

You also can't rely on expats to maintain these systems, there needs to be some sustainability built in, you need in-country capacity, you need people who are trained residents and citizens. Globally, there is a shortage of people who do this kind of work. Sometimes it's hard to make the case for mHealth when there isn't the evidence to show the impact, even though I'm pretty confident that it's going to work, you need the information regardless.



So despite growing popularity and acceptance, what do you offer when mHealth interventions continue to be approached with caution – from critics in all their forms whether they are frontline health workers, ministries of health, clinicians,



...and the communities being served? How do you assuage criticisms?



Sometimes it's a matter of reframing the problem at hand. If we know that there is a shortage of anti-malarial vaccinations, no mHealth solution will be able to create more, but we would be able to implement a tracking system to make sure they're being distributed and used correctly. We also don't know at what point we might run out of viable anti-malarials, so being able to identify where they are running low can be a great benefit as it will carry a larger cost to individual and communal health if they run out. And documenting treatment failures so we know when and where resistance is happening. People are generating massive amounts of data all the time, but if we're not tracking it we won't know until it's too late to do something. We need to know if we're distributing resources appropriately, where our resources are; we often don't have a good way of doing that. That doesn't make mHealth a silver bullet solution, a system can tell you that you have no supplies, but that won't help create the supplies, but at least we would know.



When you are at a crossroads like that, when you are trying to explain something like supply chain management or address scarcity in general in the face of a really basic fundamental health concern like just having resources - it must be a perplexing task to explain to somebody who doesn't have capacity that they need a way to track things when their primary concern is survival at a basic level.



It really comes down to the specific country and the issues that they're having. One of the things we've talked about recently is that in Zambia, you have a shortage of skilled birth attendants and it seems (we don't know right now, because we don't have the data), that part of the problem is that these attendants are not distributed properly throughout the country. Wouldn't it be great to identify and locate these individuals and use mHealth to officially make them skilled birth attendants if they're receiving on the job training and making sure they have the resources they need to perform. *Continued...*



That was one of the problems we found, that supplies were getting to central facilities but were not getting distributed and nobody knows why. So sometimes there's a resource shortage because of communications issues; if you're a community health worker in a rural area, how do you contact a district manager to let them know your supply kit is empty or soon will be? Especially if it's been five years since your training program ended and the NGO that conducted the training is long gone? So once communications have been established, you can better identify if one area was having a money issue and couldn't buy supplies while another didn't know they had supplies, so without that flow of information it can be difficult to know what the real problem is.

Digital health in all its forms is expanding at a mind blowing pace, what are some key trends you're seeing that actually resonate through a public health / health systems lens?



The biggest thing I'm seeing is the push for the adoption of the nine digital health principles. Everybody seems to be talking about that and wanting to adhere to that. They're probably not as straightforward as their bullet points show, so now we have to figure out how we, as practitioners, as donors, as developers, how are we going to adhere to these principles? I think that's the next step, figuring out how we're going to do that. If we can figure it out, it'll be really exciting because we'll be able to move towards more integrated, accessible, and equitable systems.

Looking at the domestic market, even with mobile device ubiquity, high adoption rates for wellness and fitness apps and devices, there still seems to be a lot of ground to cover in terms of positive health outcomes. What are some areas of need in mHealth, rather, what do you feel is lacking and what might be a solution for it?





I think the intention of mHealth in the U.S. is very different than developing countries, when we look at mHealth apps here most of them are focused on wellness and not really malaria control. It's really built around lifestyle and non-communicable diseases; I do think it's a bit messy because we don't really integrate what's done with mHealth into clinical practice. If I, as a patient, am sending data to my provider is she required to review the data, how often is she required, if she misses something is she legally responsible – I don't think we've really answered those questions and these are some of the bigger challenges posed to how legalistic our society is in the U.S. Everyone is worried about getting sued all the time, so this is why we might see reluctance to adopt mHealth applications. There's a lot of information, is it reasonable to expect them to be able to process and review all that information? Imagine if you have 1000 patients sending in blood pressure readings every week, are you really going to be monitoring that all the time? But this is where the opportunity for big data to come in to determine which patients are at risk so we can intervene at the right time. We can use that data to save lives, but I don't think we're there, we haven't quite figured it out, and we have unanswered questions about data ownership and transferring providers and payors. So I think we're just as messy [as developing countries] just in a different way.



Last question, if someone is interested in mHealth what kind of advice would you have for them and are there any resources you recommend?



Read. Just read as much as you can. This is really a multidisciplinary area and the more you understand where different people are coming from, how are the clinicians looking at it, do you understand the user design, do you understand policy implications, we don't have large teams with specialized members looking at a single thing. You have to be an expert in all these areas, so I would say never stop reading, never stop researching, read things that may be outside your field – despite my many years of studying neuroscience I never considered myself a behavioral scientist, but I'm starting to understand that it's more and more important in what I'm doing.

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For example, this project we're working on in Ethiopia where we're trying to improve the post-natal care visits - I can design a tool for the clinicians, but I still have to think about the behavior change model behind that, like how am I going to get them to do more visits, it's not just a phone and themselves. You need to be a jack of all trades, I'm not going to advocate studying computer science and nursing, but there are contributions from different disciplines that are going to be really important as there are a lot of collaborations. And get different perspectives; talk to the clinician, talk to the technologist, talk to the office manager, talk to the patient, talk to the ministry of health and district representatives, you really need all those voices to figure out how the system needs to interact to be successful.

We want to thank Dr. Olivia Vélez for being so gracious with her time and with sharing her thoughts on mHealth. Thank you Olivia, it was an honor and a pleasure.

**Dear readers, if you have any particular questions you would like to have us ask other mHealth superstars in future interviews or would like to ask us to interview someone in particular, please let us know!
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