

OPENPediatrics:

Medicine with a Global Reach

A Synthesis Case Study

By Susan Feldman

Having the right information is important, but it's rarely a matter of life and death. Except in healthcare. Today, lives often depend on finding the right doctor and hospital at the right time. That's a quandary that no parent should face.

Boston is blessed with abundant medical schools and fine hospitals, all of which are willing to collaborate on difficult problems. But this abundance is less common in the rest of the world. After helping a doctor treat a child in Mexico City using a flaky Internet connection to see the patient and the phone for discussion, Dr. Jeffrey Burns of Boston Children's Hospital realized that there had to be a better way to spread what he had learned to other physicians.

While mulling over the need for and the staggering difficulties in developing such a learning system, he noticed that his son was playing video games with people around the world as if they were in the same room. Moreover, although disguised as a game, the program was a model for how to teach people skills— first demonstrating, and then allowing the player to try a skill and perfect it in a simulated environment. Perfect. But how to move this to the world of medicine?

Serendipitously, while mulling over the problem, Burns happened upon the Masters Tournament Web site (<http://www.masters.com>) designed by IBM Interactive. The experience was immersive and interactive. It reported news, but also demonstrated golf skills and allowed

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the user to try them for himself. Burns contacted IBM to see if they would develop a similar system for the more complex world of pediatric medicine. After 8 months of development, the result is OPENPediatrics, a learning platform that has gone viral in its beta stage. As of October, 2013, OPENPediatrics has over 1000 users in 78 countries and 420 hospitals. Although its content is still limited, it has already saved lives worldwide.

What's in the platform?

In order to be effective, a medical distance learning system must support four phases of adult learning:

1. Explain
2. Watch a demonstration
3. Try it yourself
4. Discuss

That's a straightforward process in a traditional classroom, but it raises all kinds of technical problems online: Who will do the teaching? How good will the information be? Is a video an adequate substitute for a live demonstration that allows listeners to ask questions? How can users try a skill they are learning in an online environment using some sort of simulator before they practice on real people? Can they get reliable, timely answers to their questions in an open discussion forum?

Adam Cutler, Designer for OPENPediatrics, says that the key to its design was to combine a bounded social network with good, trusted information. To build a bounded community, IBM used its Social Business Platform, which incorporates IBM Connections and Outstart. The system interacts with users in real time. Behind the scenes, it also manages the process of building a knowledge base of curated medical information—both text and rich media including training videos produced by experts in the field. For this, it integrates multiple IBM components that are part of its Smarter Workforce initiative including:

- **Tivoli Access Manager for eBusiness** to manage security
- **Tivoli Directory Server (TDS)**, the system of record for user data
- **Tivoli Directory Integrator (TDI)**, which synchronizes updates between TDS and the Connections Profiles database.
- **WebSphere Application Server Network Deployment** for core application platform services and the core application frameworks used in the server.
- **IBM Connections**, which hosts the social components of the application
- **IBM Cognos BI** to generate analytics reports on everything from the progress of users on the system to its overall efficacy.
- **IBM DB2** for data storage and management services
- **IBM Kenexa Learning Content Management System**, which houses learning content and delivers it into the production runtime.
- **Insight2** from **IBM Research**, which provided the intellectual basis for all of the media management, services components.

The platform ingests and tags content, allowing media management, searching and browsing. It creates video-to-text transcripts, making the videos searchable by words as well as by browsing. And it creates a community to share ideas, discuss issues, and connect with each other. What is less obvious is that this new type of platform will one day will learn as it is used. IBM, particularly with its Watson technology, could add feedback to the process so that good answers, changes in treatment, new information, and errors will all help the system to evolve.

Impact, implications and the Future

OPENPediatrics signals an important change not only in medicine, but also in software development. Today, contextually based software applications and platforms have begun to arrive on the market. These are designed to support a process or task--in this case distance learning—while hiding a complex array of supporting technologies behind an easy-to-use interface. What's different is that the desired outcome, not the underlying technology, frames the application development. More and more, the person who sees the need and recognizes that there might be a solution is not a developer or an IT manager but a technology observer and user. Jeffrey Burns wanted to solve the problem of knowledge dissemination and learning at a distance, in order to spread his knowledge and stretch access to his expertise beyond the limits of his location or the 24 hours in his day. He saw two technologies that could be synthesized into a single solution. Innovators are usually people who can put together seemingly unrelated bits of knowledge into a new idea. They often come from outside a domain, and therefore they tend to use an atypical lens to focus on a problem. Furthermore, they see possibilities, not problems, because they are not steeped in the difficulties of making something work.

Custom applications that assemble all of the pieces for a specific purpose are not new. What is new is that IBM Interactive had already created a generalized platform that could serve as a starting point. We see this trend increasingly in the software world—the emergence of platforms that already integrate the many and varied technologies needed for a type of task. Domain knowledge, process and terminology need to be added, but the foundation work is done. This means that instead of many years and droves of developers, ten developers were able to roll out OPENPediatrics in 8 months.

Implications

Jeff Burns isn't the only person to realize that education can and should extend beyond the classroom. MOOCs (Massive Open Online Courses) have taken off. But these approaches are much simpler than the OPENPediatrics model; they mimic the traditional classroom model of linear learning--lecture, then test. In contrast, the learning environment typified by OPENPediatrics offers a supportive self-education environment for professionals that is interactive and globally Socratic. It is not linear, and its uses range from answering questions, sometimes in real time health emergencies, to learning needed skills, updating knowledge, browsing to explore new topics, or discussing issues with peers. The knowledge base is expanding, but its content is limited to high value information that is vetted for accuracy. Topic modules may contain lectures, but they also include demonstrations and interactive simulations for practice.

For **practitioners** this type of learning environment will offer an extraordinary opportunity to be trained by noted experts. The global online OPENPediatrics community has already become a rich experience, particularly for those who practice in remote locations. But it will also require some rethinking about how practitioners should and even must spend their professional time. Health professionals already set aside time for training and education. They attend conferences and take courses, usually at another location and at a set time. Now those courses will come to them at any time. They and their institutions will have to recognize that time spent participating in discussions or attending the regular lectures that OPENPediatrics will offer is not only acceptable but required.

Researchers may put this type of community to another good use—for discovering research needs, locating patients who would benefit from clinical trials, or discussing and testing hypotheses on a global scale. The insularity of research communities is well known. It's possible that these bounded communities of experts and practitioners can break down some of those research boundaries, allowing more interchange between the researcher and the real world. This, too, comes with some questions, though, particularly in the competitive world of pharmaceutical research: will researchers be allowed to discuss their work freely?

For IT developers and vendors, the availability of highly integrated, ready-made, process-oriented software platforms may change how they deliver technology. These platforms learn and evolve from use, so skills in machine learning, computational linguistics, and artificial intelligence will be necessary. Even more important, we are only at the beginning of understanding what will be a very complex relationship between man and machine. Machines can find patterns and make recommendations; but people need to test these patterns for reality, and they also need to be able to hypothesize and test results.

This platform is cloud-based, obviating the need for storing, installing and maintaining software. Cloud-based software comes with some of its own issues, however, such as security of information or the need for ample bandwidth, particularly for videos and simulations. One assumes that building an application on a platform that has already integrated the necessary technologies and tools should speed up the development process. Large software vendors can use these platforms to attract an ecosystem of committed and trained applications vendors, cutting down on the software development free-for-all and limiting some business opportunities for smaller businesses. These ecosystems will require standards for interchangeable information formats, as well as standards for integrating additional custom applications. Intellectual property rights could become even more murky.

For **patients**, the hope is that medical care will improve and that one will not need to be in a medical Mecca in order to receive outstanding, up-to-date care.

The Future

OPENPediatrics is not the end, but the beginning of how we deliver education. Doctors and researchers are committed professionals, eager to learn anything that will improve their skills. They are a fine community to experiment with this new kind of learning platform. We can envision other communities that are crying out for this kind of training.

But training in medicine is one facet in a much bigger medical revolution that is already underway. If we add to it the advances in big data analysis, the pattern matching and question answering technologies developed by IBM in its Watson for Medicine, and the much larger worldwide medical knowledge base that includes research publications, genomics, clinical trials, and even patient records with treatment outcomes, then we will change the practice of medicine profoundly. Imagine being able to target treatments to individuals based on characteristics such as medical history, age, occupation, genetic make up, current drug regimens and preferences for types of treatment. With enough data, medical researchers will be able to tease apart all of these variables in order to suggest the best treatment for each individual. A six year old will not arbitrarily be given the same treatment as a 25 year old or an 85 year old with the same disease. While the art of medicine will always attract the best of analytic and caring minds, the practice of medicine will become more a science and less a happy (or unhappy) accident. Individualized medicine will become the norm, and the knowledge of doctors like Jeff Burns will save lives worldwide. That's the hope.