HOT TOPICS

Nesta...

Nesta Hot Topics

Hack yourself: measuring well-being

May 2012

Introduction

Businesses regularly use their turnover, profit and other indicators to try to improve their performance, and governments track hospital waiting times, inflation and school exam results to gauge whether or not policy is turning into progress. So then why not use similar metrics to keep track of and improve our health?

That's the thinking behind the 'Quantified Self', Nesta's Hot Topic for May 2012. A grassroots movement made up of an eclectic mix of technology evangelists, fitness fanatics and hackers with a healthy curiosity about their lives, their aim is simple - to improve their quality of life. By measuring and keeping a log of their daily diet, mood, how much alcohol they consume, sleep cycles, exercise and pretty much any personal metric relating to their physical or mental health, they hope to find ways to improve their well-being.

Just as it's possible to piece together a picture of someone from their supermarket purchases, credit card activity or Internet traffic, so too can this kind of self-tracking, personal informatics or self-hacking as it is also known, reveal a lot about a person. By mining this data and finding correlations within our daily patterns, sufferers of depression, asthma, insomnia and many other complaints, as well as those curious enough to delve deep into their daily behaviour, have found ways to improve their lives.

Early days

Inspired by the dictum "you can't improve something until you can measure it", the whole Quantified Self movement was founded in 2007 when *Wired* journalists Gary Wolf and Kevin Kelly started a blog of the same name, which looked at the notion of marrying technology with self-improvement.

In many ways this is no different from the way sports coaches try to improve the performance of their athletes by monitoring every detail about their nutrition and training. With the Quantified Self, however, what was different was the emergence of new enabling technologies and the power of the crowd.

Wolf and Kelly were intrigued by what could be achieved through the combination of cheap, portable sensors, powerful mobile computing, data visualisation tools and social networking, and quickly others followed. Soon regular meetings were held in cities across the US. Today with thousands of members and conferences now held on both sides of the Atlantic it has become a global phenomenon.

Making sense

But while the early vanguard may have resorted to using homemade sensors and walking around with wires trailing off their bodies, today that is no longer necessary. For although the Quantified Self has empowered people with the ability to treat their own ailments by changing their lifestyles in some way, it has also created opportunities for entrepreneurs and inventors to develop a range of new gadgets aimed at recording just about every detail of our daily lives. And indeed through this new companies and technologies have been spawned.

FitBit, for example, is a small motion sensor that is designed to be worn on your belt, which records how many steps you take, much like an accelerometer, except that it also records how many stairs you've climbed and any movement during sleep. It then uploads this data to a website where it can be analysed, allowing users to compare it with others. San Francisco-based **Jawbone** also has a motion tracker in the form of a wristband called **Up**, which wirelessly uploads your data to an iPhone app, allowing activity patterns to be built up and shared with others.

Similarly a headband made by **Zeo** is also designed to record sleep patterns. Formerly known as Axon Labs the company was founded by a bunch of students at Brown University, in Rhode Island, who were so sleep deprived they invented a solution. Their headband contains sensors, which record the wearer's electroencephalogram (EEG) brain activity during sleep, transmitting it to a nearby device. This programmable monitor not only allows the user to study how their sleep cycle is affected by environmental factors, such as how much light there is or the weather, but it also serves as an alarm clock that will only wake the user during their optimal phase of sleep, to ensure they always feel refreshed when they rise.

Another monitor poised to hit the market is made by **Basis** in San Francisco. This wristwatch comes packed with sensors to record your movement, temperature, galvanic skin response (which is used to measure one's level of arousal) and heart rate. Although this is not the first heart rate monitoring watch, Basis prides itself on the fact that it can do this without the need and inconvenience of also having to wear a chest strap. And convenience is what it's all about. None of this information is particularly difficult to collect, but anything that can collect it passively with a minimal amount of input from the user is not only going to collect more data but it's going to build up a more faithful and objective picture of that person. One example of this is the **Body Blogger**, an online log charting the continuous heart rate of researcher Kiel Gilleade at Liverpool John Moores University. Normally the only times our hearts are monitored is when something goes wrong with them. But by monitoring his heart 24/7 for more than a year Gilleade has found ways to link his behaviour and his physiology and use this to change his behaviour for the better.

But beyond measuring physiology the Quantified Self can also involve monitoring other aspects of our daily lives. **Greengoose**, another San Francisco start-up, has created a wireless motion sensor that is small enough to be attached to just about anything. From a toothbrush to your dog's collar or toilet lid, the sensors automatically upload their data to a mobile phone app enabling you to record when and how often you brush your teeth, walk the dog, or use the toilet.


Jon Cousins,
Moodscope.com

Crowd power

But it's not just about collecting data, it's what you do with it that counts. There are now plenty of examples of Quantified Self enthusiasts cross referencing their sleep patterns with other metrics such as alcohol consumption and nutritional intake or activity to improve their well-being. However, not everyone may feel capable of crunching the numbers and doing this kind of analysis. That's where patient-driven social networking websites like **CureTogether** come in. They are helping to empower patients by providing tools to allow people to compare data on more than 500 different chronic health complaints. By taking this crowdsourcing approach, sharing quantitative data on symptoms and treatments, aggregating and analysing it, it becomes possible to reveal broad new trends, such as the discovery that sufferers of migraines associated with vertigo were four times more likely to experience painful side-effects when taking a particular migraine treatment.

While these kinds of studies lack the scientific rigour of formal clinical trials they have the advantage of more accurately representing sufferers because, unlike trials, they don't exclude patients who are on other medications or have additional complaints. What's more, the sheer scale of the data that Quantified Self enthusiasts collect on themselves is in itself a huge draw. As increasing numbers of people share their data, it is fast becoming a valuable resource in an age where Big Data crunching is seen as the next wave of innovation and discovery. Neither drug companies nor clinicians would ever be able to accrue the same amounts of data on patients. Indeed, in 2008, another social networking health site called **PatientsLikeMe** developed a tool to follow patients who had already begun taking lithium to see if it slowed the progress of amyotrophic lateral sclerosis, or Lou Gehrig's disease, following a promising, but small-scale trial reported by Italian scientists. It turned out that it didn't and these negative results were further backed up by larger and more rigorous clinical trials.

Some companies, like **Asthmapolis**, are using both data collection devices and aggregation to get results. With the help of the Spiroscout, a small device that attaches to asthma inhalers, the Madison, Wisconsin, company has found a way to gather real-time data on where patients use their inhalers and how often. Equipped with a GPS receiver, the Spiroscout sends this data to Asthmapolis servers. How often a person uses their inhaler is not only an indication of how well their condition is managed, but it also provides valuable clues about environmental exposures that cause attacks. This information can then be fed back to patients via mobile apps, helping them to avoid respiratory hotspots, and it can help clinicians and public health officials gain a better understanding of the disease and its environmental triggers.

Of course an important part of making this tick over is anonymity. From the patient's perspective it allows them to share their experiences with fellow sufferers and respect their privacy, but it also provides a means for companies like PatientsLikeMe to fund itself, selling off the anonymised data to pharmaceutical firms and other companies.
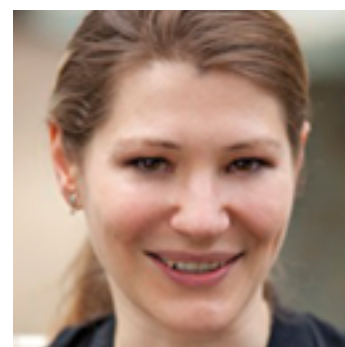
Adriana Lukas,
London Quantified Self
Group

Mind games

Another crucial aspect of the Quantified Self is its 'gamification'. This is the idea that games can be used to improve uptake by making the kinds of everyday activities involved in monitoring and improving health more fun and engaging, such as by awarding points and rewards for reaching certain targets. **Boozerlyzer**, an Android app, is one example of this. Although still only available as an early-stage alpha software release, it is designed to use games to help users track and measure their alcohol consumption and the effect of this consumption on co-ordination, reaction times, memory and emotional state.

So rather than giving users disapproving and ultimately off-putting messages about their lifestyles and habits, apps like Boozerlyzer try to take more of an agnostic position, letting the data speak for itself and allowing the user to draw their own conclusions.

But the Quantified Self also has another altogether different kind of mind game going on. Given its nature, it is impossible to know whether or not the placebo effect is at play; that is, whether people are feeling better because they are focusing on the activity by measuring it, and so are more aware of their actions. However, for advocates, often people who have seen major improvements, that hardly matters. And the fact is with companies like Philips, Vodafone and Intel sponsoring Quantified Self conferences, the big guns are clearly taking it very seriously too.

In many respects for clinicians, public health officials and the medical and drug industries it is a dream come true: a plentiful source of rich medical data that is generated by the public, and at its own cost. And as smartphone and wireless sensors technology make it more mainstream, attracting increasing numbers of users from the ranks of the 'walking well', control data will also start to build up, it is likely to secure a permanent role in the future of healthcare and medicine.

Speakers

Jon Cousins
Founder, Moodscope.com

With a background in advertising Jon Cousins is a social entrepreneur, founder of Moodscope and a founding member of the London Quantified Self group.

Diagnosed with suspected bipolar disorder, Cousins was asked by his psychiatrist to keep a record of his mood for three months to help confirm the diagnosis. But rather than subjectively evaluating it every day, Cousins wanted to find a way of rating his mood objectively and so designed the system that he called Moodscope. Purely by chance he discovered that sharing his daily scores with a friend seemed to, in and of itself, elevate his mood.

Following this personal success Cousins turned the tracking project into an enterprise, Moodscope, which now has more than 30,000 users and a database of nearly a million scores. It is being independently evaluated by London's Institute of Psychiatry. Moodscope was voted the No 1 app in a recent Department of Health poll, and Moodscopers have written to say they believe that tracking and sharing their mood scores has stopped them committing suicide.

Moodscope is one of 25 winners of the Big Venture Challenge, a national competition to identify the UK's most ambitious social entrepreneurs.

Adriana Lukas
Co-founder, London Quantified Self Group

Adriana Lukas is a leading figure in the UK's 'self-hacking' community and co-founder of the London Quantified Self Group and the Mine! Project, an open-source project for online data and relationships logistics.

A prominent blogger, Lukas also founded the Big Blog Company. Starting out as a political blogger on Samizdata.net, Lukas went on to found the Big Blog Company in early 2003. Since then she has advised companies in Europe and the US on how to make sense of the web and 'social media' hype and if, and how, to use blogs, feeds, wikis, tags and social networks in their communications and beyond.

Lukas currently also works on the Project VRM (Vendor Relationship Management) headed by Doc Searls, a fellow of Berkman Center and she blogs about media and business on Media Influencer.
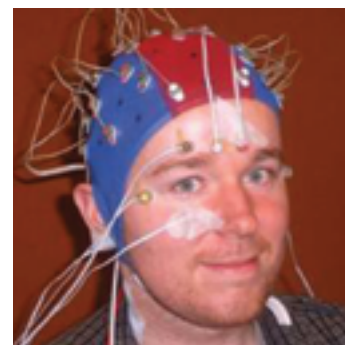
Kiel Gilleade
Research Assistant, Liverpool John Moores University
k.m.gilleade@ljmu.ac.uk

Kiel Gilleade is a research assistant in the School of Psychology at Liverpool John Moores University and creator and subject of the Body Blogger. He is a computer scientist working in the field of Physiological Computing, systems which use brain and body signals as an input control. His research background is in affective interface adaptation in interactive entertainment; he currently works on a range of physiological computing applications including adaptive experiences, self-tracking and middleware.

In this presentation Kiel will be talking about the benefits and issues involved in long-term physiological tracking and data sharing on the Internet using the Body Blogger as a real-world case study. The Body Blogger was a physiological tracking project which involved the speaker recording his physiological data for over a year and disseminating it over the Internet in real time.

Kiel Gilleade,
Liverpool John Moores
University