Wicked Problems and Collective Action

A journey of a thousand miles begins with a single step — yes, yes, we know; we’ve all had the inspirational-saying desk calendar with that particular aphorism included on some auspicious day, National Clothes Peg Day, or some such.

But while familiarity might have drained from the saying some of its ability to inspire, that does not make it any less true. And its truth becomes increasingly apparent when there are so-called wicked problems — a social problem whose complexity and continually changing requirements is such that there is not necessarily an obvious terminating condition, or even a consistent set of criteria by which to evaluate such a condition if it even existed. These problems tend to have significant economic, environmental, or political dimensions; require the coordinated and concentrated effort of a “large” number of people; and may require significant efforts of persuasion to convince those people that: firstly, a problem even exists, and secondly, that they can contribute meaningfully to its “solution.” Such efforts are also likely to encounter a number of strong cognitive biases and economic (dis)incentives. These range from confirmation bias, where people are more likely to reject data that conflicts with their axioms than rethink their axioms, to transaction costs and future discounting, where the costs are incurred by some individuals in the present are greater than their short-term benefits, and indeed long-term when most benefits are accrued by others in the future.

But just as the thousand-mile journey seems daunting at the outset, it is still necessary to take that first step. Then so it is with wicked problems. It is necessary to start somehow, even if, to push the analogy a bit further, you’ve got no map, no knowledge of the destination, and no kilometer to measure the distance that has been covered. But this can sometimes be the essence of collective action for addressing wicked problems: sometimes human behavior defies top-down direction and even nudge, and begins instead with a single initiating event and “snowballs” from there.

The Benefits of Collective Action Can Begin with a Single Deed

Digital Object Identifier 10.1109/MTS.2018.2795091
Date of publication: 2 March 2018

Parkrun

A fascinating example of this is parkrun (www.parkrun.com). As its name suggests, parkrun is a weekly timed 5k run in a park, starting at 9:00 a.m. every Saturday (or 9:30 in Scotland), open to all, of whatever age or ability, and free at the “point of access,” that access point usually being the local municipal park. Parkrun was a U.K. initiative originally called Bushy Park Time Trial in 2004, but at the time of writing (December 2017) it has morphed into a worldwide organization, with events in more than 1300 parks in over a dozen countries, with 2.5 million registered runners worldwide. The total distance covered by all the runners is reckoned to be about 150 million km (basically a gentle jog from the earth to the sun). The founder, Paul Sinton-Hewitt, was awarded a U.K. honor for his services to public health, the benefits of even a once weekly cardiovascular workout being well-known.

The transformation from single initiating event — Bushy Park Time Trial — to global collective action addressing, perhaps indirectly, a wicked problem (public health, by addressing risks associated with
physical inactivity such as obesity, high blood pressure, heart disease, and diabetes) can reasonably be explained by theories of dynamic social psychology (5). Dynamic social psychology proposes that in order to understand how people organize themselves in groups and communities, and in particular how to bring about behavioral change, it is necessary to think in terms of complex systems. This requires more than an understanding of the individual mind, on which psychology had tended to focus. Instead, it is necessary to focus on two aspects: the social and the dynamical; i.e., from the social aspect, considering the collective beliefs, micro-level behaviors and interactions between people; and from the dynamic aspect, considering the system not as an object with state transitions, but as a process, or set of interacting processes, like an ecosystem. For example, the Bubble Theory of Social Change (6) showed how social change can be brought about by concentrating on changing fragments of social networks (bubbles) rather than isolated individuals. In this theory, an initial bubble forms or is initiated, which others join, learn from and then leave to initiate other bubbles, each one largely autonomous but still associated with the original through the existing social network. Consequently, information and innovation continues to spread throughout the entire “bubble system.”

The history of parkrun (as documented in (7)) conforms to this theory. As a result, every parkrun is not only technologically accessible to any registered runner, but the common “heritage” means that the experience of any parkrun in whatever location is identifiable the same (temporally, structurally, procedurally), although with minor variation (and not just the course and the terrain: for example, at the Dunedin parkrun in New Zealand, if the run falls on the 22nd of any month, the tradition is for the male runners to turn up in a ballet skirt, or tutu).

However, the success and the sustainability of each individual parkrun is arguably due to three factors: firstly, the correlation with another social science theory, that of the self-governing institution proposed by Nobel Laureate Elinor Ostrom (8); secondly leadership, teamwork and volunteering in the collective interest; and thirdly the judicious use of technology. There is not space here to explore the first factor, except to observe that although not a common-pool resource problem, some of Ostrom’s institutional design principles for sustainable common-pool resource management can be identified in parkrun’s structures and procedures.

For the second factor, each parkrun needs a run director prepared to take responsibility for the event, a strong support network, and volunteers to perform certain jobs each week, such as barcode scanning. This is where the third factor comes into play: once registered, each runner receives an athlete ID and a barcode, which needs to be printed out and brought to each run. As each runner crosses the finish line, the time is taken and s/he is given a token that has its own barcode. Another volunteer then scans both the athlete ID and the token ID, and at the end of the event all the data is uploaded to a central database. The runners can then receive a text or email informing them of their “official” time for the run, and can also go online to view all the results of the parkrun (indeed any parkrun) and get statistics of their own performance over time. (This can sometimes be unexpectedly helpful. One friend, whose illness persisted for months even after several supposed treatments, took her series of deteriorating times to her doctor, which led to an in-depth examination, correct diagnosis, and curative treatment.)

Technology and Society

It is worth noting that there is a fairly minimal obligation on technological availability in order to participate in parkrun: access to a computer to register, receive email and browse the results; and access to a printer to output the barcode for the athlete ID. This is in stark contrast to, say, virtual payment systems. The difference between cash and electronic money is that the former has zero cost for participants to enter the market, whereas the latter requires ownership of a device, which also requires a contract with a service provider, and may also entail purchasing insurance and regular upgrades. It is also worth noting that parkrun has accumulated a vast amount of data: access to the anonymized data has granted to medical researchers, but is not used in the same way that some large IT companies use the data that they collect through use of their platforms and services.

It follows that more profound questions beyond the functional and non-functional requirements of systems need to be addressed. In particular, there are fundamental questions such as how do we achieve pro-social outcomes through collective action that reflects our shared values? But it also raises a number of secondary issues, such as: to what extent must citizens pay to participate in the digital transformation? To what extent should they be obligated (by the state) to participate in the digital transformation? For example, there is already discussion of the “digital divide,” whereby poorer areas and older people are excluded by the shift from an analogue world to a digital one. This could be extended to effective disenfranchisement if electronic voting were to be the only means by which to cast a
vote. In the U.K., entitlement to benefits (for disability, unemployment, or housing) is predicated on access to a computer, which for the less well off without a computer at home can entail a trip to a library (yet libraries themselves are being closed due to lack of funding), and an ability to fill in and return long and complicated online forms.

Therefore this discussion of parkrun and its underlying technology, as an exemplar of collective action in order to address a wicked (social) problem, while uncovering several secondary issues, is intended to highlight the distinctive qualities of Technology and Society Magazine, and the importance of the magazine as a focal point for commenting on, analyzing, and understanding such phenomena as the digital transformation, its technology, and its impact on society.

These qualities include (although not necessarily exhaustively) the following:

- Interleaving: T&S studies not just the impact of technology on society, nor just the need of society for a particular technological solution, but also the critical interleaving, in particular where technology interleaves with ethics, morality, and qualitative human values.

- Responsibility: too often engineers and scientists plead the “Oppenheimer defense” — they are only developing technology, the use to which it is put is not their concern. The magazine places an emphasis on researchers and innovators asking themselves not only “can we do this?” but also “should we do this?” Educators and professionals alike should be well aware of the precautionary principle.

- Advocacy and scholarship: the magazine offers a unique opportunity for researchers to advocate original positions or opinions, analysis, or argument of a particular social phenomenon caused or affected by technology, demonstrating scholarship in the form of evidence to support the argumentation, e.g., surveys, technological review, interviews, numerical data, etc.

- Inter-disciplinarity: almost explicitly its title, this magazine provides a forum for analysis of issues that by their very nature are interdisciplinary, trans-disciplinary and cross-cutting.

- Positive thinking: the magazine plays a critical role in contributing to the discussion, with articles highlighting innovative approaches to technological solutions, for example by design guidelines, policy recommendations, and conceptual or theoretical frameworks.

Concluding (Personal) Remarks

It is a great honor and privilege to be the successor as Editor in Chief to the awesome and wonderful Professor Katina Michael. I am extremely grateful to the IEEE search team, and to Katina, John Impagliazzo, and Keith Miller for influential discussions. I very much look forward to carrying on the work of many talented and dedicated people that has built T&S into what it has become today, and the opportunity “to stand on the shoulders of giants”.

I am also grateful to, and extremely pleased to welcome, the new (or renewed) members of the Associate Editor Board: Roba Abbas (Wollongong University), Diana Bowman (Arizona State University), Ada Diaconescu (Telecom ParisTech), Khjan Mehta (Lehigh University), Jennifer Trelewicz (Deutsche Bank), and Agnieszka Rychwalska (Warsaw University). Between them they cover a great of interdisciplinary ground, including IT, law, health, design, psychology, complex systems, and engineering, with backgrounds in academia, entrepreneurialism, and industry. I will also get my thanks in advance to people in various important editorial roles (especially Terri Bookman) and the “back office” team at Imperial College (Joan O’Brien, Kristina Milanovic, and David Burth Kurka), and similar advanced thanks to all those who will act as reviewers.

It is also a pleasure to welcome and directly address the readership of T&S Magazine. I have given seminars where I have said, indeed I slipped it into a paper once, that “If your only tool is an Ostrom-shaped hammer, then every problem is a collective action shaped nail.” On that basis, T&S Magazine is also a collective action problem, and we are trying to have transformative impact by debating and promoting pro-social and beneficial outcomes from the interleaving of technology and society. So, the benefits of collective action really can begin with a single deed… your deed to be precise, and whatever contribution you are able to make to the magazine, it would be very well received.

References