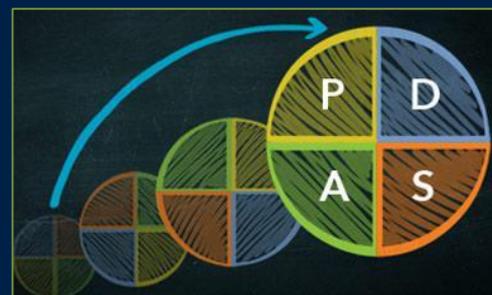


International Forum for Quality and Safety in Healthcare, Glasgow, March 2019

Improvement science in stormy and uncharted waters: what can we learn from complexity theory?

© Professor Trisha Greenhalgh *Funding: Wellcome Trust and NIHR*





International Forum for Quality and Safety in Healthcare, Glasgow, March 2019

Acknowledging the work of the George Institute for Global Health, Sydney, Australia and Dr Chrysanthi Papoutsis



Structure of this lecture

Brief explanation of
simple v complex

A (quite long) story of a
partially successful QI project

A bit of theory

Implications for QI
research and practice



Simple [or complicated] phenomena are

- More or less predictable
- More or less solvable by logical means
- Splittable up into work packages



Complex phenomena are

- Unpredictable
- Inherently unsolvable
- Full of interdependencies



Why stories?

“[A] scientific discipline without a large number of thoroughly executed case studies is a discipline without systematic production of exemplars, and ... a discipline without exemplars is an ineffective one. Social science may be strengthened by the execution of more good case studies.”

Flyvbjerg B. Qualitative Inquiry 2006; 12: 219-245

A STORY OF A QI INITIATIVE: HealthTracker – a cardiovascular risk assessment tool for Australian GPs

Assessment CV Risk Projection Refresh

Essential Items

CVD Risk Factors

Smoker

Average Systolic BP mmHg

Average Diastolic BP mmHg

Total cholesterol mmol/L

Triglycerides mmol/L

HDL Cholesterol mmol/L

LDL Cholesterol mmol/L

Past Medical History

Left Ventricular Hypertrophy

Cardiovascular Disease

Diabetes

Chronic Kidney Disease

Additional Risk Factors

Other Relevant History

Estimated 5 Year Risk

Low Moderate **16% High**

Absolute risk data is complete.

Screening Recommendations

Item	Frequency	Next Due
<input checked="" type="checkbox"/> BP	6 monthly	31 May 2011
<input checked="" type="checkbox"/> Lipids	12 monthly	29 Nov 2011
Chronic Kidney Disease		
<input checked="" type="checkbox"/> Creatinine	12 monthly	Now
<input checked="" type="checkbox"/> Proteinuria	12 monthly	08 Dec 2011
<input checked="" type="checkbox"/> Risk Assessment		
<input checked="" type="checkbox"/> Diabetes		

Treatment Advice

BP Lowering	Lipid Lowering	Blood Thinning
<input checked="" type="checkbox"/> Lifestyle Advice	<input checked="" type="checkbox"/> Statin	<input checked="" type="checkbox"/> Anti-platelet
<input checked="" type="checkbox"/> Medication	<input checked="" type="checkbox"/> Fibrate	<input checked="" type="checkbox"/> Oral anticoagulant

Treatment Targets (if presence of lipid medicines)

Statin therapy is recommended, and patient is eligible for P

The TORPEDO study of HealthTracker

- Multi-million dollar programme based in Australia 2008-2018
 - Evidence-based guidelines → desktop decision support tool
 - Refined using co-design with clinicians (Royal College as partner)
 - Rigorous testing: cluster RCT with mixed-method process evaluation
 - In-depth qualitative study of consultations (conversation analysis)
- 
- Patchy uptake: some clinicians didn't use it at all
 - Modest change in process measures
 - No documented change in patient outcomes
 - “Cost-effective” – but people didn't buy it
 - Less used and less effective in low-literacy patients

TORPEDO

STUDY PROTOCOL

A multifaceted quality improvement intervention for CVD risk management in Australian primary healthcare: a protocol for a process evaluation

Bindu Patel^{1*}, Anushka Patel¹, Stephen Jan¹, Tim Usherwood², Mark Harris³, Katie Panaretto⁴, Nicholas Zwar⁵, Julie Redfern¹, Jesse Jansen², Jenny Doust⁵ and David Peiris¹

ORIGINAL RESEARCH

Impact of Sustained Use of a Multifaceted Computerized Quality Improvement Intervention for Cardiovascular Disease Management in Australian Primary Health Care

Bindu Patel, MPH; David Peiris, MBBS, MIPH, PhD; Tim Usherwood, MBBS, MD; Qiang Li, MBIostat; Mark Harris, MBE; Kathryn Panaretto, MBBS, MPH; Nicholas Zwar, MBBS, PhD; Anushka Patel, MBBS, SM, PhD

SOCIOLOGY OF HEALTH & ILLNESS

Sociology of Health & Illness Vol. 33 No. 7 2011 ISSN 0141-9889, pp. 1002-1018
doi: 10.1111/j.1467-9566.2011.01361.x

New tools for an old trade: a socio-technical appraisal of how electronic decision support is used by primary care practitioners

David Peiris¹, Tim Usherwood², Tarun Weeramanthri³, Alan Cass^{1,2} and Anushka Patel^{1,2}

¹The George Institute for Global Health, Sydney, New South Wales, Australia

²Sydney Medical School, University of Sydney, New South Wales, Australia

³Department of Health, Western Australia, Perth, Western Australia

...ty improvement intervention for management of ca
...tion of a cluster randomized controlled trial, the inter
...ervention outcomes in the post-trial period and any h

Lots of
research!

Original Paper

An Electronic Clinical Decision Support Tool to Assist Primary Care Providers in Cardiovascular Disease Risk Management: Development and Mixed Methods Evaluation

David P Peiris¹, MBBS, MIPH, FRACGP; Rohina Joshi¹, MBBS, MPH, PhD; Ruth J Webster¹, BMedSc, MBBS, MIPH; Patrick Groenestein¹, MBBS, PhD, FRACP; Tim P Usherwood², MD, FRACGP, FRCP; Emma Heeley¹, BSc, MSc, PhD; Fiona M Turnbull¹, MBChB, FAFPHM, PhD; Alexandra Lipman¹, BAppSc(Phy), MIPH; Anushka A Patel, MBBS, PhD, FRACP

¹The George Institute for International Health, University of Sydney, Sydney, Australia

²Sydney Medical School-Western, University of Sydney, Sydney, Australia

Corresponding Author:

Patel et al. *Implementation Science* (2018) 13:140
<https://doi.org/10.1186/s13012-018-0830-x>

Implementation Science

RESEARCH

Open Access



What drives adoption of a computerised, multifaceted quality improvement intervention for cardiovascular disease management in primary healthcare settings? A mixed methods analysis using normalisation process theory

Bindu Patel^{1*}, Tim Usherwood², Mark Harris³, Anushka Patel¹, Kathryn Panaretto⁴, Nicholas Zwar^{3,5} and David Peiris¹

THE
MILBANK QUARTERLY

A MULTIDISCIPLINARY JOURNAL OF POPULATION HEALTH AND HEALTH POLICY

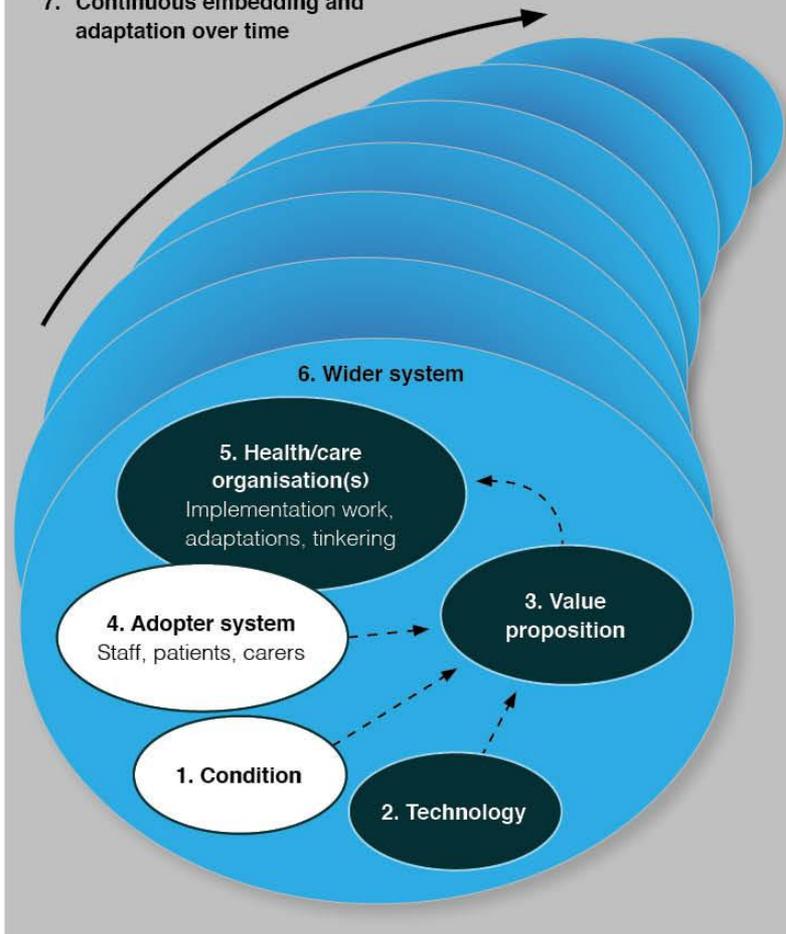
Explaining Michigan: Developing an Ex Post
Theory of a Quality Improvement Program

MARY DIXON-WOODS, CHARLES L. BOSK, EMMA
LOUISE AVELING, CHRISTINE A. GOESCHEL,
and PETER J. PRONOVOST

University of Leicester; University of Pennsylvania; Johns Hopkins University

Dixon-Woods' classic 'Explaining Michigan' paper used narrative to critically analyse and synthesise a large dataset including new interviews of project staff to answer the question "What was *really* going on in this successful project?"

7. Continuous embedding and adaptation over time



1. **CONDITION**

- Nature of condition or illness
- Comorbidities
- Sociocultural factors

2. **TECHNOLOGY**

- Material properties
- Knowledge to use it
- Knowledge generated by it
- Supply model
- Who owns the intellectual property?

3. **VALUE PROPOSITION**

- Supply-side value (to developer)
- Demand-side value (to patient)

4. **ADOPTERS**

- Staff (role, identity)
- Patient (passive vs active input)
- Carers (available, type of input)

5. **ORGANISATION(S)**

- Capacity to innovate in general
- Readiness for this technology
- Nature of adoption and/or funding decision
- Extent of change needed to organisational routines
- Work needed to plan, implement and monitor change

6. **WIDER SYSTEM**

- Political/policy context
- Regulatory/legal issues
- Professional bodies
- Sociocultural context
- Interorganisational networking

7. **EMBEDDING AND ADAPTATION OVER TIME**

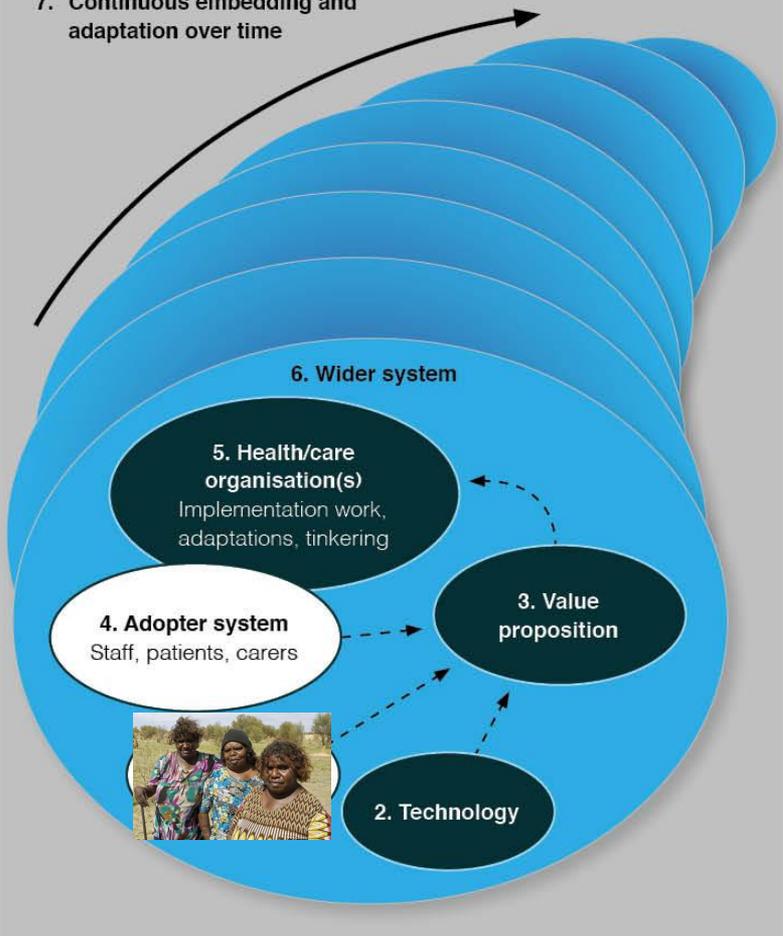
- Scope for adaptation over time
- Organisational resilience

The NASSS (nonadoption, abandonment and challenges to scale-up, spread and sustainability) framework

Greenhalgh et al *J Medical Internet Research* 2017; 19 (11): e367

...used to structure an ex-post theorization of the TORPEDO programme

7. Continuous embedding and adaptation over time

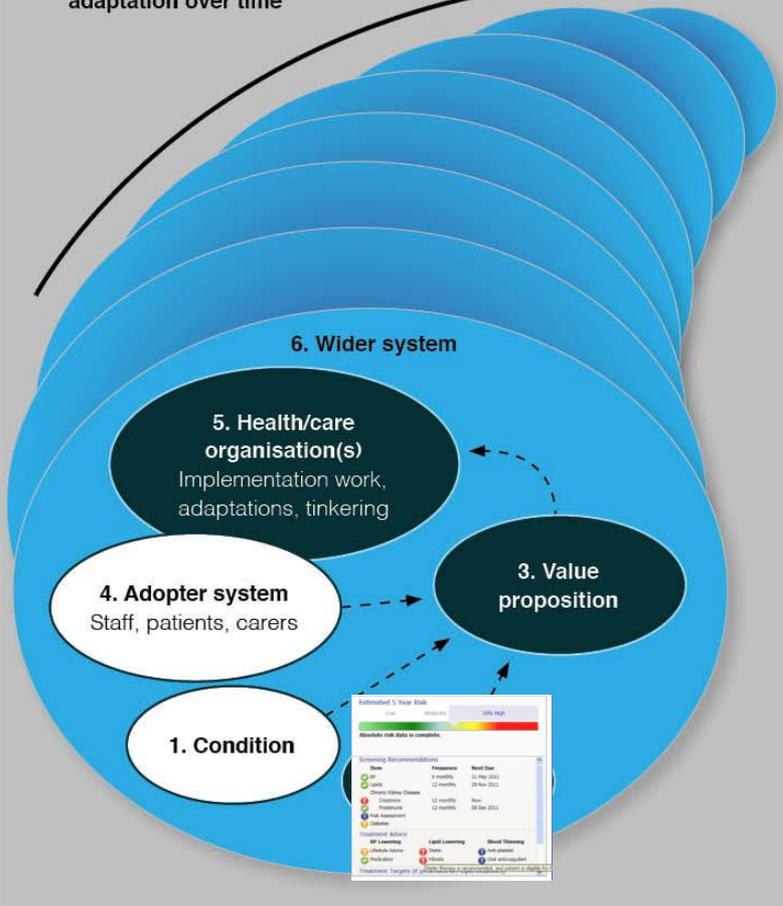


The condition: cardiovascular disease prevention in an Australian population

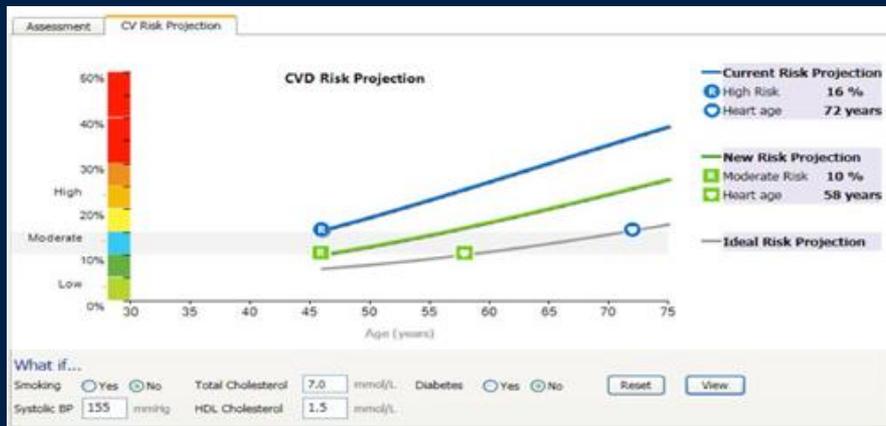


“Aboriginal people ... they’ve got very significant issues in their lives. And so their absolute cardiovascular risk is low down the priority list compared to surviving day-to-day. So I think all of those things we underestimated.”

7. Continuous embedding and adaptation over time

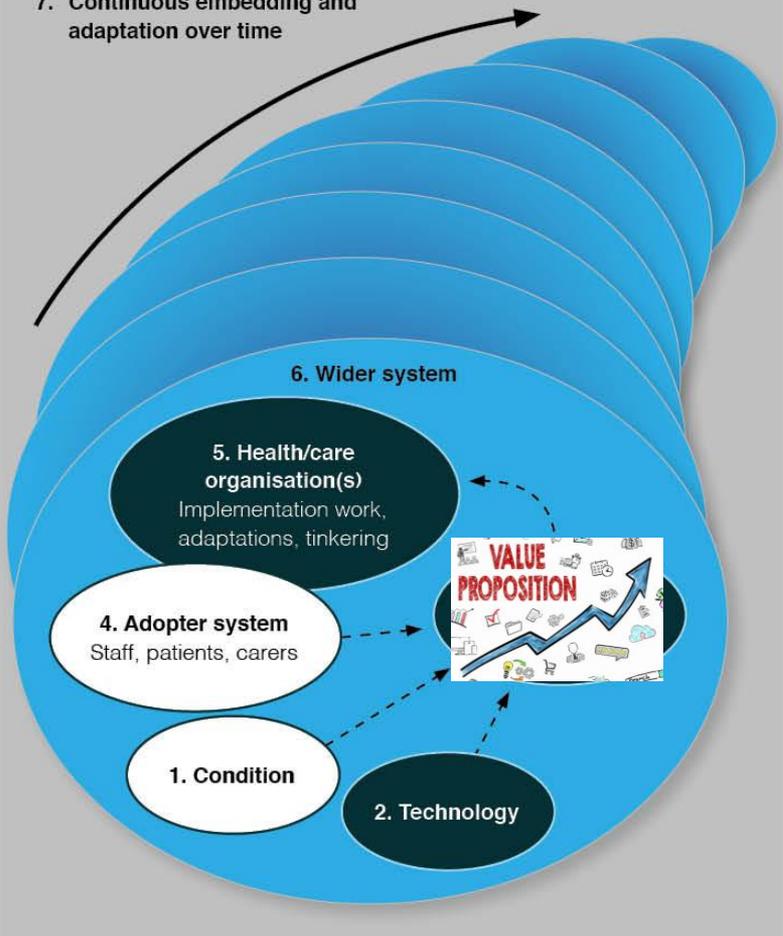


The technology: an interactive risk calculator that sits on the GP's desktop, drawing data from the EPR



“[GPs] loved it, ...loved the traffic light [which] was simple, [and] loved seeing the graphs; ... [Patients] liked seeing it move around so if they quit smoking it would improve their risk, they loved seeing that ”

7. Continuous embedding and adaptation over time



The value proposition: who gains and who loses if HealthTracker is adopted and used in consultations?



Note: Adapted from Greenhalgh T, et al. 'Beyond adoption: a new framework for theorizing and evaluating challenges to the scale-up, spread, and sustainability of health and care technologies'.¹

VALUE TO GOVERNMENT

"...quality of care, a better performing health system, reduced inefficiency, better use of medicines, reduction of morbidity and mortality, and no unintended safety consequences"

VALUE TO GPs WHO WERE KEEN ON FOLLOWING GUIDELINES

"it got all sorts of information out of the medical record and told you what otherwise you have to go hunting for"

BUT increased consultation length => reduced immediate GP income

VALUE TO ABORIGINAL COMMUNITY BOARDS

"...every one of the board members, either themselves or relatives, knows someone who's died of heart disease, or stroke, or diabetes, or kidney diseases; it's just absolutely everywhere"



NEGATIVE VALUE TO PATIENTS

Australian copayment system: \$30-50 for a follow-up consultation which the patient didn't ask for

VALUE TO GPs WHO WERE TRYING TO MAKE A LIVING

For some GPs, using HealthTracker shows *"that you're a 21st century doctor and you're doing the right thing"*

For others, *"patients are looking for a GP who speaks their language, they're not looking for them following guidelines"*

7. Continuous embedding and adaptation over time

6. Wider system

5. Health/care organisation(s)

Implementation work, adaptations, tinkering

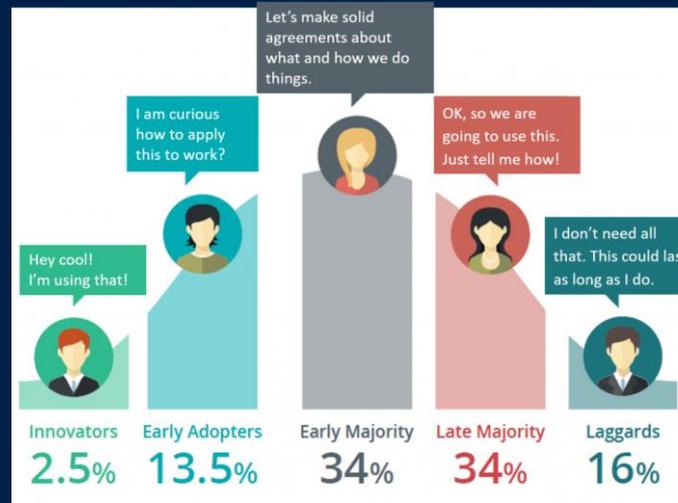
3. Value proposition

1. Condition

2. Technology



The intended adopters: do GPs want this innovation – and if not, why not?



'LAGGARD': "don't tell me to do something when I've made an active decision in discussion with my patient to not do it, don't keep giving me a red traffic light"

7. Continuous embedding and adaptation over time

6. Wider system



4. Adopter system
Staff, patients, carers

3. Value proposition

1. Condition

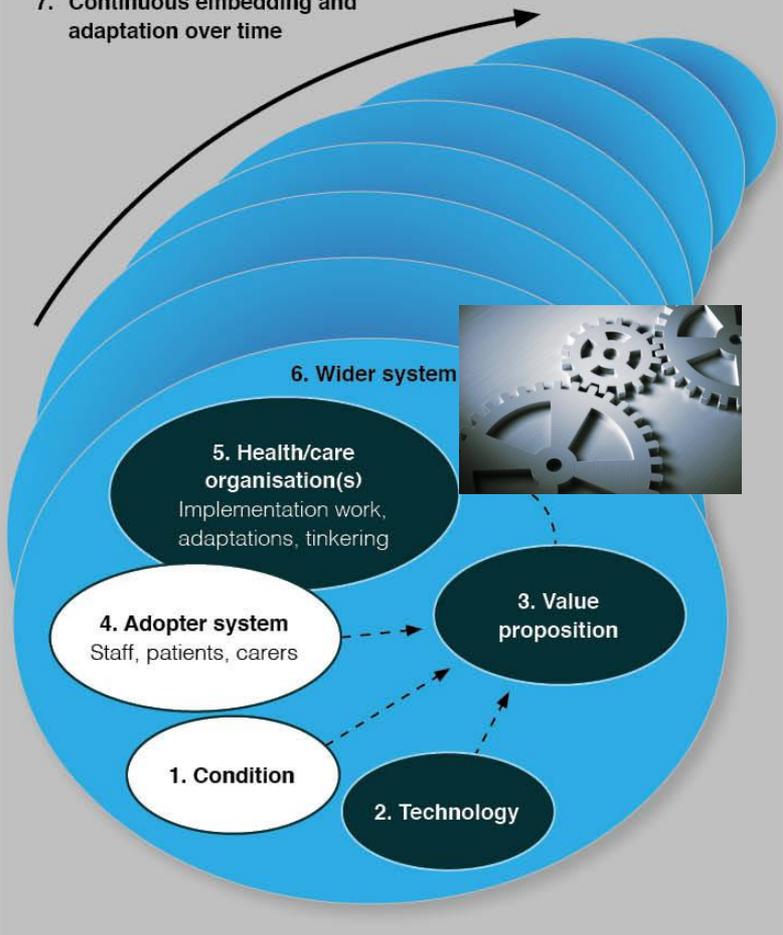
2. Technology

The organisation: does the healthcare organisation have the capacity and willingness to take on this innovation?

YES: “[the practice had] been engaged in quality improvement work very strategically for about 15 years [and] already had an operational structure that they could weave [HealthTracker] into.”

NO: “... don’t tend to change their hardware very often, or let it upgrade very often, so you’re trying to run sophisticated new software on older machines”; “one practice couldn’t even install the software”

7. Continuous embedding and adaptation over time



The wider system: how conducive is the policy context – and how much inter-organisational networking is there?

ROYAL COLLEGE OF GPs:

“when it comes to endorsing software, that’s a relatively new space for them”

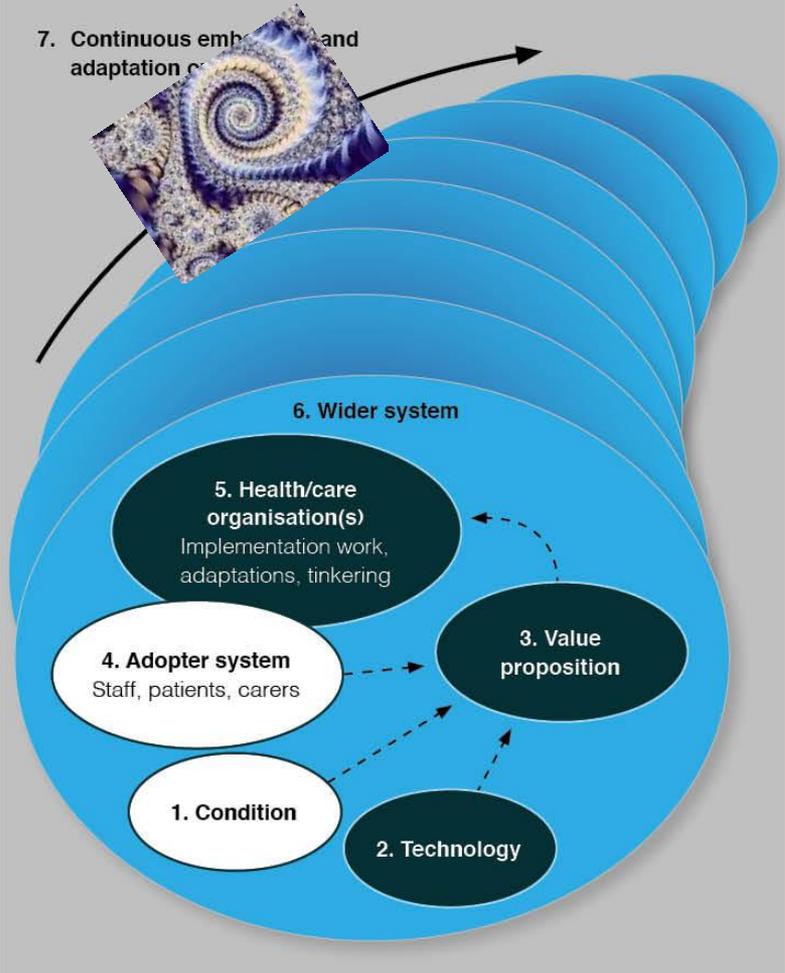
GOVERNMENT:

“we put in a submission to government only to be told eventually that from a legislative viewpoint, MBS [Medicare Benefit Subsidy] items can’t be attached to software”

INTER-ORGANISATIONAL NETWORKING

‘Community of practice’ idea was abandoned in case it contaminated the RCT

7. Continuous embedding and adaptation of

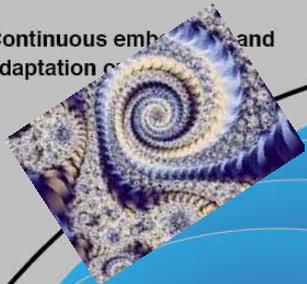


Time: How will the interactions and interdependencies between all these domains change as the system evolves?

HealthTracker is “... one player in a very congested space, competing for that crowded real estate on the screen”

“... regulating clinical practice is difficult ...ultimately, it's always going to be optional, [as] the doctor can always say, I didn't have time, I wasn't interested, it didn't seem like the right patient”

7. Continuous embedding and adaptation



6. Wider system



em
ers



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7. EMBEDDING AND ADAPTATION OVER TIME

- Scope for adaptation over time
- Organisational resilience

NASSS is a framework for surfacing a complex narrative of what happened and why

We are also using NASSS to help plan projects *prospectively*

EDITORIAL

Open Access

Studying complexity in health services research: desperately seeking an overdue paradigm shift

Trisha Greenhalgh^{1,2*} and Chrysanthi Papoutsis^{1,2}



Some theory papers



Spreading and scaling up innovation and improvement

Journal:	BMJ
Manuscript ID	BMJ-2019-049038
Article Type:	Analysis
BMJ Journal:	BMJ
Date Submitted by the Author:	29-Jan-2019
Complete List of Authors:	Greenhalgh, Trisha; University of Oxford, Nuffield Department of Primary Care Health Sciences Papoutsis, Chrysanthi; University of Oxford, Nuffield Department of Primary Care Health Sciences



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Social Science & Medicine

journal homepage: www.elsevier.com/locate/socscimed



How complexity science can inform scale-up and spread in health care: Understanding the role of self-organization in variation across local contexts

Holly Jordan Lanham^{a,b,c,*}, Luci K. Leykum^{a,b,c}, Barbara S. Taylor^{d,e}, C. Joseph McCannon^f, Curt Lindberg^g, Richard T. Lester^{h,i}

^aVeterans Evidence Based Research Dissemination and Implementation Center, South Texas Veterans Health Care System, USA



JOURNAL OF MANAGEMENT STUDIES

Journal of Management Studies 54:2 March 2017
doi: 10.1111/joms.12219

Don't Simplify, Complexify: From Disjunctive to Conjunctive Theorizing in Organization and Management Studies

Haridimos Tsoukas

University of Cyprus and University of Warwick

How Hard Can It Be?

Actively Managing Complexity in Technology Projects

The complexity assessment tool offers a framework for articulating, assessing, and managing sources of complexity in technology projects.

Harvey R. Maylor, Neil W. Turner, and Ruth Murray-Webster

Don't Simplify, Complexify: From Disjunctive to Conjunctive Theorizing in Organization and Management Studies

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“We come close to grasping complexity when we restore the past to its own present and make distinctions that overcome dualisms, preserving as much as possible relationality, temporality, situatedness and, interpretive open-endedness.”

“Nor is wisdom only concerned with universals: to be wise, one must also be familiar with the particular, since wisdom has to do with action, and the sphere of action is constituted by particulars.” - Aristotle

In other words, rich narratives allow us to learn by understanding the particular for its own sake, not as a ‘case of X’

Don't Simplify, Complexify: From Disjunctive to Conjunctive Theorizing in Organization and Management Studies

Haridimos Tsoukas

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To create rich pictures of
[change in] organisations, we
need

- An open-world ontology
- A performative ontology
- A poetic praxeology

Open-world ontology

= seeing the world as subject to multiple interacting influences which have to be described and studied in all their richness to reveal layers of influence

Performative epistemology

= a focus on real-world action and on what becomes possible through action

Poetic praxeology

= writing up case studies in a way that values descriptive detail, apt metaphor and narrative coherence

How Hard Can It Be?

Actively Managing Complexity in Technology Projects

The complexity assessment tool offers a framework for articulating, assessing, and managing sources of complexity in technology projects.

Harvey R. Maylor, Neil W. Turner, and Ruth Murray-Webster

Research-Technology Management • July—August 2013 | 45

Maylor et al

- Complexity is best conceptualised as something that is *subjectively experienced* (e.g. by project managers)
- 3 kinds of complexity: **logistical** (to do with size, scale, interdependency of tasks), **socio-political** (to do with people, relationships, conflicts of interest) and **emergent** (developing as the project unfolds over time)
- People often don't spot the complexities in a project unless and until they're doing that particular aspect of the project

Principles of quality improvement under conditions of complexity

Acknowledge unpredictability



Contemplate multiple possible futures

Recognise self-organisation



Expect local teams to tinker and adapt

Facilitate interdependencies



Assess strength of interdependencies; facilitate new ones

Encourage sensemaking



Encourage teams to admit ignorance, explore paradoxes, reflect collectively

Develop adaptive capability in staff



Ability to make judgements when faced with incomplete data

Attend to human relationships



Teams work together to solve problems using give-and-take

Harness conflict productively



Multifaceted solutions born of 'conflicting' views

OPINION

Open Access



Using flawed, uncertain, proximate and sparse (FUPS) data in the context of complexity: learning from the case of child mental health

Miranda Wolpert^{1*} and Harry Rutter²

Flawed e.g. incomplete

Uncertain e.g. contested

Proximate i.e. only a proxy measure

Sparse e.g. low volume

Much advice on use of routinely collected data assumes that high-quality data *could* be generated. But in some specialties, FUPS data is *always* the reality

Treat data as a partial remnant



Convey level of [un]certainty when presenting FUPS data

Transparency of analysis



e.g. avoid 'black box' statistics

Triangulate data



Interpret all data in the light of other information e.g. on wider context, or from other areas of health care

The numbers and quotes don't speak for themselves – they must be spoken for

The naturalistic case study is the preferred methodology for studying complex change

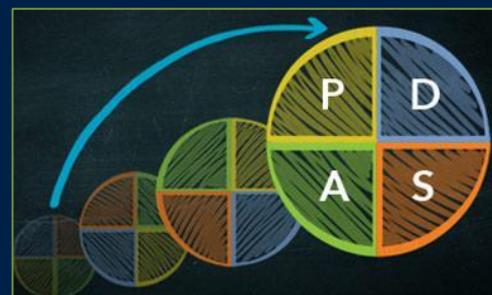
“The existence of the experimental method makes us think we have the means of solving the problems which trouble us, but problem and method pass one another by.”

Ludwig Wittgenstein, *Philosophical Investigations*, para 230 [1]

Take-home message: get better at storytelling

“Among the better evangelists, anthropologists, and dramatists are those who have developed the art of story-telling. We need to portray complexity. We need to convey holistic impression, the mood, even the mystery of the experience. The program staff or people in the community may be ‘uncertain’. The audiences should feel that uncertainty. More ambiguity rather than less may be needed in our reports. Oversimplification obfuscates.”

Stake R. Evaluation in Education and Human Services, 49, 343-362



International Forum for Quality and Safety in Healthcare, Glasgow, March 2019

Thank you for your attention

© Professor Trisha Greenhalgh *Funding: Wellcome Trust and NIHR*



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Greenhalgh & Papoutsi 2018

Traditional approach

New paradigm (complexity-informed) approach

Goal of research	Establishing the truth, universal and enduring; finding solutions to well-defined problems	Exploring tensions; generating insights and wisdom; exposing multiple perspectives; viewing complex systems as moving targets
Assumed model of causality	Linear, cause-and-effect causality (perhaps incorporating mediators and moderators)	Emergent causality: multiple interacting influences account for a particular outcome but none can be said to have a fixed 'effect size'
Typical format of research question	"What is the effect size of the intervention on the predefined outcome, and is it statistically significant?"	"What combination of influences has generated this phenomenon? What does the intervention of interest contribute? What happens to the system and its actors if we intervene in a particular way? What are the unintended consequences elsewhere in the system?"
Mode of representation	Attempt to represent research in one authoritative voice	Attempt to illustrate the plurality of voices inherent in the research and phenomena under study
Good research is characterised by	Methodological 'rigour', i.e. strict application of structured and standardised design, conventional approaches to generalisability and validity	Strong theory, flexible methods, pragmatic adaptation to emerging circumstances, contribution to generative learning and theoretical transferability
Purpose of theorising	Disjunctive: simplification and abstraction; breaking problems down into analysable parts	Conjunctive: drawing parts of the problem together to produce a rich, nuanced picture of what is going on and why
Approach to data	Research should continue until data collection is complete	Data will never be complete or perfect; decisions often need to be made in situations of incomplete or contested data
Analytic focus	Dualisms: A versus B; influence of X on Y	Dualities: inter-relationships and dynamic tensions between A, B, C and other emergent aspects