Factors Determining the Success and Failure of Digital Health Interventions

Frances S Mair
Norie Miller Professor of General Practice
Funders who have supported two decades of research:

- CSO, SDO, NIHR, Innovate, Northwest R&D, BHF, Marie Curie, EU (Horizon 2020), ESRC.

Wide range of excellent colleagues across the world but especially Profs Carl May, Kate O’Donnell, Victor Montori, Tracy Finch and Drs Katie Gallacher and Marilyn Lennon.
Layout of My Talk.......... 
• Context 
• Experience From A National Deployment 
• Can Theory Help? 
• Key Implementation Issues to Consider 
• Putting Users at the Centre Of Design 
• Engaging with Users 
• Concluding Thoughts
• The possibilities that new technologies/health informatics present to health care systems; practitioners, and carers and patients are considerable.

• Policymakers have been quick to recognise the possibilities of new technologies in the health service.

• BUT new technologies have often struggled to become part of routine service delivery.
THE RISE OF NON-COMMUNICABLE DISEASES

GLOBAL SHIFT IN DISEASE BURDEN

<table>
<thead>
<tr>
<th>Region</th>
<th>2001</th>
<th>2020</th>
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</thead>
<tbody>
<tr>
<td>Europe &amp; Central Asia</td>
<td>6</td>
<td>21</td>
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<tr>
<td>East Asia &amp; Pacific</td>
<td>19</td>
<td>47</td>
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<tr>
<td>Latin America &amp; Caribbean</td>
<td>22</td>
<td>43</td>
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<tr>
<td>Middle East &amp; North Africa</td>
<td>24</td>
<td>65</td>
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<tr>
<td>South Asia</td>
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<td>72</td>
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<tr>
<td>Sub-Saharan Africa</td>
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<td>21</td>
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Multiple Morbidity in Scotland

Life expectancy and disability-free life expectancy (DFLE) at birth, persons by neighbourhood income level, England, 1999–2003


https://doi.org/10.1371/journal.pone.0208444
https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0208444
While new technologies are subject to very rapid development, the professional, organizational and institutional terrain on which this technology is set in play is much less amenable to change.
• Implementing and embedding new technologies of any kind involves complex processes of change at the micro level for professionals and patients and at the meso level for health-care organizations themselves.

• EU has argued that implementing e-health strategies “has almost everywhere proven to be much more complex and time-consuming than initially anticipated”
Oh dear, is this another costly IT failure?

Taxpayers deserve to know why Whitehall computer contracts keep going wrong
Insufficient attention paid to implementation issues

- When you introduce a new technology you are seeking to influence how people think, act and organise themselves.
- True of all types of digital health
  - EMR
  - CDSS
  - Apps
  - Telehealth
  - Sensor based technologies etc……
The Translational Gap Remains Wide.....
Implementing new technologies necessitates changes in *expertise* and *actions*.
• Getting new technologies used in practice so that they become routinely embedded in social contexts is the result of people working, individually and collectively, to implement them.

• Important to also take a “whole systems view”
Readiness for Delivering Digital Health at Scale: Lessons From a Longitudinal Qualitative Evaluation of a National Digital Health Innovation Program in the United Kingdom

Marilyn R Lennon1, BSc, PGDip, PhD ; Matt-Mouley Bouamrane1, PhD ; Alison M Devlin2, BSc (Hons), PhD ; Siobhan O’Connor3, RN, BSc, CIMA CBA ; Catherine O’Donnell2, BSc (Hons), MPH, FHEA, PhD ; Ula Chetty2, BSc, MRCP, MSCHB, MBACP ; Ruth Agbakoba2, MSc, B Sc (hons) ; Angela Atikinsan2, MSc ; Eleanor Grieve1, BA (Hons), MPH ; Tracy F Wyke6, FRSE, FRCGHR, PhD, B Sc (Hons)

Delivering digital health and well-being at scale: lessons learned during the implementation of the Dallas program in the United Kingdom

Alison M Devlin, Marilyn McGee-Lennon, Catherine A O’Donnell, Matt-Mouley Bouamrane, Ruth Agbakoba, Siobhan O’Connor, Eleanor Grieve, Tracy Finch, Sally Wyke, Nicholas Watson, ... Show more


Published: 08 August 2015 Article history
The Dallas Programme

To transform digitally supported self care

<table>
<thead>
<tr>
<th>Impact</th>
<th>Individual</th>
<th>Systems</th>
<th>Economy</th>
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<tr>
<td>Descriptive</td>
<td>Implementation</td>
<td>Outcome</td>
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<th>Ecosystems</th>
<th>Coherence</th>
<th>Cognitive Participation</th>
<th>Collective Action</th>
<th>Reflective Monitoring</th>
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</thead>
<tbody>
<tr>
<td>Choice</td>
<td>Control</td>
<td>Community</td>
<td>Collaboration</td>
<td>Contribution</td>
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Considering Macro, Meso and Micro Issues
Recommendations

• Invest in infrastructure (national and local)
• Brand Trust and Confidence is Crucial – Consider Accreditation/Kitemarking
• Interoperability (may need incentivised)
• Invest in Engagement and Enablement
• Make digital health services more accessible.
• The importance of tailoring to meet user’s needs – self management is only one part of the workload in a person’s life
• Co-design
• Engagement and Enablement
  – The need for investment in upskilling to promote access and expedite uptake and utilisation of digital health and wellbeing technologies.
• Infrastructure
• Accreditation/Quality Assurance
• Policy (Data privacy regulations etc)
• So what factors will inhibit or promote the implementation and embedding of health informatics interventions in clinical practice in different settings: primary care, hospital, community and home?

• What needs to be considered?
In the context of digital health interventions.....

Participants: Are all those involved in operationalising these technologies:
e.g. Practitioners
    Health service managers
    Public/Caregivers/Wider Family
    Wider Community
    Policymakers
Normalisation Process Theory (NPT) – can help ..........

<table>
<thead>
<tr>
<th>Construct</th>
<th>What it addresses</th>
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<tbody>
<tr>
<td>Coherence</td>
<td>Can stakeholders make sense of a new health informatics intervention?</td>
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<tr>
<td>Cognitive Participation</td>
<td>Can stakeholders get others involved and engaged with implementation of the new technology?</td>
</tr>
<tr>
<td>Collective Action</td>
<td>What has to be done to make the technology work in routine practice?</td>
</tr>
<tr>
<td>Reflexive Monitoring</td>
<td>How can use of the technology be monitored and evaluated?</td>
</tr>
</tbody>
</table>
Thinking about doing

Coherence

Reflexive Monitoring

Doing the doing

Cognitive Participation

Collective Action

Courtesy of Prof Kate O’Donnell
Coherence - Key questions

- Are the key attributes of the new technology easy to describe?
- Is the planned health informatics intervention different/distinct from other established ways of working?
- Are all the relevant individuals clear about what specific tasks and responsibilities will be reqd of them during implementation of the new technology?
- Do participants have a shared understanding of what is hoped to be achieved by introducing the new technology?
- Do individuals understand the value, benefits and importance of the new technology; and for whom?
• So for a new health informatics intervention..
  – **Is the rationale for the new technology clear?**
    – Will benefits be valued by participants?

• OR will it all just be perceived as just more work.................?
Cognitive Participation - Engagement

• How much will individuals commit to and engage with implementing the new technology
• How much they are able to get others to buy-into the innovation. (Often referred to as enrolment).

Key questions:
• Are people prepared to invest time, energy and work in implementing and sustaining the new technology in practice?
• Do they think this is a legitimate use of their time?
Achieving “Buy In” Can Be A Struggle!
Will the new technology be seen as a good idea?

- Will people be prepared to invest time, energy and work in implementing the new technology and sustaining it in practice?

MAYBE or MAYBE NOT?
Collective Action: Does it Help?

- What do people have to do to make the new technology work in practice?
- How does the new technology affect the work of individuals?
- Does the technology change existing work at all e.g. are new staff required?
- Does the technology make existing work easier or harder?
- Do staff have confidence in the new technology?
- Do staff need training before using the technology?
- Will organisations support the deployment of the new technology?
Reflexive Monitoring: Appraisal

• How are users likely to perceive the new technology once it has been in use for a while?
• Is the technology intervention likely to be thought of as advantageous e.g. for staff, for patients?
• Will the effects of the new technology be easily identifiable?
• Can relevant participants contribute to feedback about the technology, once it is in use?
• Can the new technology be adapted/improved on the basis of feedback and experience?
• What mechanisms are in place to allow individuals to provide feedback on the new technology?

• What scope is there for iterative development?
NPT Toolkit provides a simple way to think through key issues around implementation, embedding, and integration. [http://www.normalizationprocess.org/](http://www.normalizationprocess.org/)

The NPT website is here to help you think through implementation and integration problems in health care. Whether you’re involved in technological innovations, testing complex interventions, or implementing and evaluating any new way of thinking, working, or organizing change in healthcare.

If you are a researcher, clinician, manager, or someone else who has to practically implement and integrate some form of innovation, this website could help you. It will guide you through ways to use Normalization Process Theory, some of the theory’s basic concepts, as well as offer you a toolkit to help you think about your implementation problems.

Tell us what you think

Name *
Organisation
Email *
Comments *
WHAT ARE THE IMPLICATIONS OF NEW DIGITAL HEALTH INTERVENTIONS FOR PUBLIC AND CAREGIVERS?
• Courtesy of BMJ  29 August 2009 Vol 339. May, Montori and Mair. We need Minimally Disruptive Medicine.
Thinking about the burden of treatment

Should it be regarded as an indicator of the quality of care?

Frances S Mair professor of primary care research, Carl R May professor of healthcare innovation

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Life Workload – self-management workload is only part of the workload in a person’s life!
• WHO IS AT RISK? – EVERYONE!
• ALL THOSE WITH CAPACITY ISSUES
• Those with LTCs especially Multimorbid
• Vulnerable: migrants, those with learning difficulties,
• Those with health literacy issues, socially isolated, mental health problems, addiction problems, those lacking good social support networks and so on.............
EMERGING EVIDENCE OF THE VALUE OF INTERVENTIONS TO ADDRESS THESE ISSUES...¹

Key Messages

• Buying the kit only the beginning........
• Need to invest heavily in a communication strategy – targeting all relevant stakeholders
• Target policymakers to ensure national/local policies support the implementation of the new technology.
• Reconfiguration of services may be reqd/Cost implications
• Education/support essential
• Staff/Public/Patients/caregivers need to be ENABLED and not overwhelmed.....
• Frequently, the technology is over-emphasised.

• Whereas the crucially important issue is the ways in which the ways of working need to be adapted to make the new systems work in practice.
If equipment is simply parachuted into an existing clinical context, the chances for successful introduction and integration of the digital health system as reconfigured practice will be severely compromised.
• Understanding current healthcare challenges: Multimorbidity and complex needs

• What are the implications of new Digital Health Interventions for Patients and Caregivers?
Concluding Thoughts

• Many challenges
• Not insurmountable
• BUT need ACKNOWLEDGED and ADDRESSED if digital health deployment at scale is to be realised.
• Development and Evaluation with users as partners likely to reap greatest benefit for all.
Questions?

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