How can we make innovation programmes in health and social care work?

© Professor Trisha Greenhalgh  Funding: Wellcome Trust and NIHR
The **NASSS** framework

Health technology adoption, non-adoption, abandonment, and challenges to scale-up, spread and sustainability
A. Video consultations
B. m-health for epilepsy
C. Risk analytics to reduce hospital admissions
D. Pendant alarms
E. Telehealth for heart failure
F. Care organising apps
G. GPS tagging for dementia
<table>
<thead>
<tr>
<th>SIMPLE</th>
<th>COMPLICATED</th>
<th>COMPLEX</th>
</tr>
</thead>
<tbody>
<tr>
<td>Straightforward</td>
<td>Multiple interacting components or issues</td>
<td>Dynamic, unpredictable, not easily disaggregated into constituent components</td>
</tr>
<tr>
<td>Predictable</td>
<td></td>
<td>Complexity may be logistical or socio-political</td>
</tr>
<tr>
<td>Few components</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
DOMAIN 1: The condition or illness

THE CONDITION

CO-MORBIDITIES / SOCIO-CULTURAL FACTORS

SIMPLE OR COMPLICATED
- e.g. broken ankle, cancer

COMPLEX
- e.g. dementia
DOMAIN 2: The technology

WHAT ARE ITS MATERIAL FEATURES?

WHAT KNOWLEDGE IS NEEDED TO USE IT?

WHAT KIND OF KNOWLEDGE DOES IT BRING INTO PLAY?

WHAT IS ITS SUPPLY MODEL?

WHO OWNS THE IP?

SIMPLE OR COMPLICATED

COMPLEX

e.g. telephone

e.g. machine learning
DOMAIN 3: The value proposition

WHAT IS THE DEVELOPER’S BUSINESS CASE? [SUPPLY-SIDE VALUE]

WHAT IS THE TECHNOLOGY’S DESIRABILITY, EFFICACY, SAFETY AND COST-EFFECTIVENESS? [DEMAND-SIDE VALUE]

e.g. ‘non-invasive liver biopsy’

e.g. robotic wheelchair
DOMAIN 4: The adopter system

WHAT CHANGES ARE IMPLIED FOR STAFF?

WHAT CHANGES ARE IMPLIED FOR PATIENTS?

WHAT IS ASSUMED ABOUT THE WIDER CARE NETWORK?

SIMPLE OR COMPLICATED

e.g. pendant alarm

COMPLEX

e.g. GPS tracking ("granny tagging")
DOMAIN 5: The organisation

WHAT IS ITS GENERAL CAPACITY TO INNOVATE?

HOW READY IS IT FOR THIS TECHNOLOGY-SUPPORTED CHANGE?

HOW EASY WILL THE FUNDING DECISION BE?

IMPLICATIONS FOR TEAM ROUTINES

WHAT WORK IS NEEDED TO IMPLEMENT?

SIMPLE OR COMPLICATED

One well-led and happy organisation, good technology fit, minimum disruption to existing routines

COMPLEX

Needs coordination among organisations, poor innovation-system fit, disruptive potential, success depends on cross-system savings
DOMAIN 6: The wider system

POLITICAL AND POLICY CONTEXT
REGULATORY OR LEGAL HURDLES
PROFESSIONAL BODIES
CITIZENS / LAY PUBLIC
INTER-ORGANISATIONAL NETWORKING

SIMPLE OR COMPLICATED
Policy push, wide support, extensive networking among adopting organisations

COMPLEX
Tricky political, regulatory or legal hurdles; weak inter-organisational networking
DOMAIN 7: Embedding and adapting over time

**How much scope is there to adapt / co-evolve technologies and services?**

**How resilient is the organisation for adapting to critical events?**

**Simple or Complicated**
- Technology and organisation can adapt over time

**Complex**
- Technology and/or organisation are ‘brittle’, unable to adapt
**Figure 10: The NASSS framework (Greenhalgh et al J Med Internet Research 2017; 19 [11]: e367)**

1. **CONDITION**
   - Nature of condition or illness
   - Comorbidities
   - Socio-cultural factors

2. **TECHNOLOGY**
   - Material properties
   - Knowledge to use it
   - Knowledge generated by it
   - Supply model
   - Who owns the IP?

3. **VALUE PROPOSITION**
   - Supply-side value (to developer)
   - Demand-side value (to patient)

4. **ADOPTERS**
   - Staff (role, identity)
   - Patient (passive v 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
   - Socio-cultural context
   - Inter-organisational networking

7. **EMBEDDING AND ADAPTATION OVER TIME**
   - Scope for adaptation over time
   - Organisational resilience
### THE NASSS-CAT (COMPLEXITY ASSESSMENT TOOL)

## IDENTIFY AND UNDERSTAND COMPLEXITY
- Tease out uncertainties and interdependencies (e.g. via narrative)

## REDUCE COMPLEXITY WHERE POSSIBLE
- Limit scale / scope / interdependencies / pace (extend timescale)

## ‘RUN WITH’ COMPLEXITY e.g.
- Strengthen leadership; build relationships; manage conflict
- Co-develop a vision
- Develop individuals and resource their creative action
- Control programme growth (e.g. minimise scope creep)
- Improve policy or regulatory context
THREE TAKE-HOME MESSAGES

Simple is easy

Complicated is difficult, slow and expensive

Complex may be impossible
THANK YOU FOR YOUR ATTENTION

© Professor Trisha Greenhalgh