The Person-Based Approach to developing and optimising interventions

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Overview of talk

- Introduction to the ‘person-based approach’ to intervention development
  - Illustrated by the development of ‘Germ Defence’
- The Person-Based Approach to planning and developing interventions
  - ‘Guiding Principles’
  - Think-aloud studies and the ‘Table of Changes’
- The Person-Based Approach to implementation
The Person-Based Approach to intervention development

- Approach has evolved from developing over 30 digital health interventions
- Draws on >1500 qualitative interviews with users
- Validated by evidence from trials of our intervention effectiveness published in top journals (Lancet, BMJ)
The Person-Based Approach to intervention development

• The PBA uniquely combines user-centred design methods with evidence-based behaviour change methods

• This ensures that better uptake and engagement with intervention actually leads to offline behaviour change and better healthcare outcomes

• The PBA has been used successfully to develop and adapt interventions that are engaging and effective for people from diverse cultures internationally and of all ages/abilities
Applications of the PBA to digital health

• Have developed interventions for patients and health-care professionals (primary and secondary care)

Cost-effective interventions developed for:

• promoting healthy behaviour (e.g. physical activity, weight management, smoking cessation, alcohol reduction)

• managing long-term conditions (e.g. hypertension, diabetes, cancer, cognitive impairment pre-dementia, stroke, asthma, eczema, IBS) and symptoms (e.g. back pain, emotional distress, flu, fatigue, dizziness)
Overview of the Person-Based Approach

**Aim**: to understand and accommodate the perspectives of the people who will use the intervention, in order to improve acceptability, feasibility, engagement (hence uptake, engagement, adherence and outcomes)

**Methods:**
- extensive, in-depth qualitative and mixed methods research
- involves wide range of people from target user populations
- iterative process throughout planning, development, implementation
Related and complementary approaches

• **Usability/acceptability testing** - but PBA much more in-depth, aims to be *engaging/persuasive not just acceptable*

• **User-centred/human-centred design** – but PBA more focused on *behaviour change processes*

• **Participatory design** – totally compatible but PBA involves *extensive qualitative research with wide range of users* to supplement co-design user input

• **Realist methods** – totally compatible but PBA provides *simpler method for understanding immediate context of individual behaviour change*
Combining the PBA with theory-based behavioural analysis

- Literature scoping and review
- Qualitative research with target users
- Formulate guiding principles
- Draft/refine intervention materials
- Refine guiding principles
- Qualitative piloting of draft materials
- Quantitative data analysis
- Qualitative research with users
- Triangulation

**Intervention Planning**

Behavioural analysis and construction of logic model
Revisit behavioural analysis and refine logic model
Examine theory-based questions drawn from logic model

**Mixed Methods Process Evaluation**

Complementary theory-based activities
Conducted in parallel with the PBA
Related and complementary approaches

Complements theory- and evidence-based intervention development by:

• suggesting which Behaviour Change Techniques (BCTs) most important in a particular context; identifies theory- and evidence-based BCTs most acceptable, salient, feasible for target population

• provides guidance on how best to implement selected BCTs, and avoid or modify intervention characteristics that are disliked, impractical

• suggests when need to create new intervention characteristics, hence not yet evidence-based
An illustration: Germ Defence

A theory and evidence-based intervention to combat infection and reduce antibiotic use

• WHO/DoH advised hand-washing during last flu pandemic to prevent spread of infection – no interventions to support this

• We developed and trialled first online intervention worldwide to increase hand-washing

Based on:

A) key theory and evidence-based behaviour change techniques (not information, instructions, tips, advice!)

B) designed and optimised using in-depth, iterative mixed methods research into user views
Example: Focus group and questionnaires studies to select target behaviour(s)

Findings

Social distancing: least positive attitudes as prevents caring for family

Cough/sneeze hygiene: positive attitudes but scepticism about feasibility

Handwashing: positive attitudes and seen as feasible
Example: Qualitative studies of draft web-pages for ‘Germ Defence’ to select target BCTs

28 iterative ‘think aloud’ interviews, progressively modified website

a) **Format-related findings**, e.g. wanted quizzes with feedback, larger font etc.

b) **Content-related findings**, e.g.

False beliefs – viruses are airborne so handwashing not relevant to infection

Social influence – didn’t want to be seen as having dirty hands!

Practical barrier – forgetting
Why washing your hands is the best way to protect yourself and others

Germs can live for hours outside the body.

They settle on surfaces after being *breathed out*.

They get on infected people's hands when they *cough and sneeze, or touch their face*.

They are on surfaces *touched by infected people's hands*.

You can then pick them up:

By *eating food* without washing your hands first.

Or *touching an infected surface* e.g. a cup, door handle, stair rail, computer keyboard, shop counter, and money. Then *touching your face* either consciously like scratching an itch, or automatically like rubbing your eyes.
Harnessed key emotions – disgust and shame

When could you wash your hands more?

It is hard to know if hands are dirty just by looking at them - they can have lots of germs on them but still look clean.

The more you wash your hands, the better protected you and the people you live with are from illnesses.

To help do this, you can choose your own hand washing plan. This plan can help you wash your hands MORE than you do already, such as:

- by committing to washing your hands at certain times.
- and then helping to remind you when to wash them.

On the next page is the table showing how much you have washed your hands UP TO NOW.

To choose your plan you can click on a new button to show how much you want to wash them IN THE FUTURE.
Used automatic context prompting to build new, offline habits

### GermDefence

#### How often do you wash your hands?

If you think about how much you have washed your hands over the last week, which circle best describes each activity? Please click on one circle for each activity.

<table>
<thead>
<tr>
<th>Over the last week I washed my hands:</th>
<th>almost never</th>
<th>some times</th>
<th>quite often</th>
<th>very often</th>
<th>almost always</th>
</tr>
</thead>
<tbody>
<tr>
<td>Before I ate a meal</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Before I ate snacks (e.g. crisps, fruit, sweets)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>After I went to the toilet</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>When I came into the house (e.g. after work, shopping, traveling)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Involved family/home for offline prompting and social support

Helping remind you to wash your hands

Now you can decide what you think would be the best way to use your plan and help remind you to wash your hands.

For example, you could:

Print a copy of your plan - click here.

Sign it and keep a copy.

Put it up around your house.

Show it to someone else and ask them to help remind you.
Germ Defence: findings/impact

• Intervention trialled in > 20,000 adults

• Reduced respiratory infections - frequency, severity, consultations, antibiotics use (Lancet, 2014)

• Benefited family members, gastrointestinal infections

• Effective for people with lower education levels

• Website endorsed and disseminated by NICE

https://germdefence.lifeguidehealth.org/player/play/germdefence
The Person-Based Approach to planning and developing interventions
Person-based intervention planning

Formulate guiding principles summarising a) key context-specific issues affecting acceptability and engagement b) how intervention will address these.

1. Identify relevant characteristics of target users and their situation – from relevant literature (e.g. thematic synthesis) and/or primary qualitative/mixed methods research

2. Based on this analysis of user needs, formulate guiding principles:

a) Identify key intervention design objectives

b) Identify key features of the intervention that can achieve those objectives (can include Behaviour Change Techniques, also other intervention characteristics such as delivery format)
Illustration: development of ‘guiding principles’ for HOME-BP

• Digital intervention to support management of uncontrolled hypertension

• Patient self-monitoring of blood pressure, medication changes, lifestyle changes with health care professional (HCP) support.

• Feasibility study - Qualitative Process Evaluation:
  - Interviews (15 patients, 3 HCPs)
  - Focus Groups (8 HCPs)
In-depth qualitative research

• Open-ended/semi-structured questions initially (can use theory-based questions later if required), to elicit personal stories of what is most important to users
  ‘How do you feel about the intervention now?’

• Ask about intervention not website/app
  ‘Can you tell me about the last time you tried to follow the intervention advice?’
Qualitative findings

Patients were not motivated to make lifestyle changes

“The diet and the exercise and all that, I just ignored them, they were mostly platitudes that everyone knows about anyway... I didn't do [the lifestyle changes], again, because there’s no one threatening me. [laughter]... It was all things I knew, so and that's because I've had high blood pressure for so many years...I don't do exercise because I always, I always get injured because of arthritis and gout and things like that. So I can't do a lot of the things that they wanted me to do.”
Practitioners did not appear to be implementing the protocol properly.

“The communication was abysmal...I got what was called an amber alert which told me that my blood pressure was high and I had to go and see a doctor. So I made an appointment and none of the reception staff knew what the study was about, none of the nurses – and the doctor asked me what an amber alert was and I had to explain to her... I felt quite let down.”
Interviews/focus groups with HCPs showed that they:
1. Hadn’t been checking the study emails
2. Didn’t remember the training, so couldn’t implement medication changes
3. Were reluctant to make medication changes

**BP Home Management**

How can HOME BP help you to control your high blood pressure?

HOME BP can help you to control your BP in two ways:

1. **By monitoring your blood pressure at home for one week every month.**
2. **By making changes to your medication with your GP.**
Guiding Principles for HOME BP

<table>
<thead>
<tr>
<th>Intervention design objective</th>
<th>Key features</th>
</tr>
</thead>
<tbody>
<tr>
<td>1- To facilitate implementation of medication changes by practice staff</td>
<td>Carefully designed <em>automation of practice-patient interaction</em> to make medication changes as easy and well-controlled as possible</td>
</tr>
</tbody>
</table>

**Design features:**
1) A practice lead was designated to check emails and to ensure that prescribers were aware of the intervention
2) All training was put online and patient could not be recruited until practitioners had completed it.
3) The prescriber was emailed directly to issue prescription (avoiding the need for patient to contact practice)
Guiding principles can be informed by the evidence base, theory, PPI or practical needs of an intervention as well as qualitative work.

<table>
<thead>
<tr>
<th>Intervention design objective</th>
<th>Key features</th>
</tr>
</thead>
</table>
| **2- To motivate practice staff to undertake medication changes** | 1- Education for staff about **benefits of medication changes** (e.g. evidence of need and efficacy)  
2- Elements to **promote self-efficacy** for undertaking changes (e.g. skill building)  
3- **Addressing concerns** of patients and staff about medication side effects (e.g. encouraging realistic expectations about side effects; providing methods to seek advice on side effects) |
Person-based intervention development

Further inductive qualitative research essential to gain insight into whether all intervention components

a) comprehensible, acceptable, feasible

b) easy to use, motivating, enjoyable, informative, convincing

1. **Think aloud studies** to elicit range of target users’ reactions to every element of the intervention!

2. Allow users to try intervention for a few weeks, keep diaries -- **retrospective interviews** about experiences
Think aloud interviews

• Ask participants to use the intervention and say out loud any thoughts that come to mind

• Good for:
  • Assessing immediate reactions to intervention content (particularly adverse reactions!)
  • Observing how an intervention is used
  • Assessing iterative modifications
Importance of think aloud interviews for optimising interventions

- Expert team co-designed ‘Diabetes Literacy’ digital intervention to motivate people with diabetes and low health literacy to increase physical activity
- International study - developed in English, translated into German and Mandarin, adapted for Ireland, US and Austria (using qualitative feedback)
- Tried to create personalised physical activity planner giving advice based on current level/type of activity – after 35 think aloud interviews + modifications only 50% people could use correctly, get the right feedback!
Healthy living with diabetes

How can I fit a bit more activity into my life?

Thinking about the **physical activity you already do** is the best way to plan how you can fit a little more into your lifestyle.

Just tell us **how often you do some activities in an average week** – then we can help you get the most benefit out of them.

---

**On how many days a week do you do this activity?**

Only record activities that make you feel a bit warmer and breathe a bit harder than normal.

<table>
<thead>
<tr>
<th>Activity</th>
<th>DAYS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Walking (only count fast walking for at least 10 minutes non-stop)</td>
<td>0</td>
</tr>
<tr>
<td>Heavy housework (makes your heart beat faster), DIY or gardening</td>
<td>0</td>
</tr>
<tr>
<td>Fun physical activities (e.g. dancing, sports)</td>
<td>0</td>
</tr>
<tr>
<td>Cycling</td>
<td>0</td>
</tr>
<tr>
<td>Other activity of any kind (e.g. exercises, swimming, gym)</td>
<td>0</td>
</tr>
</tbody>
</table>

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Very gentle activities such as walking slowly or washing the dishes do not count!
Healthy living with diabetes

How active are you?

You are not very active just now, and so you will get more health payback than other people from even a little extra activity.

If you can gently build up to an hour a week (just 10 minutes most days) this will make a real difference to your health.

The next page will help you plan how to do this.
Making person-based changes: A systematic decision process

1. Conduct interview and transcribe interview
2. Extract negative and positive verbatim comments
3. Tabulate and code comments in ‘table of changes’
4. Agree and implement modifications
## Making person-based changes: The table of changes

<table>
<thead>
<tr>
<th>Page or aspect of intervention (e.g. Page 1 Welcome)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Negative Comments</td>
</tr>
<tr>
<td>-----------------------------------------------</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

### Coding framework

<table>
<thead>
<tr>
<th>Code</th>
<th>Stands for</th>
<th>Means</th>
</tr>
</thead>
<tbody>
<tr>
<td>IMP</td>
<td>Important for behaviour change</td>
<td>This is an important precursor to behaviour motivation, engaging line with the Guiding un convinced by an a motivational example.</td>
</tr>
<tr>
<td>EAS</td>
<td>Easy and uncontroversial</td>
<td>An easy and feasible. For example, a parti definition.</td>
</tr>
<tr>
<td>REP</td>
<td>Repeatedly</td>
<td>This was said repeatedly.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>This is supported by...</td>
</tr>
</tbody>
</table>
## Coding framework

<table>
<thead>
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<th>Code</th>
<th>Stands for</th>
<th>Means</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>IMP</strong></td>
<td>Important for behaviour change</td>
<td>This is an important change that is likely to impact behaviour change or a precursor to behaviour change (e.g. acceptability, feasibility, persuasiveness, motivation, engagement), and/or is in line with the Logic Model, and/or is in line with the Guiding Principles. For example, participants appear unconvinced by an aspect of the intervention, so you decide to add motivational examples.</td>
</tr>
<tr>
<td><strong>EAS</strong></td>
<td>Easy and uncontroversial</td>
<td>An easy and feasible change that doesn’t involve any major design changes. For example, a participant was unsure of a technical term, so you add a definition.</td>
</tr>
<tr>
<td><strong>REP</strong></td>
<td>Repeatedly</td>
<td>This was said repeatedly, by more than one participant.</td>
</tr>
<tr>
<td><strong>EXP</strong></td>
<td>Experience</td>
<td>This is supported by experience. Please specify what kind of experience, for example: 1. PPIs agree this would be an appropriate change. 2. Experts (e.g. clinicians on your development team) agree that this would be an appropriate change. 3. Literature: This is supported by evidence in the literature.</td>
</tr>
<tr>
<td><strong>NCON</strong></td>
<td>Does not contradict</td>
<td>This does not contradict experience (e.g. evidence), or the Logic Model, or the Guiding Principles.</td>
</tr>
<tr>
<td><strong>NC</strong></td>
<td>Not changed</td>
<td>It was decided not to make this change. Please explain why (e.g. it would not be feasible; or only one person said this).</td>
</tr>
</tbody>
</table>
Making person-based changes: The decision process for messages in a booklet intervention for underweight older people

What is enough food and drink?

Experts tell us that each day adults over 65 need:

⇒ **3 big meals a day plus 3 snacks** between meals
<table>
<thead>
<tr>
<th>Negative Comments</th>
<th>Positive Comments</th>
<th>Possible Change</th>
<th>Reason for change</th>
<th>Agreed change</th>
<th>MoScoW</th>
</tr>
</thead>
<tbody>
<tr>
<td>“‘Three big meals and three snacks a day’. Stone me, you’ve got to be joking!” P213</td>
<td></td>
<td></td>
<td><strong>REP, IMP</strong> - Negative reaction to 3 big meals and 3 snacks even from those who are not our target population</td>
<td>Changed it to ‘eight small meals or snacks throughout the day’</td>
<td>MUST</td>
</tr>
<tr>
<td>“I have never, in all my life eaten that much, even during my Air Force days” P223</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>“I don’t think I ever eat three big meals and three snacks a day!” P393</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
What is enough food and drink?

The usual guidelines suggest 3 big meals and 3 snacks a day. We know that can be difficult.

Some people find it easier to **up to 8 small meals** throughout the day.

You can try adding snacks and small meals and drinks to what you already eat and build up to 8 small meals.
<table>
<thead>
<tr>
<th>Patient booklet</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Negative Comments</td>
<td>Positive Comments</td>
</tr>
<tr>
<td>“Well I certainly wouldn’t find it easier to eat up to eight small meals throughout the day.” P333</td>
<td></td>
</tr>
<tr>
<td>“‘8 small meals’, goodness me.” P33</td>
<td></td>
</tr>
<tr>
<td>“So I don’t have three snacks a day. I certainly wouldn’t eat eight small meals a day.” P513</td>
<td></td>
</tr>
</tbody>
</table>
What is enough food and drink?

We usually try to eat 3 meals (something in the morning, afternoon and evening) and perhaps a nibble in between. We know this can be difficult to keep up when we have less of an appetite.

Some people find it easier to have **smaller bites** throughout the day instead of three main meals.

**Did you know...** smaller bites can include finger food, snacks (ranging from biscuits, a toast to an egg) or even drinks!
<table>
<thead>
<tr>
<th>Negative Comments</th>
<th>Positive Comments</th>
<th>Possible Change</th>
<th>Reason for change</th>
<th>Agreed change</th>
<th>MoScoW</th>
</tr>
</thead>
<tbody>
<tr>
<td>“Small bites. I should imagine that’s okay.” P213</td>
<td>“Yeah, it’s interesting. Well that’s one where I was going to be trying small bites, finger food, snacks.” P113</td>
<td>None needed</td>
<td>None</td>
<td>None</td>
<td></td>
</tr>
</tbody>
</table>
The ‘Table of Changes’ is...

- **Systematic**
  - Record all comments and all changes, increasing transparency

- **A prompt**
  - to think about why a change should/should not be made

- **Efficient use of wider research team time**
  - Filters what needs to be discussed
    - *but fully completing table can be too time-consuming, process under revision* ...
The Person-Based Approach to implementation
Person-based intervention implementation

• Vital to evaluate experiences of actually implementing the intervention – can be process analyses of trial or real-life roll-out

• Triangulate qualitative and quantitative evaluations to help explain usage patterns and outcomes, inform improvement for future implementation
Example: Mixed methods study of community roll-out of POWeR

Randomisation
N=786 (69.5%)

- Control
  N=275 (35%)
- Web only
  N=264 (33.6%)
- Coach
  N=247 (31.4%)

Coaching Protocol:
2 short phone calls from a ‘POWeR coach’ in week 1 and week 4
Weight loss (Kg) at 8 weeks (ITT analysis, n=786)

- Control
- Web only: $p < .001$
- Web + Coach: $p = .676$
Exploring coaching uptake (quantitative data)

- Limitations of coaching:
  - only 23.5% had one phone call, 18.6% had both

- Benefits of coaching:
  - uptake of coaching associated with older age, higher BMI at baseline, hypertension, referred to a weight loss scheme by health professional, lower health literacy
  - more log-ins, sessions completed, time online
  - more weight loss
Coaching – insights into process

“I will have to try harder this week, you know, somebody’s is looking after me. I can’t let her down” (P4)

“The second time she called I was struggling, ‘cos I hadn’t lost any weight for a couple of weeks... But just having talking to her, sort of helped me to not go and rubbish the diet. And so after getting off the phone to her I actually changed what I was doing that night to actually get myself back on track. “(P1)

“The calls were good but they were when you [i.e the POWeR team] wanted to do them rather than maybe when I needed them” [P1]
Guiding principle for future support

Key intervention design objective: to deliver support as and when needed by user

Key features that can achieve this objective

Support offered:
• to all, but not as compulsory
• in variety of formats (email, phone, face-to-face)
• at various time-points
• with option for patient to initiate support
In conclusion: putting the PBA into practice

- Not prescriptive - many different combinations of qualitative, mixed methods and PPI input can be used
- Can be used for any kind of intervention
- Not always possible to fully implement - but vital to resource development properly before trialling

Continuously evolving - more details at:

www.personbasedapproach.org

or

https://www.lifeguideonline.org/pba