The Person-Based Approach to planning, optimising, evaluating and implementing behavioural health interventions

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This year the digital health research team at University of Southampton's Centre for Clinical and Community Applications of Health Psychology is celebrating ten years of the LifeGuide research programme (www.lifeguideonline.org). This research programme was initiated by developing the unique LifeGuide software, which has enabled researchers to create, modify and adapt digital interventions quickly and efficiently, without needing input from programmers. Over the course of a decade of developing numerous interventions that have proved consistently engaging and effective (e.g. Little et al., 2013; Little et al., 2016; Little et al., 2015), we have come to realise that the most important output from this research for the wider research community is not the LifeGuide software (which will soon be superseded by newer technology) but our successful methods for intervention development. We refer to these methods as the 'Person-Based Approach' (PBA, Yardley, Morrison, Bradbury, & Muller, 2015) to intervention development, which we see as an essential complement to theory- and evidence-based approaches.

The Person-Based Approach adapts methods from user-centred design, using in-depth qualitative research (informed by behavioural theory and analysis) to understand the behavioural aspects of user engagement with interventions –

both digital and non-digital (see Figure 1). It is an iterative process of collecting data to obtain a deep understanding of user views, context and experiences of the intervention and using this understanding to design, adapt and optimise the intervention to ensure it is maximally meaningful, feasible and engaging for all users. As the Person-Based Approach has evolved we have published a series of papers describing how to apply it; the following sections provide an introduction to the approach.

Intervention planning

The PBA draws on mixed methods research of users' views and experiences to inform the design and planning of an intervention, to ensure that it is engaging and persuasive. Qualitative research can provide rich data on the contextual factors that may influence target users' engagement with the intervention or the behaviour change process (e.g. what are their lives like? What do they value? What are their prior experiences of engaging with the behaviour? What concerns do they have?). Published qualitative and mixed methods research can be scoped and if appropriate, a systematic synthesis can identify the key barriers, facilitators and contextual issues relevant to the target behaviours (e.g. Corbett et al. 2018). If the existing literature is limited in scope or quality, primary qualitative research with target users is conducted.

Insights from these analyses are then used to formulate guiding principles for intervention development. Guiding principles specify the core
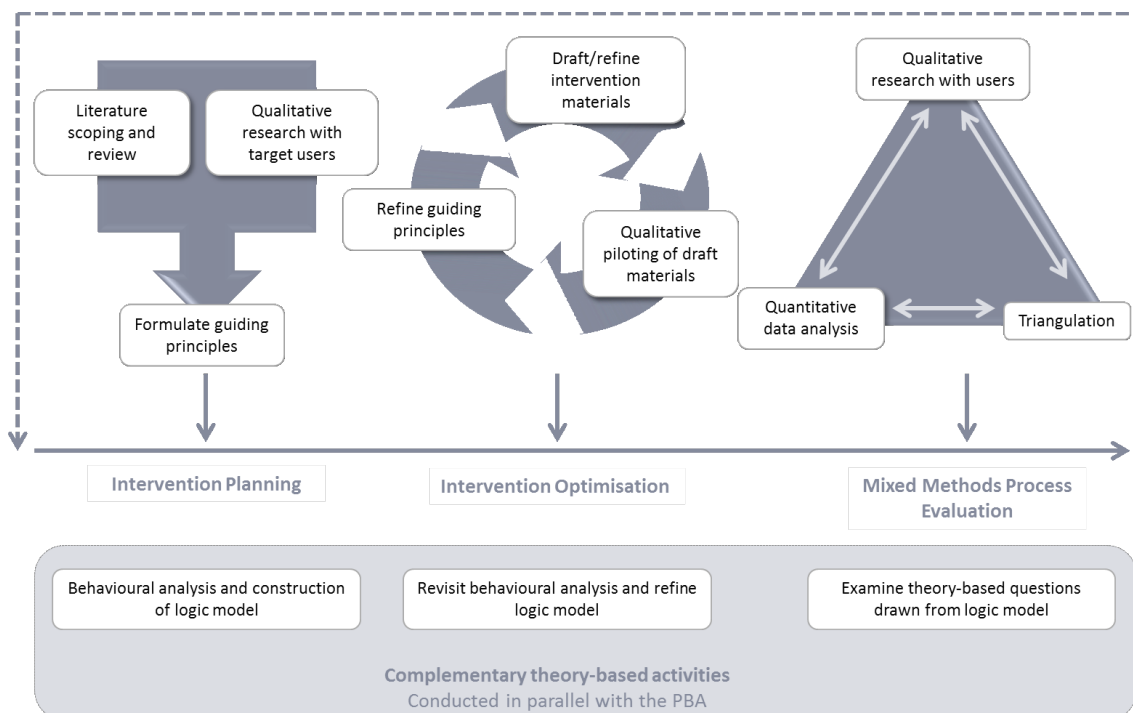
Figure 1. Overview of the person-based approach

design objectives for the intervention and the key intervention features that will support achievement of the design objectives. The design objectives specify what the intervention must do in order to address the needs of the target user (identified from the qualitative research) and enhance engagement with the intervention. For example, a core design objective guiding the development of our app-based stress management intervention was to provide a positive, useful and rewarding experience for users. This was informed by our qualitative work indicating that Smartphone users preferred apps that provided a clear and immediate personal benefit (e.g. practical, entertainment) that could be accessed in brief moments of free time (Dennison, Morrison, Conway, & Yardley, 2013).

The key intervention features specify how the design objectives may be achieved in practice. Intervention features can specify behaviour change techniques (BCTs), but also broader aspects of intervention delivery that suggest how specific BCTs may be implemented to ensure they are

optimally persuasive and engaging (e.g. tone, language, structure, intended frequency of use, mode of delivery etc.). For example, to promote an immediately rewarding experience for our app users we designed for content to be accessed in less than three minutes with every app interaction offering the opportunity to see or unlock new content (Morrison et al., 2017).

Once formulated, the guiding principles can offer a succinct summary of the crucial ways in which the intervention is intended to support change in behaviour by improving engagement with the intervention content. We have found that a succinct, accessible summary of the intervention plan can also enhance communication across different disciplines and audiences to support multidisciplinary collaboration and facilitation of stakeholder events, Patient and Public Involvement (PPI) consultations etc. Since guiding principles only identify the crucial evidence-based design objectives they can be used as a quick check-point during intervention development to prioritise tasks and changes to the intervention (see Intervention

Optimisation).

Because guiding principles are grounded in a deep understanding of the users' context they are useful for guiding *how* theory- and evidence-based intervention content are delivered and communicated. This makes them a distinct but complementary tool that can be used alongside other theory-based approaches to intervention planning (e.g. behavioural analysis, construction of logic models, see Band et al., 2017).

Intervention Optimisation

The PBA is particularly valuable for intervention optimisation through inductive qualitative or mixed methods research to elicit detailed user feedback that enables researchers to understand people's views and experiences of using the prototype intervention and the various ways that people may choose to use it. Interventions are modified based on user feedback and then further research is carried out to ensure the modifications have achieved the desired effect of making the intervention and behaviour change elements acceptable, persuasive, and easier to use and adhere to. Guiding principles can also be refined as researchers gain more insights into the experiences and motivations of target users.

We normally use qualitative think-aloud methods to optimise interventions. This interview technique allows researchers to observe participants using the intervention while saying all their thoughts out loud, thus giving valuable insights into their experiences and views of the intervention. This is particularly useful in the earlier stages of intervention development as it can provide insights into every aspect of the intervention, ensuring it is persuasive, useable and acceptable to the people who will use it. In the later stages of intervention development, longitudinal studies can be useful for optimising interventions. This is where people are given an intervention to try on their own before being interviewed about their experiences of using the intervention. This method is particularly useful for assessing people's experiences of behavioural changes or techniques that may require practice.

Intervention optimisation provides insights beyond assessing the acceptability of interventions. In our Diabetes Literacy project, this stage of the PBA was crucial for improving the feasibility of intervention components (Rowsell et al., 2016). We developed a brief web-based intervention to promote physical activity in people with type 2 diabetes and low health literacy. One of the key features of the intervention was a physical activity planner, designed to help people find achievable ways to build on their current activity level. Observational think aloud interviews illustrated early on that people were vastly overestimating their current activity level when completing the planner, leading to participants with sedentary lifestyles receiving inappropriate tailored feedback congratulating them on being active enough. Observing participants complete the planner provided valuable insight into how and why people were incorrectly filling it in. It also highlighted ways the planner needed to be modified. Changes to the activity planner were made iteratively, enabling subsequent think aloud interviews to assess the impact of each change until the intervention was deemed feasible for evaluation in a clinical trial (Muller et al., 2017).

We find it helpful to systematically document all our sources of evidence and feedback and how these feed into optimising the intervention. User feedback from qualitative studies can be entered into a table, together with other sources of evidence such as PPI and expert input or other relevant evidence, to comprehensively record, categorise, and prioritise all changes to an intervention. See Bradbury et al., 2018 for a detailed description and illustration of this approach to qualitative data analysis and criteria for deciding when to implement intervention

modifications.

Intervention Implementation

The PBA can also draw on mixed methods process evaluation of the implementation of complex interventions. Here the PBA can be used to understand people's experiences of a fully deployed intervention and highlight modifications which could help an intervention to be more effective in changing behaviour, or more successful in embedding in real-world contexts.

Qualitative process evaluations enable exploration of potential barriers to intervention success or implementation and can be triangulated with quantitative data on health outcomes, behavioural determinants, and intervention usage data, to provide a clearer picture of where the intervention might be working well and how it might need adjusting. Using the PBA, potential barriers to successful outcome or implementation can inform updates to an intervention plan (e.g. guiding principles) and further optimisation of the intervention, drawing on the methods described in the previous section.

Within the evaluation of our weight management intervention (POWeR+) we carried out a PBA qualitative process evaluation (Smith, Bradbury, Scott, Little, & Yardley, 2017) to explore how the intervention might need to be improved to ensure successful implementation in practice. POWeR + is a digital intervention, accompanied by a small amount of nurse support. Within our main trial (N=818) we tested the effectiveness of two types of brief nurse support: face-to-face support and remote support (by phone/email) (Little et al., 2016). Both were equally effective, with mean weight losses comparable to those seen within commercial weight loss interventions. Remote support was the most cost-effective and could be easier to implement at scale as it required less nurse time (Little et al., 2016). However,

qualitative interviews with the nurses who provided support to POWeR+ patients highlighted that nurses did not believe that remote support was supportive enough to help patients to lose weight – a potential barrier to implementing this support in practice (Smith et al., 2017). This identified the need for a new guiding principle to be added to our intervention plan: to persuade practitioners that remote support is useful and effective. The key feature that we used to address this was to update our practitioner training materials to persuade practitioners of the value of remote support by showing them the evidence of its effectiveness (comparable to face-to-face support) and its acceptability to patients (through patient quotes).

The PBA advocates taking an inductive approach to collecting qualitative data, asking broad open questions (e.g. about what participants found helpful or unhelpful) in order to ascertain the most important issues or challenges for a participant. If at the evaluation or implementation stage researchers want to include some deductive, theory-based questions they can simply add these after inductive questions have been explored – this way participants' initial answers won't be prompted or influenced by the questions asked.

Conclusions

Although the PBA may seem resource intensive, we find that the time taken to understand users and their views of the intervention means that problems with user engagement are identified and resolved before evaluation and implementation, which avoids wasting resources on evaluating an intervention that will not prove engaging and effective. It is usually possible to persuade funders and collaborators to invest in this work by making this argument! However, the approach is intended to be used flexibly, with whatever methods and resources are available and most suitable. The PBA

has evolved over the last decade and continues to evolve as we identify different and better ways of implementing it. For example, we now incorporate PPI input more explicitly and intensively, by forming stakeholder panels that feed in to the whole development process and can also provide rapid feedback and co-design input through regular meetings and consultations (paper in preparation). To reflect this continuous evolution and improvement we are celebrating our ten year anniversary by establishing a website (https://www.lifeguideonline.org/pba) which will provide a living archive and toolbox as we continue to publish papers describing and disseminating our methods.

Competing Interests

We have no competing interests.

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