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Engaging in large-scale digital health technologies and services. What factors hinder recruitment?

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Abstract. Implementing consumer oriented digital health products and services at scale is challenging and a range of barriers to reaching and recruiting users to these types of solutions can be encountered. This paper describes the experience of implementers with the rollout of the Delivering Assisted Living Lifestyles at Scale (dallas) programme. The findings are based on qualitative analysis of baseline and midpoint interviews and project documentation. Eight main themes emerged as key factors which hindered participation. These include how the dallas programme was designed and operationalised, constraints imposed by partnerships, technology, branding, and recruitment strategies, as well as challenges with the development cycle and organisational culture.

Keywords. recruitment, engagement, digital health, eHealth, implementation

Introduction

Our changing lifestyle patterns have given rise to a plethora of non-communicable diseases which are now the leading cause of death, disease and disability in the European region [1]. This combined with our ageing population, who have additional health and social care needs in later life, place huge resource burdens on our health services [2, 3]. As current care models are unsustainable, digital technologies and services are being developed and trialed to promote active and healthy ageing, to support individuals in the management of their long-term condition at home and to keep them better connected to their health and social care providers [4]. If these new digital devices and systems are put in place it could lead to better health outcomes and reduced utilisation of the health service [5].

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The eHealth field is relatively young and yet there exists a vast literature on many aspects of its implementation. Although digital health interventions can fare relatively well when evaluated in pilot studies or randomised controlled trials, they often experience a myriad of difficulties when they are scaled up and implemented in 'real-world' complex health systems [6]. One of the first steps when implementing any technological solution is to engage with a range of stakeholders with a view to ultimately recruiting them to participate in the digital solution. Once they have 'signed up' the next challenge is to ensure adoption and sustained use of the technology over time. However, many fail at the first step by underestimating the difficulties involved in recruiting individuals to complex eHealth interventions [7]. More research is needed to explore these issues in relation to consumer oriented digital health solutions as these technologies are still in their infancy. Therefore this study examines the factors that are affecting recruitment to a large-scale digital health innovation programme currently being implemented across the United Kingdom (U.K).

1. Methods

Delivering Assisted Living Lifestyles at Scale (dallas) is a three-year digital innovation programme funded by the UK Technology Strategy Board. It aims to demonstrate how assisted living and other technologies can be used to promote health and wellbeing [8]. In tandem, the programme wants to establish a consumer market for digital health products and services by promoting the design, development and roll-out of these technologies at scale. It set ambitious targets to reach up to 169,000 people between May 2012 and 2015. Dallas comprises four service-led consortia or 'communities' each of which consist of a range of organisations such as NHS Trusts, local authorities, voluntary organisations, industry and academia. Each dallas community is creating and implementing a range of digital products and services including personal electronic health records, mobile health applications, telehealth and telecare systems, and various types of assisted living technologies and services.

We performed secondary analysis of project documentation, such as project plans, quarterly dallas reports, evaluation updates and observation logs, and interviews conducted with key members of the four implementation teams over the first two years of the dallas programme. Thirty-three interviews were carried out between October 2012 and 2014 based on the e-Health Implementation Toolkit (e-HIT). e-HIT was designed to assist those responsible for implementing new technologies in healthcare by enabling them to identify factors which both help and hinder this process [9]. Thematic analysis of the data was conducted following an inductive approach to draw out themes that affected participation in the dallas programme [10].

2. Results

The following eight themes emerged as factors that impeded recruitment.

Programme design: Some aspects of the programme design such as its relatively short timeframe affected recruitment, especially where new digital products and services were being designed. In addition, using participant numbers as one measure of success meant recruitment began very early which took the focus away from co-design and development activities as the following comment illustrates: "service partners spend a lot of their time recruiting … so there is less capacity then for service innovation" (Respondent 12). Some implementers felt this could affect product quality

and jeopardise future engagement and buy-in: "I do think the targets can hinder you … if you can build quality and get the quality right the numbers will follow" (Respondent 20). There was clear evidence of a tension between designing and developing innovative digital health products and services early, and gaining the desired user numbers required to reach scale before the products were fully developed.

Operational planning: Several issues arose at the operational level that affected participation. Each dallas consortium spent a lot of time initially identifying the required recruitment expertise to roll-out their digital solutions at scale and some of this work had to be outsourced to specialist organisations: "so there's been a lot of people doing things that they're not kind of used to doing. I think that reflects on the targets thing" (Respondent 15). In addition, high level recruitment plans were in place but it is also important to plan in detail how user numbers would actually be delivered as demonstrated by this remark: "And no depth in terms of when, how, what, what's the message, how are you going to do it … The level of detail was very poor" (Respondent 30). With a programme of this size and complexity there was clearly a lack of understanding of the implications of tracking people and their sustained engagement over time as they become users: "And things we have learnt through the project, like, for example, tracking engagement and conversion and how do we find out where people lost interest in the process, all of those things" (Respondent 29).

Partnership constraints: The large consortia of dallas members inevitably meant that some partners withdrew before it ended. Some of these were key to engaging end users and this delayed recruitment until alternatives could be found as illustrated by this comment: "When the 'ANON' fell over, we had to take a step back and we had a decision to make" (Respondent 12). Another complication reported by the implementation teams was that some partners were not ready to recruit individuals at the outset: "what we've seen is an inability at the NHS end to actually, kind of, understand what they've signed up for and to commit to what they've signed up for" (Respondent 29). So before some organisations could recruit, they first had to go through a phase of collective organisational buy-in themselves. Other partners were unsuitable as a route to reach target audiences and substitutes had to be found: "primary care basically we're realising is the route to getting the project out… But then the level of the partners that we've brought in to do that for us isn't happening there's a breakdown there" (Respondent 29). So it was unclear at the outset of the programme which routes to market were 'ready', the consumer or the statutory routes, which is something that is being discovered as the dallas programme rolls out and scales up.

Marketing: Using dallas as a brand that was not well established during the first recruitment drive meant initial consumer engagement was low, as its digital products lacked the support of recognised healthcare organisations and this made recruiting at scale difficult. Furthermore, attempts to affiliate digital services with trusted professional bodies were hampered by the current regulatory environment that prevents medical associations supporting products with advertising as this comment reveals: "The consumer product was going to have to be paid for, if you like, or supported in some way by advertising and sponsorship that was a huge bone of contention with them" (Respondent 24). This highlights a key tension between consumer and statutory markets for digital health in the UK and the type of recruitment approach that can be used. The low profile of some technologies due to their relative novelty also impeded recruitment: "the lack of profile at the moment is just maybe hindering it, so you say telecare, telehealth to 99.9% of the population and they'll go what?" (Respondent 29).

Development cycle: Some dallas communities used co-design methodologies to generate increased ownership and user buy-in, yet these engagement strategies were

also very time-consuming and resource intensive to implement: "there's a bit of a conflict between the push to recruit lots of people and the aim of the process, which is to involve people in development" (Respondent 21). Prototype applications also caused frustration among end users who wanted to sign up and use finished digital products as this statement demonstrates: "parents don't think it's worth signing up to this thing because it's just a model, you know" (Respondent 24). Co-design is clearly something that deserves more attention. It has some potential benefits with regards to increasing buy-in, uptake and sustained use, yet there is little evidence yet as to whether it is practical or whether these benefits are realised, when implementing at this scale.

Recruitment strategies: Implementation teams used a variety of engagement approaches some of which did not translate well to a large-scale programme and were not suitable for recruitment in the later stages when communities were scaling up as illustrated by this remark. "it can't all be face-to-face, because the numbers are so big". The location of some engagement activities could also be problematic: "the smarthouse is based in the museum… But I think it definitely needs to be pitched more to the residents of the city not the tourists." "The challenge is always when you are doing something at scale it's sustaining, sustaining the numbers and sustaining the network" (Respondent 25). Recruitment strategies are continuing to evolve as the dallas programme progresses and more research is necessary to explore this complex process.

Organisational culture: Resistance from a variety of clinicians was also highlighted as a factor that prevented participation in dallas. Some healthcare staff responsible for recruiting users held traditional perceptions of care and did not yet see the benefit of the digital products they were asked to promote as the following comment illustrates: "so the resistance is partly from, as we talked about before, from doctors and patient interests, that don't see the need for new technology" (Respondent 30). A contributory factor was that some healthcare organisations lacked up-to-date policies on digital health, had poor Internet connectivity and their staff had little knowledge of technology while others were more proactive. The following quotation demonstrates the contrasting contexts in which staff worked: "they're much further developed in terms of their own digital strategy as an organisation so their staff do mobile working, they have tablets and, you know, they're digitally enabled" (Respondent 30). The readiness of the statutory sector is varied and can be a blocker for introducing and endorsing digital self-care technologies at scale.

Technology & the Digital Divide: Technological factors such as cost, availability, usability and trust in digital products were also raised as factors which impeded user engagement and recruitment: "The availability, the cost, the lack of profile at the moment is just maybe hindering it". "there's concern particularly amongst parents … they're worried about putting data about their child onto a digital product" (Respondent 24). There are still concerns about the secure storage and management of health data and therefore more work is needed on raising public awareness around these issues. It was also noted in interviews that digital exclusion was an ever-present barrier to full participation, as some dallas communities were operating in deprived areas with limited access to technology as this comment highlights: "it's all right for the government to say that nearly every household's got a PC … but actually the reality is that a lot of them don't" (Respondent 29).

3. Discussion

Implementing consumer oriented digital health technologies and services on a large-scale is a complex process and a number of barriers to engagement may be

encountered. Clearly more research is needed to explore the readiness of the consumer market for digital self-care technologies and services. The challenges outlined here can provide valuable lessons, from which we can learn how to improve the recruitment process for future digital care platforms that will need to be rolled out at scale. Such learning is crucial if we are to address the dual challenges of chronic disease and aging populations. The dallas programme is still progressing and as such engagement strategies are continuously evolving to address its complex needs, so it is still too early to assess whether the various recruitment approaches adopted will ultimately be successful. However this study has given us some important insights into the factors that hinder recruitment in large-scale consumer-oriented digital health initiatives.

The UK Medical Research Council recommends that complex interventions are explored in detail before they are scaled up and implemented in practice [11]. They suggest the use of theoretical frameworks to aid our understanding of the range of factors which affect the implementation process. Future research could benefit from using conceptual frameworks such as the Normalization Process Theory [12] as they could provide a useful lens to understand how recruitment to digital health initiatives unfolds. This paper has some limitations as we only assessed participation from the view of implementers before the dallas programme was complete. Further research that examines the views of other stakeholders such as frontline healthcare staff and end users who participated and did not participate would be beneficial to establish what factors influenced their decision to engage.

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