ABSTRACT This paper reports on the discovery phase of an econsultation project, that aimed to deliver a technology enabled service for consultations between healthcare professionals and patients to occur using digital communication tools. The project involved a mixed methods research phase that supported agile service design work. A number of learnings were derived from the project and these are contextualized into a high-level framework for agile service design that starts from a Minimum Viable Service through provision of a Minimum Living Service (MLS) through to a Minimum Sustainable Service.

Keywords: service design, agile, socio-technical design, consultations
Introduction

This paper reports on the discovery phase of a digital healthcare project that investigated the introduction of a new e-consultancy service to the National Health Service (NHS). The project sought to define a vision for a new digital service and created a proof of concept that enables face-to-face consultations between patients and General Practitioners (GPs) using a proprietary digital communication platform (Skype for Business). The project was funded and delivered by Accenture and aimed to explore virtual consultations as a way of meeting increasing demand from patients for digital access to health and care services. The resulting prototype was completed in two months and enabled online consultations, appointment management and basic functionality centred on five core use cases:

- Book an appointment
- Cancel an appointment
- Reschedule an appointment
- Edit an appointment
- Take part in a consultation

The future role out of the service would offer many benefits to patients, GPs and health professionals alike. These include increased and improved access to primary care, including hard to reach patients and those with stigmatized conditions including mental and sexual health issues. The service is also anticipated to reduce time and cost in consultancy delivery, streamline operations and provide better and more secure data collection. Patients engaged during the discovery phase, also noted the potential to reduce contagion by not having to travel in person to surgeries. Most importantly, online consultations offer the potential to better quality and timeliness of diagnosis, through broader knowledge sharing and improved, faster ways of triaging. Together, these relatively small incremental improvements contribute to better healthcare in the broadest sense and specifically for:

- Follow up appointments and doctors
- Repeat prescriptions and doctors
- Sexual health advice and test results.
- Mental health advice and check-ups
- Medication reviews for doctors
- Getting advice and results online
Despite the benefits, poor connectivity, unfamiliarity with technology (especially for older patients) were cited as negative aspects of the new service. Further evidence is currently being collected on these issues, as well as further insights into the value and impact of video consultations in healthcare more generally. In addition, work is also continuing in testing the prototype and evaluating options for enhancing functionality and running a broader pilot study.

**Approach**

Research was carried out during a short (three week) immersive research phase. This work included in-situ interviews, observation and generative workshops with 8 Doctors, 11 Patients and 6 Admin staff of mixed demographics. Sessions took place in various locations, as well as some conducted remotely using video telephony. A hybrid approach was taken to research and design as the new service related to three different domains. Firstly, the work focused on the development and adoption of a new technology (socio-technical focus) where adoption is critical. Secondly, the outcome is a public service (service design focus) where a holistic approach (e.g. service design) is needed to orchestrate the various actors and activities into an optimal whole. Lastly, this new service comprises screens, buttons and interfaces to a proprietary software product (human-centred design and technology focus) that were to be developed using agile methods.

The hybrid approach was exemplified in using socio-technical methods (e.g. Technology Acceptance Model, TAM Davis, 1989). Insights from TAM assisted and augmented the service design (Shostack 1982) work, specifically uncovering adoption issues and opportunities that would otherwise have been neglected in more traditional user studies. We found that despite doctors and admin staff having a positive attitude towards virtual consultations, the perceived usefulness of the service was comparatively low. We also discovered that despite participants having high self-efficacy, they were anxious about having such a service rolled out. Moreover, staff felt that the value of consultation could be diminished if online consultations are either overused or misused. This may have contributed to being anxious about using it. Lastly, we learnt that staff felt that management support around the service would be limited, but also believed they have the technological equipment required to launch the services as a kind Minimum Viable Product.

**Analysis**

The research phase produced abundant data, spanning functional and non-functional requirements, collaboratively produced sketches and interview transcripts. The insights gained were analysed using an Agile Coding and Framework approach, where data was reviewed with a research facilitator and an initial model of the data and framework produced (top down). Themes were explored using this top-down approach as well as a bottom up Framework (Ritchie and Lewis 2003) approach. Together, the data mapped to four themes comprising:

- Access to Technology
- Access to Healthcare
Quality of Healthcare

Quality of Experience

As every data point had been classified and counted it was possible to quantify relative weights to the groupings and also the relative strength of constituency (e.g. patients vs. GPs) among all participants. While the data pertained to specific healthcare project, in relating to the design and development of a new, technology enabled healthcare service could be generalisable. In essence, the commonalities with other similar projects centre on the need for a strategic framework for delivering sustainable new services built around unlocking value. The findings suggest that enabling access to healthcare through technology is both ‘locked’ in terms of being a barrier to adoption by less technically savvy patients and providers. At the same time, it is ‘unlocked’ as it drives adoption generally and specifically among technical astute users (e.g. younger, geographically dispersed groups etc) who might otherwise be less willing to get treatment. The notion of lock also suggests that digital healthcare services must therefore transition through states of increasing sophistication. This means that adoption needs to be built through incremental service improvement, with each step widening the potential audience for the service, but without risking developing expensive and/or risky functionality.

Convenience and efficiency
A key theme that derived from both patients and clinicians was convenience. Patients viewed this as one of the most important features (especially millennials) and those who were reliant on public transport. Because patients stated that they were more likely to attend online appointments, it would, in turn, result in more patients being treated sooner. For clinicians, the convenience of being able to conduct some home visits virtually would save approximately 30-40 minutes per day in travel time, which again suggests that more patients could treated. These benefits were operationalized in the prototype through a GP and admin dashboard and appointment form.

Consultations
The rapport between patients and GPs was noted as a possible challenge to virtual consultations. Elderly patients stated that the relationship that they had built up with their doctor over many years might become less personal. GPs in most cases, agreed with this assessment, but reported that everyday face to face consultations would not be replaced entirely and rather that only specific appointments could be served through this channel. For younger patients, the loss of rapport was not an issue, particularly because they did not feel the emotional connection with one particular doctor, and just wanted to be seen quickly.

Better patient care
Better patient care was a key theme across all patient and clinicians. Millennials noted that they were more likely to book an appointment and turn up if it was online, meaning their health concern would be looked at, and if required treated via this channel. For the younger generation, mental health was a key concern, (also confirmed by GPs) and that most check-ups are already done over the phone. Being able to see the body language of the patient online, was seen as
positive attribute of the new service as it would provide a greater insight into the patients’ feelings, thus offers the potential to support greater patient care. The elderly were less wedded to the idea that virtual consultations could improve health outcomes. These insights fed directly into the design work through providing a patient waiting room and help and advice content relating to general medical issues.

**Technology**

From a patient’s perspective, internet connectivity was one of the main areas of concern. Most believed that this would be the greatest barrier to this technology performing well. The user’s choice of device was also a discussion point. GPs had similar worries on internet connection and felt that this might actually cause delays in their appointments. Most GPs noted that they had the right necessary equipment with just a few gaps requiring an investment in webcams or microphones, would be required. All participants agreed that by using technology, access to healthcare could be increased and hard to reach patients would receive more and better healthcare. A WIFI signal check was built into the prototype to help alleviate this issue.

**Demographics**

From the interviews and particularly from the TAM related data, we found that both patients and doctors had concerns around the social groups that would be able to use virtual consultations. Millennials were the most enthusiastic about such a system. Yet, parents with small children were sceptical and specified that they would rather their children be physically examined. Elderly patients were mixed in their response and were dependent upon their specific device (such as a tablet). Clinicians concurred that virtual consultations would make treating the hard to reach much easier, which in turn, would result in better healthcare.

**Agile Service Operation Framework**

From the research, the project progressed into design and development. This was carried out using an Agile approach (Beck 2010). While agile has established itself as a tried and tested software development methodology, cases relating to healthcare applications are few and even fewer when wrapped up with a service design approach (e.g. Vink et al. 2017; Lee 2011). Agile manifested itself in developing a ‘Minimum Viable Product’ (MVP) rather than a fully provisioned end-to-end service. The service also utilized existing technology, that included much of the necessary functions, rather than developing a fully bespoke solution. On the negative side, this means that the resulting product or service is always only capable of providing a subset of the fully functioning end state version.

Agile is also based on regular deliveries of ‘working software’ delivered in short sprints. This means that releases can be trialled, and feedback gained early and often. In the case of the project, this data-driven approach was further enhanced by providing a patient feedback screen. From an operational perspective, agile’s common language of ‘user stories’ provides an accessible and easy
way ensure full and deep stakeholder involvement. For healthcare projects this clearly requires balance and a focus on reducing risk, driving adoption and data driven enhancements.

Service design’s affinity with ‘digital transformation’ in general and public service optimization specifically, makes it a natural partner in healthcare technology. Evidencing services out of seemingly disparate service encounters (whether digital and/or human) would seem to be one a positive differentiator to other approaches. Similarly, designing across multiple, individual actors, interactions and systems sets service design apart from the single interaction focus of user experience design. In addition, co-creation (designing with a broad set of active stakeholders) distinguishes it from more instrumental User-centred Design methodologies. Despite this potential, there are arguably a number of areas in which service design needs rebalancing in order to support technology-based healthcare applications.

Immersive research is ubiquitous within the service design domain. Augmenting ‘ethnographism’ with more socio-technical methods would make sense given contemporary everyday life is bound within non-visible networks, databases and intelligent automations. A different kind of data that goes beyond observing technology’s end users’ behaviour is needed for designing viable healthcare services. Naturally service design privileges the kind of data produced through immersive research as inputs into design. The value of such data is unquestionable in its usefulness in ideating new service concepts. However, data pertaining to and generated from the real-time, actual use of service is arguably even more valuable to verifying concepts and optimising the experience for healthcare services.

Emphasizing human activity (at the expense of technological capability) in the here and now (e.g. before service use) naturally follows through into the predisposition for mapping, blueprinting and modelling in service design. Having mapped out an optimal snap shot of human activity for a service, it is relatively easy to layer on where the technological magic happens. This ‘design futurism’ discounts the nitty gritty nuts and bolts of actual service delivery and optimization which at best is vision setting and at worse misleading. The blueprints also embody an architectural metaphor which lacks relevance to living services where interactions track to fixed paths and ‘journeys’ that extend over time. The notion of dynamically created and evolving services is, to some extent, counter to Service Design orthodoxy which focuses on mapping extant to future prescribed services. Instead this research and resulting framework suggest that while mapping actors and activities is important to the design of a service another lens is required (that of living service) is required to ensure the sustainability of the service.

The holistic but largely conceptual focus of service design makes sense when projects are design-led, timescales and budgets are generous and project goals are transformational. The lack of health-related cases is perhaps an indication that these conditions are relatively rare and perhaps more importantly out of step with best practice in delivering positive change through technologically based innovation. Agile is not only a reaction to the failure of delivering large-scale expensive software projects but a potentially valuable counterbalance to the ‘blue-sky thinking’ that underpins so much of service design cases. Instead, we should augment agile’s focus on delivering tangible,
working systems but framed within a strategic design approach that delivers incremental as well as long-term value.

The rebalancing of service design is thus partially built on recasting the role of technology. Technology must shift from afterthought to primary importance in the research and design of a service, in order to fully realise the value of the approach. For health, this a critical and relevant focus as healthcare providers’ challenge is most often connecting legacy systems into usable services. This does not mean that service design should constrained by technical constraints or limitations. What is needed is a more nuanced and sophisticated approach to services that recognises the centrality of the materials of their construction and the organic nature of their use and development, beyond design.

As with all of the project’s design work, this was carried out in close collaboration with the developers and took account of the platforms limitations and capabilities. Designing for a specific platform is a commonplace approach in commercial design and requires creativity and technical ingenuity to deliver well-crafted living services. Design systems are a natural corollary of designing services to fit platform constraints and enablers. Unlike traditional, ‘design a blank sheet of paper’, this approach utilizes common components that integrate with the platform well, offer a consistent experience and are consistent to users. At the same time, designers can focus all of their creativity on where elements are lacking.

A structured framework for delivering agile service design, would help sensitize service design for healthcare. This would begin with founding projects on the basis of a Minimum Viable Service (MVS). An MVS is focuses on enabling access to a simplified, stripped down version of the service. Such a proposition is by nature basic and supports a few use cases, but is built to ensure it enables core functions and proves the viability of the service. In the case of econsultancy, this means ensuring that the service provides a simple and convenient way of organising consultations for both healthcare professionals and patients. An MVS is, however, more than a conceptual proof of concept. Its adoption and use enables early data collection that can help develop richer features, but more importantly enables mapping service supply and demand data. In this sense, a simple digitalized entry point for healthcare becomes the first manifestation of a Living Service, where data is used to enrich the experience and start to build a critical mass of users. Having established a strong and sustainable user community, the next phase of Minimum Living Service (MLS). This is focused on delivering an optimized experience that can drive broad adoption. Finally, a Minimum Sustainable Service focuses on facilitating value co-creation and operational excellence.

References


