Chapter 11
The 'engage' System: Using Real-Time Digital Technologies to Support Citizen-Centred Design in Government

Brian Cleland, Jonathan Wallace, and Michaela Black

Abstract Much of the literature on citizen-centric e-government focuses on the evaluation and classification of systems, while relatively little research exists on methods to ensure that such systems are designed around unmet user needs. This chapter focuses on the use of a specific ICT-based tool for citizen-centred service design within Northern Ireland. The 'engage' system is a novel technology for user research developed by Ulster University and commissioned by a variety of public sector clients to support the development of new policies and services. The 'engage' platform is examined in the context of the wider trend towards user-centred design and digital transformation in government. The relative advantages and disadvantages of the system are analysed in light of alternative user research methods and tools currently in use in the public sector. Lessons from real-world trials over a period of approximately 5 years are discussed, and implications for the future adoption of user research technologies in the public sector are explored.

Keywords e-Government • Digital government • e-Participation • User research • User-centred design • Citizen-centric

1 Citizen-Centred Service Design in e-Government

Policy and research interest in the impact of technology on the structure and function of the public sector has continued to grow in recent years [1, 2]. At the same time, there has been an increasing demand for more citizen-centred public services. Links have been drawn between these two trends, with some experts speaking of

B. Cleland (✉) • J. Wallace
School of Computing and Maths, Ulster University, Northern Ireland, UK
e-mail: b.cleland@ulster.ac.uk

M. Black
School of Computing and Intelligent Systems, Ulster University, Northern Ireland, UK
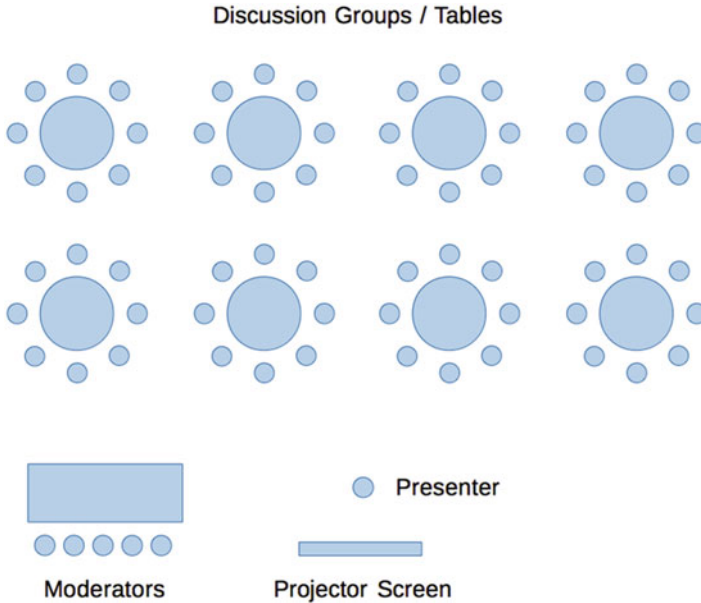
Discussion Groups / Tables

Fig. 11.1 Typical room layout for an eTM/engage workshop (from Galbraith et al. [46])

the demand for citizen-or user-centred e-government [3–5]. Despite this alignment, there has been relatively little exploration of how technology can be used to support user-centred service design. In this chapter we will investigate one example of how digital tools can support user-centred design in the public sector, and consider the implications for future adoption of such technologies.

1.1 Overview of e-Government

The move towards internet-based services in the private sector has increased demand for similar forms of interaction with government. Edmiston [6] argues that citizens now expect the same service standards and levels of satisfaction in their dealings with the public sector. The promise of e-government is "more efficient, transparent and accessible public services" [7]. As a research field, e-government is relatively young [8], and has generally been multidisciplinary in character [9]. Some experts argue that the field is showing some signs of maturity, and alternative labels have been suggested, including "transforming government", "online government", and "digital government". Irani et al. [7] point out that it is not yet clear whether e-government should be considered a field in its own right, or is more properly understood as a subset Public Administration or Information Systems research, or even as an intersection of these two disciplines.

According to Welch et al. [10], research on e-government addresses how the public sector can use online information exchange and deliver services relevant to the needs of citizens, businesses, and other government bodies. Others have suggested that e-government promises efficiency and process improvement within government alongside enhanced public services [11, 12]. Irani et al. [7] highlight the need to identify effective strategies, practices and processes in order for e-government to become broadly adopted. In addition, the benefits, challenges and organisational change requirements of each e-government project must be understood in relation to its specific context [13]. It should also be noted that the benefits of e-government, such as better transparency and higher quality services, come at a significant cost to the public sector [14], and that the uptake of e-services by citizens may sometimes present a challenge [15].

A review of the literature by Irani et al. [7] observed that while earlier research tended to emphasise the challenges of e-government delivery (e.g. [12, 16–18]), later studies were more likely to address questions of diffusion and adoption (e.g. [15, 19–21]).

1.2 Citizen-Centred e-Government

Early discussions of citizen-centred e-government by Chen [5] suggested that e-government had arrived at an important turning point, as progress was slower than many had hoped [22, 23] and that its potential was not being fulfilled [24]. Digital interactions with government were still relatively rare, with the exception of a few popular examples such as driver licence renewals and online filing of taxes. According to Scott [25], e-participation had an even lower level of uptake, following an examination of US-based municipal authority websites. Despite these issues, the continuing global trend towards online services in the private sector has created an expectation that governments will follow suit.

Chen [5] argues that the tension between expectations and delivery has encouraged experts to question existing research assumptions. Alternative perspectives have been proposed, critiquing standard linear models of e-government maturity [16, 22, 26]. Chen [5] proposes that such innovators are characterised by their ability to deviate from the linear model of progress. Citing the UN report on e-government [27], he suggests that the research should focus on citizen-centric services as "the ideal manifestation" of e-government. The implication is that government information needs to be shared across internal silos, organisations, and sectors [28]. Furthermore, service users should not be required to have knowledge of the internal structures of the public sector. On the contrary, government agencies should be interconnected in order to enhance their efficiency and effectiveness. Chen [5] illustrates this point with the example of 311, a single phone number which connects users to non-emergency services in many parts of the United States and Canada.

1.3   Engagement and Digital Government

More recently, many practitioners have been using the term "digital government" to describe the transformative impact of technology on the public sector. This has been reflected to some degree in the literature. One example is Janowski [29], who presents a model of digital government evolution which proposes that the concept tends towards greater complexity, contextualisation and specialisation over time, mimicking the evolutionary processes one finds in culture and society. Janowski's model has four stages: Digitization (Technology in Government), Transformation (Electronic Government), Engagement (Electronic Governance) and Contextualization (Policy-Driven Electronic Governance). Evidence for the model is provided by an analysis of the digital government research published between 1992 and 2014 in Government Information Quarterly. The author also describes a Digital Government Stage Analysis Framework to explain the evolutionary process.

In the context of this chapter we are particularly interested in the Engagement Stage. According to Janowski, this stage is intended to transform the relationships between government and non-government institutions, including citizens, businesses, and the voluntary sector. Some of desired outcomes include the promotion of the knowledge-based economy, enhanced civic participation, and better access to government information and services. Janowski argues that the Engagement Stage dovetails with the more general trends towards Digital by Default and Open Government, and thus should enable greater transparency, accountability and trust between government and external actors. This stage builds on the earlier Digitisation and Transformation stages, facilitating improved interactions and collaborations internal and external organisational boundaries.

Examples of activities typically carried out during the Engagement Stage include: increasing adoption of e-services by citizens (e.g., [30–32]); growing levels of civic engagement and participation (e.g., [33, 34]); more open, transparent and accountable government (e.g., [35–37]); and increased trust and cultural transformation (e.g., [35, 38]).

1.4   Digital Government Exemplars

We have described how e-government research has developed in recent years and examined where engagement might fit in terms of the evolution of digital government. However, as Brown [39] points out, while maturity models can be useful to understand global behaviours they are less effective in explaining the behaviour of individual organisations. We will therefore take a closer look at two exemplars commonly cited in research and policy literature—the UK and US governments.

1.4.1   UK Government

Brown et al. [40] explore the example of the UK's Government Digital Strategy, outlining how the public sector might realise the government's concept of "digital-by-default" services. The authors point out that the term "digital" might be best understood as a vision of new organisational practices and values, highly focused on user needs, with an emphasis on speed, agility and flexibility. While technology is often the catalyst for such changes, digital transformation is not restricted to technical innovations. The aims include services that can respond quickly to changes in policy and user expectations, reduced costs and increased efficiency, as well as the exploitation of novel technologies.

A key part of this digital transformation strategy has been the establishment and growth of the Government Digital Service (GDS), a new agency that is designed to grow digital capacity in the heart of the public sector. GDS has been charged with developing the vision for digital government in the UK, as well as implementing key changes and new online services. One of the architectural principles that the GDS team are working towards is "Government as a Platform" (GaaP), which envisions a suite of shared e-services and digital standards to be implemented across government. GDS are also extremely vocal about the central importance of user needs to service design. Thus the first of their ten Design Principles is "Start with needs", which they explain means "user needs not government needs" [41]. From April 2014 it was mandated that all new public services must meet the GDS digital design standards in full [40].

1.4.2   US Government

In the US, an important catalyst for digital transformation was the Presidential Innovation Fellows programme, launched by President Obama in early 2012 with the aim of saving lives, reducing the burden on taxpayers and enhancing private sector job growth. A key aspect of the programme was the hiring of private sector innovators to bring experience of agile and user-centred design methods to apply [42]. Of the over 700 people who applied, 18 were eventually appointed as Fellows. During the last 6 months of Obama's first term, small innovation teams were effective in making bidding processes 12 times more competitive and reduced contract costs by 30%. They also developed a range of tools for making government services easier to find and use, and enabled US citizens to access their personal health data.

As awareness grew of what had been achieved, demand for Fellows also increased. Working alongside the General Services Administration, the White House created a completely new agency—called 18F—to promote wider adoption of successful practices that had originally been championed in the Presidential Innovation Fellows programme. 18F has since established a strong reputation for innovation and leadership in open collaborative networks in the US public sector [43].

Around the same time as 18F was being established, the US government launched its much-heralded Healthcare.gov website in October 2013. It's aim was to provide access to information and services associated with the Affordable Care Act, but the site failed to work from the start. Drawing on private sector skills and Presidential Innovation Fellows, the White House created a small team of experts to correct the problem. By April 2014 the site was operating properly and eight million citizens had been signed up for health insurance. Following the high-profile success of the rescue operation (including a Time magazine cover feature), the White House decided to create the US Digital Service, partly modelled on the UK Government Digital Service. This organisation works within the Office of Management and Budget to support other public sector agencies to design, develop and deploy online services [42].

Strong links exist between the UK and US government initiatives, with the US in many instances emulating practices that originated in the UK Government Cabinet Office. Common themes emerge when looking at both programmes side-by-side, such as the emphasis on recruiting external talent into Government, the adoption of agile processes and the focus on user needs. While it is too soon to speculate on the long-term impact of these initiatives, the overall level of public investment suggests a significant commitment to creating a fundamental organisational shift.

1.5   The Purpose of This Chapter

From the preceding analysis, it seems clear that e-government is about a broader transformation of government, and not simply about adopting new technologies. It is about evolving culture and practice, introducing new approaches such as agile development, and focusing on user needs [44]. This focus on the user applies not just to online activities, but to everything that government does. Despite the link between digital transformation and citizen-centrism, there is a marked lack of attention being paid to how technology can enable better user-centred design. This may be due in part to the fact that engagement happens only in the later stages of e-government [29]. In the rest of this chapter we will examine one particular example of how technology can support effective user engagement.

2   The Use of 'engage' in the Design of Citizen-Centred Services

The *engage* e-participation system has its origins in the PARTERRE project, which was funded by European Framework 7's Competitiveness in Innovation Programme (CIP). One of the core goals of the project was to pilot a number of workshops—called "Electronic Town Meetings" (eTMs)—across the partner

countries, in order to address a variety of public policy issues. These pilots were designed to determine the viability of the eTM framework, which comprised a specific technical framework and methodology based on small group discussions. Ultimately, the aim was to analyse the effectiveness of the eTM as a tool for engaging with communities of "lead users" [45, 46] in the context of developing public policy. Ulster University, as one of the partners in the PARTERRE project, was responsible for piloting the eTM framework within Northern Ireland.

2.1 The engage Methodology

The eTM methodology was implemented in Northern Ireland in the following manner. Each eTM is a workshop-style event, typically coordinated with members of a particular stakeholder network. These members normally invite other stakeholders to attend an event to discuss a matter of importance to the network. At the start of each event, a short introduction to the topic is provided to the entire room of participants, which can number from 20 to 150. The room is then organised into small round-table discussion groups, which then discuss typically 3–5 sub-topics related to the overall theme of the workshop. Each discussion is normally 15–30 min in length. Instant minutes of each group's conversation are taken by table facilitators, using wirelessly networked tablet computers. In another part of the room, a team of domain experts collects and reviews the comments in real-time, clustering emerging issues, removing duplication and identifying conflicting perspectives.

The system also allows polling so that participants can select their preferred option from multiple alternative opinions. Comments, themes and polling results can be visualised on a projector screen, and feedback is given to the room at regular intervals during the event. An "instant report" is also generated in parallel with the discussion, and is available for distribution as soon as the workshop is completed. This report summarises the aims of the debate, the process which has been undertaken and the key results of the work [46] (11.1).

2.2 Technical Implementation

The design of the engage system is deliberately focused on the needs of users who hold regular consultative and participative events. For this reason, the system is intended to be unobtrusive to workshop participants, highly interactive and responsive to group discussions, and easy for table facilitators and event organisers to use. It is also designed to minimise the workload for organisers pre- and post-event. Thus, setting up the equipment before the event and taking it down after the event can be done quickly by one or two individuals in under an hour.

These requirements are enabled by the strategic use of specific technologies. Thus, mobile devices with bluetooth keyboards can be quickly deployed to a large number of tables and connected to a wireless network without worrying about either power or ethernet cabling. The use of off-the-shelf tablets provides familiar, user-friendly controls for table facilitators and other participants. Node.js, a software framework for building real-time applications, is used to allow the rapid capture of comments and voting data and to provide immediate visual feedback on a projector screen. By combining consumer hardware with open source software the entire system can be made available at a relatively small cost.

2.3 Application in Service and Policy Design

The use of the engage system as a policy tool consists of two main phases. The first phase was the PARTERRE project, during which it was deployed across Northern Ireland in a range of policy contexts. This initial phase included eight pilot events, which are described in Table 11.1. For each of these eTM pilots, the topic was identified by a representative of a specific community, who approached the project team with a request for an event. User-centred research methodologies were employed during the organisation and implementation of each eTM. The research team found high levels of interest and motivation among Lead Community Coordinators (LCCs), who were keen to professionalise the engagement process, make it more efficient and improve the outcome of the civic engagement [46]. LCCs can be defined as highly motivated experts who take a leadership role to connect user communities. The number of participants of each eTM pilot ranged from 40 to 50 per eTM, with a total of 380 participants across the eight cases. The pilot events took place over a period of approximately 12 months.

The second phase of engage deployment took place after the PARTERRE Project ended. The pilot events have successfully identified and catalysed a market for novel stakeholder engagement tools and methods, which lead to ongoing demand following the end of the research project. Due to strong research network links the majority of these additional workshops took place in collaboration with the public health sector. A range of strategy, policy and service design issues were addressed in 16 events which took place between 2014 and 2016. The specific event topics are detailed in Table 11.2 below.

3 Comparison of 'engage' with Other Approaches

In order to gain a deeper understanding of the context of the ongoing demand for the *engage* platform, six in-depth semi-structured interviews were carried with users of the system. These users included health sector managers and university staff who had co-organised and delivered engage events, and were selected for their ability to

Table 11.1 eTM pilot events in Northern Ireland under the PARTERRE project

Title	Objectives	Participant profile
Strategy for Allied Health Professionals (AHP) in Northern Ireland	Develop a comprehensive response to the DHSSPSNI consultation on AHP Strategy for Northern Ireland	Representatives from the AHP workforce and experts from related academic fields
Open Government—Making Open Data Real	To co-design a response to the public consultation on open data, and to influence public policy at regional and national level	Industry representatives, local and regional government, policy-makers, academics
Partnerships for Business Innovation—Engaging for Growth	To explore how businesses can be supported in innovation activities using partnerships models with academic and government stakeholders	Representatives from industry, trade associations, regional and local government, and academia.
Worklessness Within North Belfast	To engage stakeholders in North Belfast in civic debate on issues related to worklessness in their local communities	Community representatives, local and regional government, academics.
Maximising Social Value Through Public Sector Procurement	To improve understanding among stakeholders of how social value can be integrated within the commissioning process	Academics, charitable and voluntary sector, procurement practitioners, policy-makers
Innovation in Sustainable Construction and Energy Management	To consider implications of sustainable construction and energy management for industry and educators	SMEs, large corporates, academics, local and regional government
Brain-Computer Neural Interfaces	To improve understanding of the potential for BCNI to support people with neurological conditions who are living at home	Academic staff and students, occupational therapists
Embedding Telehealth in Care & Service Provision	To understand the future role of connected health technologies within the South Eastern Health and Social Care Trust	Clinicians, senior management

Table 11.2 Post-PARTERRE engage workshops

Date	Client	Topic
21 Feb 2014	Health and Social Care Board	Strategic Futures Workshop on eHealth and Care Strategy for NI
28 May 2014	BCS Health NI and HSCNI	Better Data Better Care
06 Jun 2014	Telecare Service Association	Best Practice Workshop on ECRs, Interoperability and Big Data
05 Sep 2014	European Connected Health Alliance	Exploring Engagement Between Academic, Business and Clinical
16 Sep 2014	Assoc. British Pharmaceutical Industry	Increasing collaboration with the Pharmaceutical Industry in NI
09 Dec 2014	Public Health Agency	Beyond 2015 Staff Engagement—Internal
10 Mar 2015	Public Health Agency	Beyond 2015 Staff Engagement—External
26 May 2015	Public Health Agency	Making Life Better in Partnership
19 Jan 2016	MAGIC Project	Pre-Commercial Procurement Stakeholder Engagement
21 Jan 2016	MAGIC Project	Pre-Commercial Procurement Stakeholder Engagement
16 Feb 2016	Public Health Agency	Electronic Clinical Health Record Benefits
07 Apr 2016	HOME SBRI	SBRI Stakeholder Engagement
12 Apr 2016	HOME SBRI	SBRI Stakeholder Engagement
16 May 2016	Public Health Agency	Research for Better Health & Social Care
15 Jun 2016	Health and Social Care NI	Domiciliary Care Workforce Review
22 Jun 2016	Ulster University	Employers Engagement Event

provide feedback on organisational drivers and barriers, usability issues, and policy impacts.

A key theme that quickly emerged was increasing organisational demand for stakeholder engagement, along with a growing expectation that policy and service design should be focused on user needs. In some cases, this was linked to a policy drive for greater openness and accountability. This trend in the Northern Irish public sector reflects the push for user-centred design that we observed in the context of digital government, which in turn suggests a deeper shift in public sector culture, permeating from the national down to the regional level. It also reflects the observation of [29], that the Engagement Stage of digital government evolution is often linked to the concept of Open Government.

In this context we will explore how user research is currently carried out by the leading digital transformation agencies, as well as public bodies in Northern Ireland.

3.1 Alternative User Research Methods

In the US and the UK, there has been a shift towards bringing technically skilled individuals and agile methodologies into government, accompanied by an increasing emphasis on user-centred design. In the case of 18F and GDS, each of these organisations have published online guides to agile development in the public sector. Within these guidelines, specific user research methods are suggested for adoption by government agencies. Both 18F and GDs divide the design process into four phases. 18F name the phases "Discover", "Decide", "Make", and "Validate", and categorise the research methods according to the appropriate design phase. GDS, on the other hand, name their development phases "Discovery", "Alpha", "Beta", and "Live", and while they note that "Different types of research are more appropriate depending on what phase of service development process you are in." [47], they do not provide specific guidance on when each method should be used (Tables 11.3 and 11.4).

In terms of research methods commonly used in the Northern Ireland public sector, our investigation of *engage* users revealed that the most frequently mentioned methods were interviews, focus groups, workshops and online surveys. Methods mentioned by interviewees were limited in variety compared to those listed by organisations like 18F and GDS. This is perhaps not surprising, given the difference in available resources and cultural focus between these high-profile digital transformation agencies and local organisations in Northern Ireland which are primarily focused on operational matters. Nevertheless, there was a consistent message from respondents that stakeholder engagement and citizen-centred service design were increasingly important.

Table 11.3 User research methods used by 18F

Discover	Decide	Make	Validate
Feature dot voting	Comparative analysis	Protosketching	Card sorting
KJ method	Content audit	Wireframing	Multivariate testing
Metrics definition	Design principles	Design pattern library	Usability testing
Design studio	Site mapping	Prototyping	Visual preference testing
Bodystorming	Task flow analysis		
Cognitive walkthrough	User scenarios		
Contextual inquiry	Affinity diagramming		
Heuristic analysis	Journey mapping		
User interviews	Mental modeling		
	Personas		
	Storyboarding		
	Style tiles		

Table 11.4 User research methods used by UK Government Digital Service

Method	Description
Evidence-based personas	A persona is a fictitious individual, based on a composite of the characteristics of a group of real users
User Journey Maps	A technique that helps teams to understand the full experience that users have throughout the lifecycle of the service
Eye tracking	
Unmoderated usability study	User attempts a task or series of tasks alone and the moderator observes in a separate room
Surveys	A survey is user research that includes a questionnaire
A/B and Multivariate testing	A/B tests are controlled experiments on the web. Show two randomly assigned groups of users different designs of a page
Remote user research	User research can be done over the phone or using a VoIP system. Can be done in conjunction with screen sharing
Pop-up research	Take questions and prototypes to where target users are likely to be, such as libraries, day centres and colleges
Depth interviews	Semi-structured conversation that help learning about users' needs. Ideal for exploring attitudes, aspirations and preferences
Community research panel	A group of pre-selected users who have agreed to participate in research activities on a regular basis
Ethnographic research	Ethnographic research is sometimes called contextual research or contextual inquiry
Affinity mapping	A technique for sorting large volumes of unstructured information, as a means of understanding patterns and themes
Card sorting	Helps to understand how users naturally organise different kinds of information. Can also be used for sorting user needs
Co-design	A co-design workshop involves getting users in the same room creating sketches/prototypes and generating ideas
Day in the life	Mapping someone's activity over a day, including what products and services they use at what time of day
Guided tour	Helps to understand what people actually do rather than their reported experience
Map your use	Can be used to understand a user's current use of services and their feelings towards them
Think aloud	A way of testing how users experience a service. Using a service while thinking aloud about what they are doing
Write a diary	

3.2 *Alternative Tools and Technologies*

There appear to be limited alternative technologies specifically tailored for citizen engagement—perhaps reflecting the fact the engagement happens at the later stages of e-government development according to Janowski's evolutionary model [29]. The UK's Government Digital Service provides a list of user research tools that it uses, which is given in Table 11.5 below. According to Northern Ireland users of the *engage* system, technology-enabled engagement was restricted to online surveys

Table 11.5 UK Government Digital Service user research tools

Tool	Description of usage
UserZoom	UserZoom is used for quarterly benchmarking of the usability of top tasks on GOV.UK. It also enables remote testing by external stakeholders
What Users Do	WhatUsersDo allows for rapid usability testing with people who are in their own home/work with their own computers. Teams can quickly and inexpensively conduct iterative usability testing at a feature based level. Teams can also able to see videos of user sessions
CRM	A CRM system is used to build and manage a panel of people who have agreed that they are interested in participating in user research
GoToMeeting	GoToMeeting supports moderated remote user research with users who are either too busy or otherwise unable to come into the lab, or when it important to talk to them in their own context
FluidSurveys	FluidSurveys are used to perform online surveys
OptimalWorkshop	OptimalWorkshop enables testing about information architecture and navigation, including card sorting and tree testing
Mental Models Template	GDS use a mental model template to structure discovery research data. A mental model skyline diagram can be generated using a Python script (CSV to Visio)

(which were widely used) and electronic voting systems (which were less common). The limited range of available technologies is somewhat surprising given that all respondents recognised an increasing demand for stakeholder engagement at the organisational level.

3.3   Where Does engage Fit Into Existing Practices?

According to Daae and Boks [48], user research methods can be divided into three categories, according to how information is collected: methods for communicating with users, methods for investigating what users do, and methods that both investigate what users do and communicate with users. This classification is illustrated with examples in Table 11.6. Within this framework the *engage* system would be most appropriately classified as a method for communicating with users.

It was clear from talking to *engage* users was that the system, which in many ways resembles a traditional roundtable workshop, fitted easily into familiar business practices. This is not surprising, given that Preece et al. [49] consider workshops to be one of the five basic data collection methods. All the respondents had taken part in such workshops before, and some had used them for stakeholder engagement in the past. In this sense, the system felt familiar to both organisers and participants and did not require a steep "learning curve". For organisers, the

Table 11.6 Three types of user research method (from Daae and Boks [48])

Methods for communicating with the user	Methods for investigating what the user does	Methods that include both investigation and communication
Interview	Observation	Applied ethnography
Focus group	Studying	Contextual enquiry
Survey	Documentation	
Verbal protocol	Video ethnography	
Conjoint technique	Shadowing	
Wants and needs analysis	User testing	
Card sorting	Empathic design	
Group task analysis	Culture-focused research	
Probes/diary study		

burden of preparing for an engage event was no greater than it might have been for a more traditional workshop. For participants, the process of engaging in a series of structured conversations was a familiar and comfortable activity.

3.4 Comparative Advantages of engage

User feedback from the PARTERE pilots was in general very positive, particularly in terms of the methodology [46, 50]. Stakeholders felt that participation levels were good, and that the quality of discussion and debate was high. An analysis of user responses showed that *engage* offered advantages over traditional workshops in a number of ways, which might be classified as "immediacy", "connectedness", "transparency", and "efficiency".

Immediacy—One of the frustrations that users expressed with traditional workshops was the delay between participating in a discussion and receiving a formal report of that discussion. Some users felt that this gap between contribution and feedback lead to a sense that such events were merely a "box-ticking" exercise, and that the lack of tangible outputs was a sign that their contribution would have little impact on actual policy or service design. For these users, the *engage* framework addressed this issue by allowing for real-time feedback during the event and for a final report to be distributed immediately after a workshop was completed. Thus "immediacy" appeared to be a significant source of value for many respondents.

Connectedness—Another benefit of the *engage* approach was the ability to connect multiple different discussion groups, and thus multiple perspectives, within the context of a wider shared conversation. One example given by a frequent user of the system was the facility to compare and contrast the views of different professional groups—for example, pharmacists and physiotherapists. The user pointed out that such groups inevitably have a different view of how services should be delivered and how value can be created for service users. By allowing conflicting

perspectives to be surfaced and discussed, the user felt that it was possible to achieve a more robust consensus and thus a more effective overarching strategy.

Transparency—The value of transparency was raised by a number of users. In the context of *engage*, this meant the transparency of the process by which participant comments were converted into the final report and recommendations. One of the problems with a traditional paper-based workshop is that the delay between recording ideas and opinions on paper, and converting those statements into a final report is slow and opaque. By making feedback immediate and visible to all, users of the *engage* platform can see straightaway whether the outputs of the discussion are reflective of their inputs, thus enhancing trust and increasing user satisfaction.

Efficiency—A fourth major theme that emerged from interviews was that the *engage* framework was attractive to event organisers due to its ability to reduce their workload compared to conventional workshops. Stakeholders felt that relevant data was collected, analysed and distributed in a more timely and resource-efficient manner. It was suggested that *engage* workshops allowed for effective consultation at scale, making it significantly more cost-effective that running multiple interviews or focus groups.

3.5   Challenges of Wider Adoption

The *engage* methodology has a number of limitations in its current state. The level of engagement of participants depends to some degree on the skills of the individual table facilitator. Also, by their nature, roundtable discussions do not allow for the same level of in-depth analysis as one-to-one interviews. Nevertheless, the experience of the engage platform suggests that an acceptable level of participation can be created through the use of untrained facilitators, with a minimal technical introduction to the system.

Perhaps the largest methodological barrier is the need for trained event organisers, particularly with regard to the structuring of discussions and presentations. In particular, the correct wording of questions is critical to ensuring satisfactory outcomes [46, 50]. Defining effective questions is an important challenge that requires some experience in terms of what typically works, but also a specific understanding of the discussion topics and purpose of the engagement. At the moment, the need for trained event coordinators is a major contributor to the cost of using the system. Wider adoption is likely to be accelerated if this cost can be reduced through a training programme, or perhaps partial automation of core tasks.

A further challenge to the *engage* method is the need to have all participants in the same room at the same time. While this requirement supports high levels of engagement and inclusion for those in the room, it may occasionally exclude stakeholders who are unable to attend the event in person. In the context of health sector service design and policy development, this created a challenge for service users and carers. It is possible that this issue might be addressed in future through technical enhancements to facilitate remote participation.

There are a number of costs associated with the use of the system that may be addressed through technical improvements. For example, the price of hardware is continuing to come down over time. Another significant cost is the requirement for university staff to attend each event. This could be addressed by the provision of a cloud-based software model, accompanied by a suitable training programme for clients. Furthermore, from talking to users it became clear that further technical enhancements could increase the value of the system and reduce overheads. Specific examples could include increased automation of core tasks (including report generation), richer visualisation and analysis tools, and easier integration with social media.

One of the key messages from users is that significant obstacles to technology adoption exist in the public sector. Some concerns raised during user interviews included challenges relating to IT infrastructure, including the difficulty giving novel hardware and software systems access to public sector networks. These issues were associated primarily with security and resource concerns—i.e., getting access to IT staff who can enable integration, and justifying perceived risks to security.

Another issue, related to organisational culture, was ensuring that engagement activities had credible impacts. A number of stakeholders suggested that it was often the case that consultation was a "box-ticking" exercise, and that actual stakeholder empowerment might be met with resistance from senior management. It was suggested that stakeholder opinions could be diluted or distorted to the point where they had little real impact. One respondent suggested that a possible solution to this problem would to have repeat engagements, allowing stakeholders to evaluate ongoing policy impacts. This was referred to as "closing the loop". This implies that in order to maximise impact (as well as stakeholder satisfaction), engagement should be an ongoing process or "conversation" rather than a one-off activity, echoing the iterative approach found in agile development practices.

4   Future Trends and Conclusion

As we noted at the start of this chapter the discourse on e-government has evolved significantly in recent years. One of the most influential concepts has been that of Digital Era Governance, originally proposed by [44]. A key insight from the authors is that changes in governance are driven not simply by public sector adoption of new technologies, but by changes in society at large. These social changes take many forms—cognitive, behavioural, organizational, political, and cultural—but all can be linked back in some way to the evolution and impact of information technology. Mike Bracken, formerly of GDS, makes a similar point when he says: "Digital means applying the culture, practices, processes and technologies of the internet era to respond to people's raised expectations." [51].

This insight may help to explain why digital transformation is occurring in parallel with the drive towards more citizen-centred government, insofar as low-cost, disintermediated forms of communication enabled by the internet create an

expectation that governments will embrace deeper citizen engagement. Dunleavy et al. [44] label this mode of governance "Needs-Based Holism". Citing Hood [52], they point out that "detector" mechanisms (which enable information-seeking) are as important to government functioning as "effectors" (which enable delivery). The *engage* platform may thus be considered a novel "detector mechanism" for government.

It is worth noting how scarce and underdeveloped such tools appear to be given the demand for effective solutions. Even in the case of technology-orientated practitioners and early adopters such as GDS and 18F, non-digital user research methods seem to predominate. It may be that user research data—which is often qualitative, complex and subtle—may not lend itself to digital capture or analysis. Or perhaps it is merely that suitable solutions have yet to be developed. Or perhaps, as Kotamraju and Geest [53] suggest, there is a fundamental tension between user and government needs that creates a barrier to adoption of user-centred methods and tools. Such questions inevitably point to opportunities for further research.

If we speculate about what form such technologies might take, the experience of *engage* suggests that the greatest opportunity lies in unobtrusive user interface design, systems that complement well-established forms of human interaction, and approaches that are tailored towards the capture and analysis of qualitative data. While the *engage* system is undoubtedly an early-stage technology, it perhaps illustrates the potential for digital tools to support a new era of citizen-centred governance.

References

1. Zhang H, Xu X, Xiao J (2014) Diffusion of e-government: a literature review and directions for future directions. Gov Inf Q 31(4):631–636
2. Belanger F, Carter L (2012) Digitizing government interactions with constituents: an historical review of E-Government research in information systems. J Assoc Inf Syst 13(5):1
3. Osman IH, Anouze AL, Irani Z, Al-Ayoubi B, Lee H, Balcı A et al (2014) COBRA framework to evaluate e-government services: a citizen-centric perspective. Gov Inf Q 31(2):243–256
4. Mahmood Z (ed) (2013) E-government implementation and practice in developing countries. IGI Global, Hershey
5. Chen Y-C (2010) Citizen-centric E-government services: understanding integrated citizen service information systems. Soc Sci Comput Rev 28(4):427–442
6. Edmiston KD (2003) State and local e-government: prospects and challenges. Am Rev Public Adm 33(1):20–45
7. Irani Z, Weerakkody V, Kamal M, Mohammed Hindi N, Osman IH, Latef Anouze A, Al-Ayoubi B (2012) An analysis of methodologies utilised in e-government research: a user satisfaction perspective. J Enterprise Inf Manag 25(3):298–313
8. Dwivedi YK (2009) Viewpoint: an analysis of e-government research published in Transforming Government: People, Process and Policy (TGPPP). Transform Gov People Process Policy 3(1):7–15
9. Irani Z, Dwivedi YK (2008) Editorial. Transf Gov People Process Policy 2(4):221–224
10. Welch EW, Hinnant CC, Moon MJ (2004) Linking citizen satisfaction with e-government and trust in government. J Public Adm Res Theory 15(3):371–391

11. Riley TB (2003) Defining e-government and E-governance: staying the course (The Riley Report), eGov Monitor, London
12. Irani Z, Elliman T, Jackson P (2007) Electronic transformation of government in the UK: a research agenda. Eur J Inf Syst 16(4):327–335
13. Hazlett S, Hill F (2003) e-government: the realities of using IT to transform the public sector. Manag Serv Qual 13(6):445–452
14. Sharif A, Irani Z, Weerakkody V (2010) Evaluating and modelling constructs for decision making in e-government. J Oper Res Soc 61(6):929–952
15. Carter L, Weerakkody V (2008) e-government adoption: a cultural comparison. Inf Syst Front 10(4):473–482
16. Layne K, Lee J (2001) Developing fully functional E-government: a four stage model. Gov Inf Q 18(2):122–136
17. Gant J, Chen Y (2001) Transforming local e-government services: the use of application service providers. Gov Inf Q 18(2):343–355
18. Fang Z (2002) e-government in digital era: concept, practice and development. Int J Comput Internet Inf 20:193–213
19. Brandtzæg PB, Heim J, Karahasanovic A (2011) Understanding the new digital divide – a typology of internet users in Europe. Int J Hum Comput Stud 69(3):123–138
20. Saebo O, Rose J, Skiftenes Flak L (2008) The shape of eparticipation: characterizing an emerging research area. Gov Inf Q 25(3):400–428
21. Al Shafi S, Weerakkody V (2007) Implementing and managing e-government in the state of Qatar: a citizens' perspective. Electron Gov 4(4):436–450
22. Coursey D, Norris D (2008) Models of e-government: are they correct? An empirical assessment. Public Adm Rev 48:523–536
23. Norris D, Moon MJ (2005) Advancing e-government at the grassroots: tortoise or Hare? Public Adm Rev 65:64–74
24. West D (2004) E-government and transformation of service delivery and citizen attitudes. Public Adm Rev 64:15–27
25. Scott J (2006) "E" the people: Do U.S. municipal government web sites support public involvement? Public Adm Rev 66:341–353
26. Hiller JS, Belanger F (2001) Privacy strategies for electronic government. IBM Center for the Business of Government, Washington, DC
27. United Nations (2008) UN e-government survey 2008: from e-government to connected governance. United Nations, New York
28. Pardo TA, Tayi GK (2007) Interorganizational information integration: a key enabler for digital government. Gov Inf Q 24:691–715
29. Janowski T (2015) Digital government evolution: from transformation to contextualization. Gov Inf Q 32(3):221–236
30. Teerling ML, Pieterson W (2010) Multichannel marketing: an experiment on guiding citizens to the electronic channels. Gov Inf Q 27(1):98–107
31. Cegarra-Navarro J-G, Garcia-Perez A, Moreno-Cegarra JL (2014) Technology knowledge and governance: empowering citizen engagement and participation. Gov Inf Q 31(4):660–668
32. Pieterson W, Ebbers W, van Dijk J (2007) Personalization in the public sector. Gov Inf Q 24(1):148–164
33. Linders D (2012) From e-government to we-government: defining a typology for citizen coproduction in the age of social media. Gov Inf Q 29(4):446–454
34. Carlitz RD, Gunn RW (2002) Online rulemaking: a step toward E-governance. Gov Inf Q 19(4):389–405
35. Bertot JC, Jaeger PT, Hansen D (2012) The impact of polices on government social media usage: issues, challenges, and recommendations. Gov Inf Q 29(1):30–40
36. McDermott P (2010) Building open government. Gov Inf Q 27(4):401–413. http://doi.org/10.1016/j.giq.2010.07.002
37. Missingham R (2011) E-parliament: opening the door. Gov Inf Q 28(3):426–434

38. Bannister F, Connolly R (2011) The trouble with transparency: a critical review of openness in e-Government. Policy Internet 3(1):1–30
39. Brown MM (2007) Understanding e-government benefits. Am Rev Public Adm 37:178–197
40. Brown AW, Fishenden J, Thompson M (2014) Revolutionising digital public service delivery: a UK government perspective. Retrieved from http://www.blogs.jbs.cam.ac.uk/markthompson/wp-content/uploads/2014/02/Digital-Public-Service-Delivery.pdf
41. GDS (2016) GDS design principles. (n.d.). https://www.gov.uk/design-principles. Accessed 1 Aug 2016
42. Farmer JP, Panchadsaram R (2016) Designing American government. Des Manage Rev 27(1):6–11
43. Mergel I (2015) Open collaboration in the public sector: the case of social coding on GitHub. Gov Inf Q 32(4):464–472. http://doi.org/10.1016/j.giq.2015.09.004
44. Dunleavy P, Margetts H, Bastow S, Tinkler J (2006) New public management is dead—long live digital-era governance. J Public Adm Res Theory 16(3):467–494
45. Von Hippel E (1986) Lead users: a source of novel product concepts. Manage Sci 32(7):791–805
46. Galbraith B, Cleland B, Martin S, Wallace J, Mulvenna M, McAdam R (2013) Engaging user communities with eParticipation technology: findings from a European project. Technol Anal Strateg Manage 25(3):281–294
47. GDS (2016) Welcome to user research methods Wiki. (n.d.). https://userresearchmethods.hackpad.com/Welcome-to-User-Research-Methods-Wiki-S0j1jM7vrcp. Accessed 1 Aug 2016
48. Daae J, Boks C (2015) A classification of user research methods for design for sustainable behaviour. J Clean Prod 106:680–689
49. Preece J, Rogers Y, Sharp H (2002) Interaction design: beyond human-computer interaction. Wiley, New York
50. Cleland B, Mulvenna M, Galbraith B, Wallace JG, Martin S (2012) Innovation of eParticipation strategies using living labs as intermediaries. Electron J E-Gov 10(2):120–132
51. Bracken M (2016) What we mean when we say digital. https://digital.blogs.coop/2016/06/14/what-we-mean-when-we-say-digital/
52. Hood C (1983) The tools of government. Macmillan, Basingstoke
53. Kotamraju NP, van der Geest TM (2012) The tension between user-centred design and e-government services. Behav Inf Technol 31(3):261–273. http://doi.org/10.1080/0144929X.2011.563797