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RESEARCH ARTICLE

Low-fidelity policy design, within-design feedback, and the Universal Credit case

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Abstract
Policy design approaches currently pay insufficient attention to feedback that occurs *during* the design process. Addressing this endogenous policy design feedback gap is pressing as policymakers can adopt 'low-fidelity' design approaches featuring compressed and iterative feedback-rich design cycles. We argue that within-design feedback can be oriented to the components of policy designs (instruments and objectives) and serve to reinforce or undermine them during the design process. We develop four types of low-fidelity design contingent upon the quality of feedback available to designers and their ability to integrate it into policy design processes: confident iteration and stress testing, advocacy and hacking, tinkering and shots in the dark, or coping. We illustrate the utility of the approach and variation in the types, use, and impacts of within-design feedback and low-fidelity policy design through an examination of the UK's Universal Credit policy.

Keywords Policy design · Feedback · Formulation · Human-centered design · Digital government · Universal Credit

Introduction

Policy design scholarship has generated a robust set of concepts, methods, and findings which have been applied to a range of policy problems and jurisdictions. However, designs are often depicted and studied as high fidelity or completed artifacts with little to no attention to the policy relevant feedback that occurs *during* the design process. Rather, feedback in a design sense is typically restricted to exchanges among elites around initial political and technical determinations and specifications of policy problems and corresponding policy instrument selection (Howlett, 2019; Peters, 2018). Or, researchers using 'policy feedback' theory adopt a post hoc approach that focuses on the feedback generated by *established policies* studying their effects, how policy designs have evolved, or what

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makes policy designs more or less adaptive and robust (Capano & Lippi, 2017; Jordan & Matt, 2014; Skogstad, 2017). However, 'low-fidelity' policy design approaches are now also in use that feature compressed and iterative policy feedback[1]-rich design cycles *during* design. Popularized by digital government approaches and policy/innovation units, the approach generates low fidelity[2] policy designs which are then stress tested in operational contexts to generate policy relevant feedback that informs iteration and eventual scale-up (Bason & Austin, 2021; Clarke & Craft, 2018; Hermus et al., 2020; Kimbell & Bailey, 2017; Villa Alvarex et al., 2022; Whittle & Campbell, 2019). Instead of 'complete' policy designs implemented at scale as typically presented in traditional policy design accounts (Peters, 2018), low-fidelity approaches begin with a policy intent/direction but see policy problems/aims and their corresponding designs as subject to verification and specification as policy relevant feedback from operational applications is gained (McGuinness & Schank, 2021; Noveck, 2021). While this type of designing has become an established practice in a range of policy sectors and jurisdictions (see Bason & Austin, 2021; Clarke & Craft, 2019; Hermus et al., 2020), it lacks clarity in terms of how feedback informs design or corresponding design implications. No distinction is made regarding the potential types of policy relevant feedback, to what that feedback is or should be directed, nor regarding the implications of when that feedback is received during the design process, or what leads to its integration or exclusion in design iterations and why. In sum, scholars and practitioners are currently left with little guidance by which to understand how to think about, study, or practically manage the policy relevant feedback occurring during policy design.

Part one of this article sets out how feedback is dealt with in traditional and low-fidelity approaches to policy design, and develops our argument regarding the endogenous design feedback gap. Drawing on policy feedback and policy design research, we then highlight the potential types, applications, and effects of within-design feedback. We canvass how feedback during design may serve to undermine or reinforce policy designs and then apply well known structural and agentic considerations from the policy design literature to low-fidelity designing. We argue that low-fidelity design approaches fall into four types based on the quality of feedback available to designers and their ability to integrate that feedback *during* design. These include: confident iteration and stress testing, advocacy and hacking, tinkering and shots in the dark, or coping. Part three then examines the case of the UK's Universal Credit (UC) to illustrate the importance played by within-design feedback during the initial policy design (2010–2013) as well as during the overall design process. We highlight how low-fidelity design and within-design feedback informed the "parallel" design approach involving the retention and iterative improvement in the problematic original 'live' design and parallel design of a 'full' UC service alternative (2013–2018) (Griffiths, 2021; Pope, 2020; NAO, 2018). The UC case reveals the importance of the impact, types, and orientation of within-design feedback. It showcases how policy designers adopted several low-fidelity policy design approaches including coping, confident testing

[1] The term policy relevant feedback is used to reflect the transmission of evaluative or informational inputs and signals in policymaking to the original or controlling source. As such, it differs from 'policy feedback' that focuses on how "existing policies can shape key aspects of politics and policymaking" (Béland & Schlager, 2019).

[2] Low fidelity connotes a design process where designs are not fully formed but rather are tentative with basic design features established but subjected to testing in applied settings to validate and specify the design iteratively. We adopt this term instead of 'Agile' which is a specific method with defined requirements (see Clarke & Craft, 2019) and to acknowledge that low-fidelity design can but does not always involve 'real-time' feedback.

and iteration, and advocacy and hacking during the design process as the quality of feedback and their ability to integrate it within the design permitted. We conclude by raising some of the broader implications of this work. We clarify key lacunas related to policy design and highlight how low-fidelity design and within-design feedback raise questions about how policy learning and evaluation are used in a more iterative and feedback-rich policy process, particularly as policy designers move from broad policy design ambitions to operational policy designs.

Policy relevant feedback during design: from post hoc to in situ

Policy design entails the conscious and deliberate effort to define policy aims and map them instrumentally to policy tools intended to achieve them (Howlett, 2019; Peters, 2018). Scholars have increasingly adopted a decompositional approach to policy design (see Table 1) to more carefully clarify the components of policy designs, and to ensure greater precision regarding the dependent variable and policy design dynamics (Haelg et al., 2020; Howlett & Cashore, 2009). This has enriched not only our understanding of how policy designs are created and work, but has allowed researchers to focus on individual design components and their interaction, and to offer more precise analysis of design features and policy change processes linked to components or overall designs (Dupuis & Biesbroek, 2013; Marsden & Reardon, 2017; Moyson et al., 2017).

However, the policy design approach, like others in political science and public policy, conceives of and focuses predominantly on policy feedback in post hoc terms.[3] Punctuated equilibrium, policy feedback, and policy design approaches all focus on the policy feedback effects and mechanisms of *established* policies, that is, how feedback effects of established policies impact politics or subsequent policymaking, and particularly their effect on policy stability or change dynamics (Baumgartner & Jones, 2002; Béland & Schlager, 2019; Cashore & Howlett, 2007). Our contention is that policy relevant feedback can occur in situ, endogenously *during* policy design process, particularly with low-fidelity design approaches.

Researchers have recognized that despite widespread gains in understanding particular policy designs the process of designing itself remains understudied (Peters, 2018). Attention has been primarily focused on high-level and program-level design matters with considerably less research directed to 'micro-level' analysis of how objectives and instruments are specified and operationalized in actual design uses (Howlett et al., 2023). Researchers have returned to focus on how settings are calibrated, how policy objectives are specified and how both are coupled in designs, acknowledging that "understanding settings and calibrations *during design* is required in order to assure congruence between goals and means" (Gofen et al., 2023, p. 304, emphasis added). Scholars are revisiting earlier attempts that set out criteria for instrument calibration including an interest in the complexity of operation, level of public visibility, adaptability across uses, intrusiveness level, relative costliness, reliance on markets, chances of failure, and precision of targeting (Linder & Peters, 1989). Others have devised frameworks with essential criteria for ensuring congruence

[3] For exceptions see Burroughs (2017) on feedback in formulation and Tosun and Treib (2018) on implementation feedback, Hoppe (2018) on problem structuring, or Bobrow (2006) on policy design. These studies typically also apply a post hoc focus or deal with partial and discrete aspects or applications of feedback rather than systematic examinations of policy relevant feedback during design.

Table 1 Elements of policy design. *Source*: adapted from Howlett and Cashore (2007)

	Policy content		
	High-level abstraction	Program-level operationalization	Specific on-the-ground measures
Policy focus			
Policy ends or aims	Goal What general types of ideas govern policy development?	Objectives What does policy formally aim to address?	Settings What are the specific on-the-ground policy requirements?
Policy means or tools	Instrument logic What general norms guide implementation preferences?	Instrument selection What specific types of instruments are used?	Calibrations What are the specific ways in which the instruments are used

between policy goals and instruments and their celebrations including the coerciveness degree required to accomplish the goal, whether delivery is direct or indirect, usage of pre-existing implementation structures or creation of new ones, and visibility in both policy review activities and budgeting (Salamon, 2002; Howlett & Ramesh, 2023). However, the post hoc logic remains with no explicit attention to policy relevant feedback within the design process, or how calibrations and settings are determined or adjusted in response, as designs themselves are formalized or iterated.

Gofen et al. (2023) have argued that calibration 'flexibility' is an overlooked aspect of policy design, with calibrations being "the extent to which implementers are provided with discretion to adapt, fine-tune and customize the policy instrument" (Gofen et al., 2023, p. 309). Low-fidelity policy design approaches also prize flexibility, but see it as an essential activity occurring in response to feedback generated *during* the policy design process. The basic logic of low-fidelity approaches is to include policy relevant feedback from operational data and/or real users, and to do so as soon as possible in the design process, instead of relying on stakeholder and consultation-based feedback which typically occurs after key design decisions have been made and which are not operationally informed (Mintrom & Luetjens, 2012; Fraussen et al., 2020). It seeks to depart from the traditional policy design approach, as one digital government practitioner has put it, with traditional policy design involving "educated guesswork with a feedback loop measured in years" (Code for America, 2019).

Low-fidelity approaches adopt shortened and more frequent design-feedback cycles, often informed by user experience or 'real-time' or 'near real-time' data to stress test designs (Bason & Austin, 2021; Code for America, 2019; McGuinness & Schank, 2021; Noveck, 2021). This aims to avoid problem definition and policy designs built on untested assumptions, poor or stale data that no longer reflect the on the ground reality of policy-making, and designs that have not been subject to real world application (Greenway, et al. 2018; Noveck, 2021). Low-fidelity designing privileges the 'users' for whom the policy is intended and seeks to test assumptions to address 'pain points' 'friction' and the administrative burdens that render policy designs suboptimal for those who will use them (Bason & Austin, 2021; Greenway et al., 2021; Herd & Moynihan, 2018; Welby & Tan, 2022).

Many digital government units have institutionalized these types of within-design feedback inputs by embedding digital "standards" in public service processes to create routine feedback cycles, often with mandatory compliance assessments, which designs must pass for interventions to be funded and authorized (Digital Transformation Agency, 2020; Standards & Assurance Community, 2019; Greenway et al., 2021; Patterson & Agarwal, 2023). These often require proof of user/operational testing, data or performance strategies, and evidence of the fielding of smaller scale trial versions—all intended to generate and institutionalize within-design feedback into design processes. However, low-fidelity policy design approaches lack comprehensive theoretical accounts and empirical research that engage with questions of the nature of the iteration cycles. The design period is bounded operationally in part by the time and resources available to develop an initial low-fidelity design, testing it in operational contexts and then integrating that within-design feedback toward the next design iteration. Low-fidelity approaches end when iterative approaches are halted. This may be because resources have run out, designs have been terminated for political or operational reasons, or policymakers have decided that 'high fidelity' has been achieved, or that continuous design is no longer desirable or warranted.

This suggests considerable variation in the nature of feedback cycles and highlights the significant discretion involved in low-fidelity designing in determining what constitutes an acceptable low-fidelity design to launch, as well as how much feedback is required and

when it reaches a threshold that merits iteration. How this discretion is determined or operationalized remains understudied and so does its linkage with the potential types of feedback produced during design iterations. Low-fidelity design approaches do not currently distinguish between types of policy relevant feedback or provide comprehensive and standardized guidance on what to do with policy relevant feedback generated during design. Rather, practitioners are often left with considerable discretion in determining what constitutes the standards, however those are set, for example, with many 'digital standards' referenced earlier providing general principles or serving as 'playbooks' that provide general guidelines and parameters but fall well short of systematic, comprehensive, or consistent direction (Patterson & Agarwal, 2023; Welby & Tan, 2022). The assumption is designers will be able to effectively use discretion and interpret and apply these principles during design. Secondly, it assumes that low-fidelity approaches always generate useful and usable policy relevant feedback for design. This runs counter to well established principles and evidence from policy design, policy learning, and policy evaluation which have all documented the political, normative, and operational constraints that can prevent the use of various forms of evidence, redesign, and policy learning (Clarke & Craft, 2019; Howlett & Mukherjee, 2014; Dunlop et al., 2018).

Low-fidelity design types and within-design feedback

A first step to address the endogenous within-design feedback gap and further specify low-fidelity design is to acknowledge that there are six types of within-design feedback associated with various design components[4] included in Table 1. This recognizes that during policy design, policy relevant feedback may be directed toward the broad or specific aspects of a design's policy aims or means. Second, drawing on work from traditional policy feedback approaches, we can extend the decompositional approach to reflect that policy relevant feedback *occurring during design* may serve to reinforce or undermine various components of policy design (Jacobs & Weaver, 2015; Skogstad, 2017), for example, with feedback during design processes revealing that initial design objectives were poorly specified or require restructuring, or that policy instruments or their settings are suboptimal and require adjustment.

Low-fidelity design then can be characterized by extending the considerations of Table 1 to include the types of feedback and its orientation to broad or specific aspects of the design. *Type III* within-design policy feedback being oriented to macro- or high-level considerations, with feedback either reinforcing or undermining basic policy making ideas or fundamental implementation preferences. For example, during the Covid-19 pandemic governments that adopted initial laissez-faire policy designs, involving limited government intervention and herd immunity objectives, received considerable self-undermining design feedback leading to significant redesigns featuring interventionist state led mitigation and manage objectives with corresponding implementation preferences (Boin et al., 2020; Cairney, 2021; Marciano & Craft, 2023). *Type II* within-design feedback serves to reinforce or undermine the more specific policy objectives or instrument selections within a given design. Drawing again from COVID-19

[4] We use the term 'types' to avoid further complicating the 'orders' that are used in studies of policy change, policy design, and slightly differently in the policy design mechanisms literature.

governments received feedback and modified policy designs to deal with the pandemic as they received operational feedback that public health interventions required economic and social policy interventions as well to ensure broader pandemic management goals could be achieved (Goyal & Howlett, 2021; Cairney, 2021). Finally, *Type I* within-design feedback is the most granular, oriented to on-the-ground requirements of the policy or the specific calibration of instruments. In the COVID-19 example, Type I feedback reinforced and undermined a variety of calibrations and settings regarding the use of vaccinations and physical distancing instruments in response to shifts in vaccination and infection rates, and as more became known about the virus transmission and intervention efficacy (Ibid) (Table 2).

Low-fidelity design approaches presume two things: usability and quality. That feedback produced during design will be of sufficient quality, serving to usefully inform or clarify design considerations, and that the policy designers can in fact integrate that feedback into designing (Code for America, 2019; Greenway et al., 2018; Noveck, 2021; McGuinness & Schank, 2021). However, there are often limitations on both fronts related to whether an agent has the capacity, resources, and political and operational design conditions favorable to generating and integrating quality feedback (Hood, 1986; May, 2003; Peters, 2018). We know that there are instances where governments may be fixed in their policy goal or instrument preferences, in a way that constrains policy designers (Capano & Lippi, 2017). Likewise, budgetary, political contexts, or resource or operational considerations can limit the ability to generate or use feedback, or the available suite of instruments or the type of design process that can be considered (May, 2003; Howlett & Mukherjee, 2014). Designers may have carte blanche or discretion only at the margins to address a well or poorly specified policy goal—using a specified or open-ended set of policy instruments. They may not have the time or capacity required to 'test' or seek out feedback during design or to use it once received. Further, the quality of the feedback may be limited either in providing needed signals and evidence to be useful in design, or it may conflict with other inputs in the policy design, or the broader policy mix within which the design is nested (Bason & Austin, 2021; Clarke & Craft, 2019; Goyal & Howlett, 2021).

Table 3 operationalizes four types of low-fidelity design given these considerations, based on feedback quality and the ability of designers to use that feedback to inform design. This analysis extends the above discussion of whether feedback is self-reinforcing or self-undermining and how it may be associated with an instrument or the policy objective. When designers are receiving high-quality feedback and are able to use that feedback, they are able to *confidently iterate and stress test.* They can utilize feedback to further structure the policy problem and design objectives, to alter or test instruments and their calibrations, or adjust entire policy designs. They can seek to reduce or front load risk by managing it through iterative testing and adjustment in feedback-rich and compressed iteration cycles.

An *advocacy & hacking* type of low-fidelity policy design will prevail when quality feedback is being generated, but constraints exist on the ability of designers to use it. For example, digital government approaches often must 'hack' public services. That is, look to end-runs around key constraints to make the case for or demonstrate the applicability of within-design feedback in light of 'red tape' or heavy bureaucratic process, constraining legacy technology, and poor or non-existent delivery approaches (Eggers, 2016; Godbout & Kunin, 2014; Kattel et al., 2019). There may also be insufficient financial or human capacity; or political, temporal, or structural constraints preventing the generation or use of feedback. Additionally, within-design feedback may compete with or be incongruent with other relevant design considerations including consultation, operational, or political preferences—with low-fidelity design therefore taking on

Table 2 Types of within-design feedback. *Source*: Authors, adapted from Howlett and Cashore (2007), Howlett (2009)

	Feedback orientation		
	Type three design feedback (*broad goal or implementation preference*)	Type two design feedback (*objective or instrument selection*)	Type one feedback (*policy setting or instrument calibration*)
Design component and within-design feedback type			
Policy goals			
Self-reinforcing	Supports general types of high-level ideas that govern policy design	Validates/further structures specific policy objectives	Reinforce Specific On-the-ground policy objectives
Self-undermining	Undermines general types of high-level ideas that govern policymaking	Undermines specific policy objectives	Reinforces the specific On-the-ground policy objectives
Policy means			
Self-reinforcing	Feedback supports the general implementation norms/preferences	Validates or reinforces policy instrument selection	Reinforces operational calibration of instrument
Self-undermining	Undermines general norms that guide implementation preferences	Undermines selection of instruments	Undermines calibration of instruments in operation

Table 3 Within-design feedback and low-fidelity policy design approaches. *Source*: Authors

Quality of feedback	Ability to use feedback during design	
	High	Low
High	Confident iteration and stress testing	Advocacy and hacking
Low	Tinkering and shots in the dark	Coping

an advocacy type to champion the use of operationally grounded feedback or attempting to inform how best to balance or synthesize various types of feedback (Clarke & Craft, 2019).

A third type *tinkering & shots in the dark* type applies in policy design contexts characterized by an opportunity to use feedback in design but where feedback is of poor quality. Incremental types of trial and error may attempt to stumble through design improvements with lower quality feedback to direct efforts or seek to improve the quality of feedback available to inform design work. Alternatively, given a high ability to integrate feedback designers may opt for *shots in the dark* where designers test hunches or experiment given the low-quality feedback available, for example, with policy labs trying various types of experiments or design approaches to generate policy relevant feedback (Hermus et al., 2020). Finally, the *coping* type of low-fidelity design would apply to design contexts characterized by both low-quality feedback and low ability to integrate feedback. With this type, designers are stuck coping with their suboptimal design and look to generate better feedback or ways to improve their ability to integrate feedback to facilitate improved design or wait for contexts to change.

Low-fidelity design and the types set out here also reflect the dynamism of the policy design context. The quality of feedback or ability to integrate it into policy designing can shift and evolve. As such, designers may adopt more than one of these types during an entire low-fidelity design process. An initial advocacy and hacking approach may result in changes in the ability to use feedback, leading to the adoption of confidence iteration and stress testing types of design. Indeed, digital government approaches rely heavily on 'flywheel' tactics where hacking or narrowly authorized design engagements are used to demonstrate viability and effectiveness, to generate confidence and authorize additional resources or expand design scope or authorities to adopt low-fidelity feedback heavy iterations into designs. For example, digital government and policy labs have targeted high transaction government services or used 'exemplar' projects to demonstrate quick improvements to user satisfaction, improved outcomes, or cost-savings to create buy-in for low-fidelity ways of working (Bason & Austin, 2021; Greenway et al., 2018; Noveck, 2021). Finally, we also recognize that shifts from one mode of design to another may be produced by interaction effects as policy tools and goal feedback may impact one another, the entire designs, or the broader policy mix within which the design is nested. This may lead to potential changes in the basic conditions or quality of feedback, or the ability to integrate it during design (Daugbjerg & Kay, 2019; Goyal & Howlett, 2021). As long as a design process is still 'open' with feedback being generated or sought, and iteration occurring then design conditions exist for low-fidelity design.

The case of UK Universal Credit policy

Launched in 2010, the UC policy was designed to replace six means-tested benefits and tax credits into a single benefit that provides support for working age adults. Delivered by the British Department for Work and Pensions (DWP), the social benefit was intended to deliver simplifications to the benefit system for applicants, to generate cost savings for the government from efficiencies and improved fraud detection, and ultimately to help return participants to work or increase the hours of those already working while on the benefit (Griffiths, 2021; Timmins, 2016). The benefit was intended to be dynamic: it would be based on a heavily automated feedback cycle with changes in user earnings, employment, or other circumstances leading to changes in the benefit calculation. Various eligibility criteria were developed, and a 'taper' rate was calibrated—which sets the rate at which UC is withdrawn as claimants' earnings increase or to reflect changes in their eligibility criteria (e.g., children or dependents, or health conditions or disabilities) (Bennett & Milar, 2022; Hobson, 2021). The £2.2 billion UC policy had ambitious policy goals with the DWP aiming to transfer eight million households to Universal Credit by 2017, with 300,000 more people expected to rejoin the workforce, and a reduction of fraud and error by £2.1 billion a year and saving the government £400 (NAO, 2018, p. 6).

The focus in this article is not on the merits or shortcomings of the policy, but rather on its design process from 2010 to 2016. UC credit is an ideal case, given the government publicly committed to a low-fidelity design including Agile methods and a 'digital by default' approach centering on users and iterative design principles as part of the UK government's broader digital transformation agenda (NAO, 2013, 2018; Timmins, 2016).

Low-fidelity design and Universal Credit

The initial UC policy design struggled to move from general policy goals to operational policy from 2010 to 2013. The design lacked internal coordination across policy and delivery teams and relied too heavily on externally contracted technology firms. The DWP committed to low-fidelity design principles, adopting a 'digital first' approach and commissioning user research and engagement with a spectrum of *potential* UC beneficiary types, civil servants from DWP and other departments and units, and the public. The 2011 user engagements included 160 *potential* benefit users and approximately 20 staff from the department, the Treasury, and a local government (Rotik & Perry, 2011, 2012). These generated policy relevant feedback and operational insights including: participants challenges in completing their own budgeting as required by the UC design, insufficient return to work incentives, and a problematic monthly payment schedule for participants; however, little to none of this was integrated into the policy design (Griffiths, 2021). As such, it can best be characterized as advocacy and hacking where feedback was generated, but not integrated.

This shifted to a coping mode of low-fidelity design given there was insufficient capacity to generate or integrate operational feedback to iterate on the design. Enabling legislation and regulations were only finalized by 2013, due to (according to a government audit) an overarching absence of precisely how the policy was meant to work (NAO, 2013, p. 33). In fact, by 2013, three years into design, there were no users, nothing had been implemented, and the policy had cost over £400 million (NAO, 2013). In short, the policy design was in crisis, with a lack of clarity and coherence regarding how the design would actually

work. As one insider put it "Policy designed without regard to deliverability, programmes and IT developed without regard to operability, and operations not knowing the objectives of the change" (Timmins, 2016, 38). A range of internal project oversight and audit reports emphasize that DWP lacked capacity to deal with the technical requirements and effectively manage external technology vendors, but also that the DWP clearly lacked the capacity required in policy and delivery staff to work in low-fidelity ways involving iterative and stress tested approaches (NAO, 2013, 2018; Pope, 2020; Timmins, 2016). The UC's initial 'live service' policy design service was emblematic of the coping type of low-fidelity design where there was very poor feedback being generated from operational contexts and a clear lack of ability to integrate feedback into design work.

By April 2013, the DWP department was able to salvage some of the initial policy design and legacy technology that has not been decommissioned or written off (NAO, 2018). The DWP launched a 'pathfinder' that accepted a limited number and type of claims through its 'live' service, those single and unemployed working level adults from select areas, and required considerable workarounds by staff to function (NAO, 2014, p. 5; Timmins, 2016). The 2013–2016 period of the 'live' design is therefore best characterized as having adopted an advocacy and hacking form of low-fidelity design. The small operational footprint was generating self-undermining policy relevant feedback linked to the UC design components, but the department could not integrate that feedback easily into the design given their capacity deficiencies, and had to 'hack' and workaround technology and policy processes to adopt a low-fidelity design approach.

The negative within-design feedback was revealing shortcomings in dealing with the policy objectives of serving a complex set of eligible recipients including those with dependents or who were already working. Type I self-undermining within-design feedback was produced with poor digital security and usability of existing instrument calibrations being regularly fed back into the design by applicants, DWP front line staff, and external technology firms (Timmins, 2016; Griffiths, 2021; NAO, 2018). Self-undermining Type II feedback was also received related to the UC policies 'digital first' policy objective as it was unable to effectively manage demands from those who needed non-digital and in-person services with a clear failing in using digital platforms and web-enabled applications as well as meeting other service channel needs (Pope, 2020; NAO, 2018). However, advocacy and hacking continued as the DWP design was limited in its ability to integrate this Type I and II within-design feedback given continued capacity gaps to work in low-fidelity ways, and poor external vendor contracting arrangements for UC technology (NAO, 2018; Griffiths, 2021; Timmins, 2016).

Parallel design and confident iteration and stress testing in UC policy

The continued problems with the 'live' UC policy design forced a 'reset' with the government announcing it was adopting a parallel 'two track' approach. This involved retaining the existing suboptimal 'live' policy design while in parallel working toward a new 'full' service policy design that would learn from the ongoing 'live' and eventually serve to replace the 'live' design. The DWP had invested heavily in building its own departmental technology and low-fidelity design capacity including an integrated team that featured policy, prototyping, user research, and data experts working collaboratively and using Agile methods to deliver UC policy via low-fidelity design principles and practices (Pope, 2020; NAO, 2018). Figure 1 depicts their low-fidelity design approach used to develop the 'full'

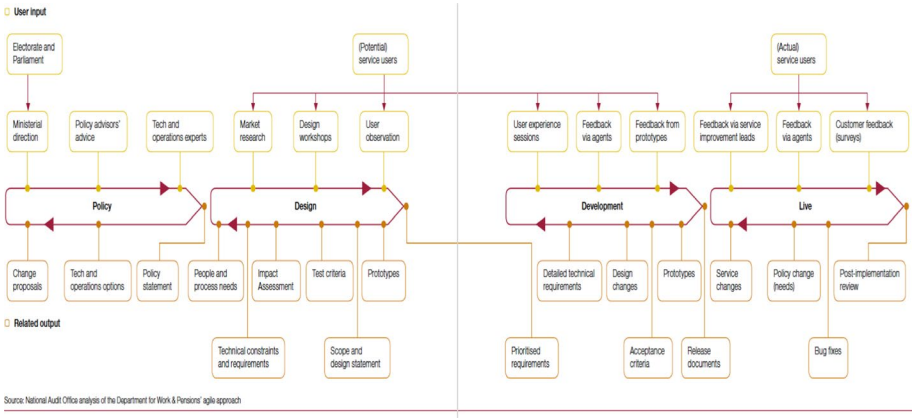

Fig. 1 UC low-fidelity design approach (*Source* NAO, 2018, pp. 16–17)

service which demonstrates how initial policy intent is turned into a working and testable design which was then refined through iterative design processes involving Type II and Type I feedback.

While the 'live' design continued to operate and was characterized by advocacy and hacking, the development of the 'full' design (2013–2016) was characterized by confident iteration and stress testing. The DWP's increased internal capacity combined with policy relevant feedback from the suboptimal 'live' design provided essential guidance for developing a more effective 'full' design. Several aspects of the original design evolved with iterations to the UC 'full' policy. While the high-level goals and implementation preferences remained more or less consistent, the policy settings and instrument calibrations, particularly linked to the initial calculation period, and the payment features of the UC policy design evolved during the 'full' design. The initial monthly payment format and protracted waiting period for first payments were subject to redesign given self-undermining within-design feedback from a range of users about the friction and administrative burdens they were causing (Herd & Moynihan, 2018; Pope, 2020). These include the applicants, Scottish, Welsh, and Irish governments, and from landlords and third parties (e.g., employers) who provide some of the data used in the determinations of eligibility, payments, or uses of funds (e.g., rent, childcare) (Hobson, 2021).

However, the ability to confidently iterate and stress test the settings was and remains conditioned in part by country residency of applicants given devolutionary powers in UK with APAs being discretionary and exceptional in England and Wales, while twice monthly payments were automatic in Northern Ireland and were requested by the Scottish government and implemented (Bennett & Milar, 2022; Hobson, 2021). Confident iteration and stress testing also occurred with respect to the objectives with Type II self-undermining feedback revealing that many beneficiaries wanted an option to directly pay landlords which ran counter to the fundamental policy idea that citizens should be independent and responsible for their own budgeting and financial management (Pope, 2020).

The key distinction between the 2010 and 2013 'live' design and the parallel 'full' design (2013–2018) is that the latter generated and integrated user and operational data in an ongoing way as part of a low-fidelity iterative design. As one report put it, "The test and learn approach is part of agile. But it became embedded with the twin-track approach.

That meant, essentially for the first time, that the staff who operate Universal Credit and the claimants on the receiving end, became part of the design and build process. That too—the involvement of frontline operational people in its design and adaptation, using feedback from claimants—looks to have been crucial to recovery." (Timmins, 2016, 72). By 2014, a working 'full' design was tested with approximately 30 or so participants, including a more diverse set of applicants from the target population than the 'live' service was serving. Self-reinforcing and undermining policy feedback was generated on the design with iterations then released to approximately 100 participants and so on, until ultimately by 2015 approximately 140,000 users were on the full service (Timmins, 2016, 54). Further examples of confident iteration and stress testing involving Type I within-design feedback were linked to the first payment and initial waiting period for benefit features. Users and non-governmental organizations had since the outset of the UC policy in 2011 signaled the challenges around the payment settings and instrument calibrations involved as leading to hardships for existing beneficiaries and applicants (Hobson, 2021; Pope, 2020). Increased resources provided in Budget 2017 coupled with the design feedback received from real users facilitated adjustments to the design's settings and instrument calibrations to reduce wait times for initial payments and to provide Alternative Payment Arrangements (APAs) including one-month advanced payment option (NAO, 2018, 18; Pope, 2020, 33).

The two track design process existed until December 2018 when 'live' was closed down with the 'full' design now available across the UK. The 'full' design had benefited from considerable self-reinforcing and self-undermining feedback that allowed for iteration and design improvements and for the policy design to be scaled to all types of UC applicants across the entire UK. Confident iteration and stress testing were animated by within-design feedback from operational activity. The low-fidelity design approach also continued to be impacted by the political direction of government who wanted changes to the settings of the taper rate instrument at which the UC benefits are paid and introducing changes to the number and types of dependents covered by UC benefits (Pope, 2020; Hobson, 2021; Bennett & Milar, 2022). The UC design was able to continue to adopt a confident iteration approach based on these required changes to the design. Type I feedback was received allowing for the sounder operation of the 'full' design that governments and designers were better able to look at how design changes based on this feedback could be linked to the policy aims and instrument selections. Self-reinforcing Type II feedback leads government to request design changes to meet the objectives of the UC policy to secure cost savings, incentivize participants to return to work or work, and provide supports for specific policy purposes (or specific benefit user groups) that reflected government preferences regarding broader labor market and social policy, and were conditioned by the political and economic contexts of the day (Bennett & Milar, 2022; Pope, 2020). These changes were, however, informed by the operational data on the UC policy performance including who was and was not receiving the benefit, for how long, and with what effect.

Conclusion

Policy design now often emphasizes and requires the generation and use of policy relevant feedback *during* design—as part of the very act of designing policy. Low-fidelity design approaches compel a revisiting of existing policy design theory but problematically, point to major gaps in our understanding of feedback occurring endogenously within policy design. Likewise, those in digital government or policy/innovation units, or those seeking

to adopt iterative, and feedback-rich design processes need to be clearer about the types, purpose, and conditions of use of policy relevant feedback during policy design. We have argued that a first step to better depiction and analysis of within policy design feedback and low-fidelity policy design is in linking feedback to the foundational components of policy design. Second, we have argued that within-design policy relevant feedback can serve to reinforce or undermine these components. This enriches and more precisely identifies how within-design feedback impacts not only the macro level policy aims and objectives but also potentially the meso- and micro-level design considerations required to go from abstract to operational policy design. Crucially however, we have argued that this within-design feedback may not always be present, may be low quality, and that designers may not always be able to integrate that feedback during design.

The UC case examined provides an illustration of many of these features with policy designers grappling with choices around policy objectives and instruments, their specification and redesign subject to feedback received during design (or not). Universal Credit also highlights how designers may cycle through one or a number of these low-fidelity design types as the availability of high-quality feedback and their ability to integrate it into designs permit. The early advocacy and hacking within the UC design, to copying types, to confident iteration and stress testing for the full design, revealed that policy design work can evolve, and shift based on the context and constraints within which it is undertaken. The initial live and subsequent 'full' designs demonstrated the range of reinforcing and undermining Type I and type II within-design effects linked to broad policy instruments and objectives, but also their more specific calibrations and settings such as when and how recipients were compensated. It also highlighted that design feedback was provided by users but also by governments who used operational policy relevant feedback to inform design settings and calibrations to better meet their policy intent and operational contexts. While the UC policy designers did not adopt tinkering or shots in the dark approaches, that type of low-fidelity design remains likely in scenarios where feedback quality is poor, but where designers are able to integrate it during design.

While our analysis is focused on the more immediate impacts of feedback during the design process, there are obvious and important questions that remain about the cumulative or longer-term impacts of within-design feedback. One is linked to choices around the automation of design features and processes, facilitated by data and technology, which may serve to limit or constrain certain types of feedback while privileging others in how the design operates and evolves, or may limit the flexibility of calibrations as the design evolves (Bennett & Milar, 2022). Relatedly, low-fidelity design and within-design feedback may privilege or discount certain forms of policy learning or evaluation given its emphasis on quicker iteration informed by operational testing. As the UC case demonstrated, designers were not always able to integrate feedback into design with poor capacity to do so being a hallmark of the early UC design process. We also noted the challenges around the standardization and methods for selecting users/appropriate feedback, and discretion and ad hoc determinations for the thresholds of feedback usability.

The interaction between the within-design types outlined in this article also raises questions for policy mix scholarship. Suggesting that mixes may not only involve various policy instruments and objectives operating concurrently, but that mixes may also feature differences in design approaches with low-fidelity policy design occurring and mixing with other policies that adopt similar or more traditional forms of policy design. Finally, we also recognize that their low-fidelity design may produce a range of effects over time. Contemporary research on policy feedback more generally has argued that processes operating at the level of policy instruments can either reinforce or undermine the idea underpinning

the policy (Daugbjerg & Kay, 2019). Self-undermining feedback on the instrument level (i.e., feedback signaling the need for a change on the policy instrument level or indicating how the instrument fails to fully achieve its aim) can produce small adjustments over time through a net feedback effect. While this logic was developed with a post hoc design perspective, it raises further areas of study regarding the interactions of the within-design feedback types. The accumulation of feedback of one kind or another may have different implications for the operation and evolution of designs over time. Policy design must grapple with these questions to ensure that low-fidelity and traditional design are well placed to deal with policy relevant feedback occurring, during design.

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