



Practices, the Built Environment & Sustainability

A Thinking Note Collection

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Foreword

This Thinking Note Collection has been produced by the newly established 'Practices, the Built Environment and Sustainability' (PBES) network. The purpose of the PBES network is to establish a community of early career researchers with an interest in theories of practice and the built environment, who are keen to move away from the 'ABC' and technological deterministic mentality that dominates building-related studies. The network has been created as part of collaboration between Anglia Ruskin University's Global Sustainability Institute (GSI) and Aalborg University's Center for Design, Innovation and Sustainable Transitions (DIST). The network's first two events, which focussed on these Thinking Notes, were in association with British Sociological Association's Climate Change Study Group (BSA CCSG).

The PBES network was launched through two summer events in Cambridge (25-26 June and 15-16 September 2014). The June event brought the network members together for the first time and provided them with the opportunity to bundle around common points of interest, which in turn provided the foundations for these Thinking Notes. The network members were given the challenging task of delivering 3-page Notes, which succinctly tackle potential (usually conceptual) future developments and/or 'sticking points' in the PBES field. The September event provided the network with an opportunity to present and more deeply reflect on the content of the Thinking Notes and, in particular, where their initial thinking on these topics may eventually take them. Whilst the primary purpose of these Notes was to stimulate discussion within the network itself, we have chosen to publish the Collection more widely in the hope that it could also spark debate for other colleagues. Therefore, we note that many of the ideas presented in these Thinking Notes are exactly that, an overview of our evolving thoughts and ideas on emerging PBES-related topics. These Notes represent a means for further thinking and discussion, as well as the seeds of further work.

These Notes cover a wide range of mainly conceptual PBES-related topics, ranging from time, narrative, and codes and standards, to know-how, feedback, and communities of practice. In discussing these Notes, salient discussion points included: the relationship between individual performance and the social organisation of practices; the interconnections between domestic and professional practices, including the 'everydayness' of practices; different practice configurations (e.g. bundles/complexes, compounds, systems); the intentionality of materiality; policy interventions; and when and how we could utilise theoretical perspectives beyond theories of practice, and whether or not that is even necessary.

In producing this Thinking Note Collection, we would like to extend our thanks to the following colleagues who contributed to the two summer events and/or offered feedback on the Thinking Notes themselves: Ben Anderson (University of Southampton); Susse Georg (Aalborg University); Tom Hargreaves (University of East Anglia); Russell Hitchings (University College London), Elizabeth Shove (Lancaster University); Yolande Strengers (RMIT University); Dylan Tutt (University of Reading); and Dan Welch (University of Manchester). We are also grateful for the financial contribution of Anglia Ruskin University's Global Sustainability Institute in establishing the network and funding its first two events.

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TN 1 – Entities, performances and interventions

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In this Thinking Note, we revisit various definitions of practice-as-performance and practice-as-entity to comment on the similarities and differences between them. We contend that when drawn on in discussion these concepts are imagined and applied in subtly different ways. In particular, there is a notion of entity as a block or pattern to be filled out (Reckwitz, 2002) which can lead to an understanding of entity as an ‘ideal type’. There is also a concept of entity as a nexus of doings and sayings (Schatzki, 1996) which can lead to an understanding of entity as all the performances of a practice (i.e. all the actualisations) in time and space. After explaining these two conceptualisations we show how these different notions have implications for how the relationship to practice-as-performance is conceptualised, and thus for the opportunities for steering change that might be identified. We argue that any such model for intervention must recognise that performances are always in a recursive relationship with the practice-as-entity, itself always already embroiled in a ‘system of practices’.

Entity as ‘ideal type’

The first notion is of practice-as-entity as an ‘ideal type’. We use this term to refer to an idea construct, which synthesises characteristics of a given phenomenon without corresponding to any one case. We identify this as occurring when a practice (e.g. showering, cooking, driving) is spoken about as a kind of envisioned, existing, understanding of the ‘mainstream’, ‘normal’ or ‘typical’ way of doing a practice. This application of the entity concept pulls towards standardisation and to the reproduction of the status quo. We suggest this reading can be traced to a definition in Reckwitz’ foundational text¹, *Towards a Theory of Social Practices* (2002), in which practices are described as existing patterns or blocks of action. He writes that: ‘...a practice represents a pattern which can be filled out’ (p.250), and:

‘A practice – a way of cooking, of consuming, of working, of investigating, of taking care of oneself or of others, etc. – forms so to speak a ‘block’ whose existence necessarily depends on the existence and specific inter-connectedness of ... elements...’ (p.250)

These quotes emphasise an overarching understanding of a bounded entity, a form distinct from others, which directs and organises action. This idea is further reinforced in Reckwitz’ explanation of the relationship between entity and performance, which he describes as the filling out (through performances) of these patterns or blocks (entities):

‘...by a multitude of single and often unique actions reproducing the practice (a certain way of consuming goods can be filled out by plenty of actual acts of consumption).’ (p.250)

We suggest that there is a tendency in this usage to talk in terms of a straightforward correlation between the practice-as-entity (e.g. showering), and the kinds of performances which reproduce it (e.g. instances in which showerers take a shower).

Entity as all the performances of a practice across time and space

The second understanding is of all the performances across time and space *as actualising* the entity. Conceiving the entity in its multiplicity can be achieved in a number of ways, we outline three:

Entity as all the performances of a practice that occur at any given moment. In this case, rather than pulling towards an ‘ideal type’, the entity concept embraces variety. E.g. a range of ways of doing showering exist at any one moment and that range *is* the practice entity.

Entity as being actualised by a broader range of performances. The correlation between the entity of showering and the actions of showerers is only part of the story. The practice-as-entity of showering is also actualised in many other instances of performance, for example when a bathroom designer proposes a

¹ We are not arguing that Reckwitz viewed the practice-entity concept in this way. Rather it is our suggestion that one reason why the concept has been taken up in this manner might be the wording of these particular, often cited, phrases.

shower room to replace a bathroom or when shower gel is invented. These instances of performance, may well be associated with practices of design, marketing and so on, and will thus have a different status in relation to the actualisation of the practice-as-entity, but they are nevertheless part of the 'system of practices' that shape the practice-as-entity of showering (and thus performances).

Entity as the accumulation of all the performances of a practice over time and space. This formulation adds to the above notions' focus on the development / embedding of a variety of meanings, materialities, knowledge and skills which the history of performances affords. As such, at the same time as embracing variety, there is recognition that past performances have implications for the present, and that performances *now* make certain things more or less probable in the future.

We see these three ways of speaking about a practice as being informed by Schatzki's writing, particularly in *Social Practices* (1996). He emphasises that:

'Practice in the sense of do-ing [performance]... actualizes and sustains practices in the sense of nexuses of doings [entities]. For this reason, a general analysis of practices *qua* spatiotemporal entities must embrace an account of practice *qua* do-ing...' (p.90)

There is then, a significant difference between these accounts: a form / block / pattern to be filled out by performances is not the same as understanding performances across space and time as actualising the entity. The former edits the processual, dynamic qualities from the entity concept, and pulls towards standardisation and the reproduction of the status quo. The latter emphasises the spatio-temporal qualities of the entity concept, and pulls towards variation and potential transformation. Despite these differences, both versions of practice-as-entity fundamentally rely on an understanding of practice-as-performance to explain the reproduction of social practice. We now argue that understanding this recursive relationship has implications for conceptualising dynamic processes of change and opportunities for intervention. We focus on three distinctive differences – (a), (b) and (c) – that come to light.

Processes of change and intervention

(a) In our opinion the 'ideal type' formulation of practice-as-entity is more deterministic and loses much of the iterative quality that is key for understanding practice dynamics. Nevertheless, we suggest that such 'ideal type' constructs have an effect in the real world. Ideas about 'normal', 'typical' and 'mainstream' ways of doing play an important part in national policy making. For example, in transport policy ideas about the distance that might 'typically' be commuted on a bike (5 miles) creates the frame in which decisions about the scope and design of interventions are made.² We acknowledge that the consequences of policy are always unpredictable, but it is hard to believe that interventions designed around such imagined 'ideal types' have no effect at all. What role do these 'ideal types', which form the basis of policy decisions, play in understandings of entities as actualised by performances?

In *The Dynamics of Social Practice* (2012), Shove *et al.* present and develop some conceptual tools that provide a way of thinking through this problem. Taking from Giddens (1984) the notion of a 'reproduction circuit' they show how loops of feedback and feedforward – partly a result of the ongoing 'monitoring' both of entity and performance – result in either continuity or the adaptation of a practice-as-entity. They highlight the importance of considering the means by which understandings of 'correct' practice are shared and how these ideas change (Shove *et al.*, 2012, p.101). For example, the 'ideal types' of policy makers, such as those highlighted above, are part of the 'reproductive circuit' that through the describing, mediating and materializing (Shove *et al.*, 2012) of a particular practice-as-entity, further limit or expand the 'range' of plausible performances and in turn redefine the 'ideal type' entity itself.

(b) At the level of practice-as-performances, Shove *et al.* provide an example of mixing cement to demonstrate that 'monitoring' also happens as part of the enactment of a practice. In the do-ing (of mixing cement), the human body and its various senses act as instruments of monitoring and responsive adaptation to determine the 'correct' consistency of the mix. This embodied memory of previous experience is fed forward to provide a template against which the batch is evaluated. In this way, the

² Similarly a recent study (<http://www.sprg.ac.uk/projects-fellowships/zero-carbon-homes>) found that the designers of zero carbon homes were working with ideas of 'mainstream' 'normal' housing which would guarantee sales, rather than pursuing innovative designs which reconfigured these ideas of 'normal'.

'correct' performance of a practice depends on the previous experiences of the performer or their community of practice (paraphrased from Shove *et al.* 2012).

We agree entirely with this claim, but also think that it is useful to pause and reflect at this point. Which concept of entity and so which performances are we thinking about? If we focus on the 'ideal type' notion of entity and its direct correlation only to practice-as-performance, we would be led to focus on the ongoing monitoring of performances of 'cement mixers' (as above), or of 'showerers', 'drivers' and so on. However, we have noted the performances which actualise 'driving' also include those of transport planners, car manufacturers etc. All these performances are monitored and reproduced in the ongoing manner outlined above.

This is the key point. *Performances which actualise a particular practice entity (such as driving) are part of multiple practices.* Such performances are therefore 'monitored' in terms of the practice they are part of. Whether or not such 'standards of practice' align is an empirical question. Irrespective of the degree of alignment, the performances of transport planners, car manufacturers, policy makers, practitioners, etc. are locked into a 'reproduction circuit' with the practice-as-entity (e.g. driving), itself shaping and shaped by its relationships with other practices. It is for this reason that thinking in terms of 'systems of practice' is particularly useful.

(c) The broad spectrum of performances which actualise any particular practice entity as it is now (and thus current performances) are not only distributed across multiple practices in the present they are also distributed across spacetime. Past performances have obdurate qualities (Hommels, 2005) such that the practice as entity is partly constituted from the embedded meanings, materials, knowledge and skills which this history of performances affords. Such obduracy is most easily identified in the material world, for example, a large proportion of the buildings in which we live, work and play have been built many decades ago, because of this they were built to different standards, and for 'ideal types' of 'normal life' which may no longer be relevant. We can also see obduracy of past performances in regulation, standardisation and legislation which has been made at particular historical moments to address the issues of the day. In this sense, change might come from identifying and intervening in some of these obdurate aspects.

Conclusion

Our focus has been on different notions of practice-as-entity, practice-as-performance and the relationships between them as they have been outlined in key texts and taken up in theories of practice. We have also considered the implications of these different conceptualisations for thinking about processes of change and intervention arguing that Schatzki's work perhaps offers a wider scope for thinking through potential sites of intervention, whilst the formulation of practice-as-entity found in Reckwitz' work appears more bounded and deterministic of performances. Through our discussion, we have also touched on the question of whether it is indeed valuable to ever separate entity and performance. Our conclusion is that there is analytic value in sometimes separating these concepts, but that it is important to know when and why it would be useful to do so. Focussing on different notions of entity, for example, helps to identify which performances we might be interested in: whether these are all the performances of a practice in a given moment, broader performances situated in multiple practices, or the accumulation of performances over history. On the other hand, thinking about particular performances also enables the identification of specific spatio-temporal configurations of doing. However, we emphasise that such analyses have little value for understanding change unless the iterative relationship of performance and entity is brought back into view. At the end of the day, to intervene in performance is to intervene in entity and vice versa, as although these ideas can be analytically separated, they remain, and should be considered as, fundamentally connected and mutually configuring.

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TN 2 – Know-how, practices and sustainability

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Introduction: What do we mean by know-how?

Knowledge has been part of the "environmental behaviour change" agenda for many years, perhaps due to the focus on individuals as more or less rational decision-makers. Research and policy have focused on what people know about the impacts of their actions ("literacy"), as part of educating people to be "good environmental citizens". However, literature suggests that knowledge comes in different forms. The most common distinction is between know-how (practical knowledge), and know-what (or know-that), which is explicit, intellectual knowledge (Brown and Duguid, 2001). For example, knowing how to ride a bike is different to having theoretical knowledge about the movements involved. Know-how is closely linked to competence; one of the three widely used elements of practice, alongside images and materials (Shove *et al.*, 2012). Røpke (2009) describes competence as the skills and knowledge needed to perform a practice; it both emerges from and guides performances. She also describes know-how as the tacit form of knowledge, though we suggest that not all know-how is necessarily tacit. However, know-what is generally considered more easily shareable than know-how. Whilst not defined as such, the description of other parts of knowledge as codifiable in 'formal rules, principles, precepts and instructions' (*op. cit.* p.2492) aligns with the above description of know-what. These different types of knowledge, transmitted and learned in different ways, have implications for sustainability policies and interventions, which often aim to transmit knowledge, but tend to focus on know-what, and top-down methods of educating and informing.

The aim of this Note is to explore the role of know-how in relation to the built environment and sustainability, drawing on practice theoretical perspectives. We consider the significance of know-how, focus on some key themes, and conclude by reflecting on unresolved questions.

Why is know-how important?

In recent years, researchers have become increasingly interested in the implications of everyday routines for sustainability. While these approaches move away from individualism, knowledge still seems to play a significant role. Theoretically, know-how is important because: (1) it is generally accepted as a core element of practice, underlying much of everyday consumption (though it has received relatively little attention within practice-based studies of sustainability); and (2) it serves to link individual performances with wider social practices, the mind with the body, and past with future performance. Know-how also has significance for sustainability policy and interventions. For example, understandings about how to use heating controls can have a big impact on energy consumption. To date, sustainability policies have emphasised information-based, intellectual approaches, not the development of know-how. However, due to a growing perception that such approaches have little effect on people's lives, many are increasingly focusing on know-how (e.g. draught-proofing workshops run by some Transition Town groups).

Neglecting know-how is not only a missed opportunity to build useful, practical knowledge, but it may also constrain the spread and circulation of know-what. Brown and Duguid (2001, p.204) argue that the practice must come first in order to make the 'circulation of explicit knowledge [know-what] worthwhile'. This argument seems logical: engaging in a learning-by-doing process can create an experiential framework in which related know-what makes sense, and can be usefully linked to everyday experiences. For instance, instruction manuals for innovative technologies may not become truly meaningful until a practice (which that manual offers instructions for) is performed. Further exploration of how developments in one dimension of knowledge relate to, and can influence, one another, could provide interesting ideas for research and/or policy intervention. Indeed, deeper reflections on know-how may help to explain some of the failings of conventional behaviour change approaches, as well as offer the basis for new directions.

Know-how in relation to elements of practices; images and materials

As an element of practice (often understood as competence/skills), know-how is intricately connected with the other two elements: images and materials (Shove *et al.*, 2012). The relations between know-how

and images are a relatively neglected area, and raise interesting questions such as: how do norms and meanings shape the know-how used in everyday practices, especially those with major environmental implications? For example, the idea that a home should be warm in the morning might link to know-how in programming a heating system. Equally, how do shifts in know-how affect images? For example, if we feel competent in doing something (e.g. using a smart meter) we might begin to normalise it.

The third element, materials, is also central to the development and expression of know-how, and this raises questions for sustainability and built environment studies. For example, how does interaction with the built environment help form the know-how we use in everyday practices? How do homes and technologies “teach” us to use energy, through scripts and affordances? How do individuals accommodate and resist these know-how trajectories through their practices, including through improvisation, “tinkering”, and bricolage? How do changes to the built environment (e.g. microgeneration technologies) stimulate new know-how? And to what extent does know-how persist over time, through materials change? Such questions regarding know-how and its relationships with other elements have implications for policies and interventions; understanding these could minimise undesirable unintended consequences.

Know-how and embodiment

Following closely from the subject of materiality, know-how also has interesting links with embodiment. In recent years, researchers have increasingly begun to consider forms of knowledge that are not cognitive, conscious and held in the mind, but rather held in the body. Often, know-how is an embodied form of knowledge; we have bodily habits that represent ways of performing a particular practice, from driving a car to making tea. Bodily/sensory experience is one way that know-how develops; seeing, hearing, touching and so on are important ways we learn about our surroundings for certain ends, especially if this is in the context of *doing* something. This is fundamental to the idea of ‘situated learning’ (Lave and Wenger, 1991). In the field of sustainability, Wallenborn and Wilhite (2014) suggest we pay attention to how habits are ‘remembered’ by the body as well as the mind. For example, we may have physical habits such as closing doors to keep heat in, or drawing the curtains at night. Royston (2014) considers some sensory experiences involved in know-how for keeping homes warm; e.g. temperature indicators include hard toothpaste, visible breath or a smell of damp. Embodied knowledge is significant not only for theory (deepening understandings of knowledge) but could also have policy implications; interventions could promote the development of know-how through sensory experiences such as hands-on workshops. However, more work is needed to understand the role of the body in the development and enactment of know-how.

Know-how and collective experience

While know-how is often tacit, this does not mean it cannot be shared between people. As well as through the bodily experiences of individuals, know-how can be formed through collective experiences and shared participation in practice – it can be passed on through “showing” and through “doing together”. This can be described as social learning, and often occurs within a Community of Practice (CoP). Lave and Wenger (1991) describe various forms of apprenticeship through which people may develop highly specialised skills through observing others, and performing ‘legitimate peripheral participation’ (i.e. sharing in an activity but as a recognised “beginner”). Aside from some work on CoPs (see Thinking Note on CoPs), there has not been much research on collective experience and know-how in the field of sustainability. However, recent work with off-grid communities (Daly, unpublished thesis) suggests that personal engagement and learning-by-doing through participation in community practices (e.g. working bees, voluntary committees, house-sitting), is an important mechanism for the spread of know-how.

Know-how, disruptions and moments of change

It is not necessarily the case that significant life ‘moments’ (e.g. having a baby; moving house) lead to a cognitive re-framing of decision-making and thus actions (as suggested by Verplanken *et al.*, 2008). Instead, major life events expose people to new “ways of doing”. This involves, for that individual/group, a reconfiguration of elements of practice, which influences how practices are performed. So instead of regarding key moments in people’s lives as an opportunity to bombard them with information (know-what), to convince them to make additional changes, we regard these moments as transitional periods whereby people acquire new know-how and re-negotiate performances. In addition to these often

revolutionary shifts, temporary disruptions (e.g. powercuts; appliance breakdown) can also shape know-how. Disruptions could lead to people: finding new ways of performing a practice which still yield the same outcomes (e.g. cooking without an oven); re-negotiating the 'needs/outcomes' associated with the practice (e.g. prioritising the convenient microwave option over the usual healthy meal); and/or abandoning the practice altogether (e.g. dining out instead). The experience of adjusting one's practices to cope with these unexpected temporary disruptions will accumulate know-how. This new know-how does not inevitably lead to reconfiguration; it may make existing practices more resilient and durable, by providing flexibility in performance. Whatever the consequences though, it is clear that one-off events should not be considered in isolation, but instead as one of many related experiences through which know-how is accumulated.

This ongoing process means that practices are always evolving, but this does not mean that know-how associated with previous ways of performing a practice is forever lost. Elements of practice, such as know-how, can lie dormant as 'practice memories' (Maller and Strengers, 2013). Embodied know-how accumulates through practitioners' experience, and persists into future performances. The idea of 'practice memories' suggests that interventions to promote more sustainable ways of interacting with the built environment should reflect on whether engendering new know-how is an appropriate aim. While it will be sometimes, in other instances, safeguarding or reinvigorating existing know-how may prove more effective.

Final thoughts

Based on this brief exploration, we suggest binary distinctions such as know-what/know-how, explicit/tacit and cognitive/embodied, are only useful up to a point. Some know-what has practical applications or impacts. Similarly, most know-how has embodied **and** cognitive dimensions. Some knowledge is sharable, but only in certain ways. So (in contrast to some literature) we see these as dimensions, not binary poles. This understanding raises interesting (empirical) questions, such as:

1. where do codes and standards fall into these distinctions? Are these (e.g. weights and measures for the practice of cooking) a form of know-what, or know-how, or another type of socially shared or institutionalised knowledge (as Gram-Hanssen, 2010, suggests)? And,
2. what are the implications of the trajectories of different types of knowledge for change/stasis in practice? If know-how constantly evolves through experiences/interactions, but know-what is codified, does this mean know-what tends to maintain the status quo, and know-how is more able to challenge this, and create innovations in practice? Or is know-how just as path-dependent, but in different ways?

In considering practical implications of a know-how approach to sustainability, important questions concern the transmission of know-how. First, what know-how do we need to build (or remove) in order to develop more sustainable ways of life? What existing or dormant forms of know-how can be developed and shared? If know-how is tacit and embodied, how can we share it? What degree of active participation is required to produce durable and meaningful know-how? What is the role of context in the sharing of know-how? Finally, the order of knowledge transfer, the idea that know-what may be more easily learnt if know-how is already present, raises some interesting ideas. And, whilst this extends beyond the scope of this Note, highlights similar questions about the dispersion and interactions of the other elements of practice.

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TN 3 – Exploring the relationship between narrative and social practice

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Introduction

In this short thinking piece, we highlight narrative as an under-theorised and under-researched dimension of social practice. We argue that social being and social change cannot be fully intelligible without a consideration of narrative. We thus focus on exploring the possibilities that arise from a more explicit integration of insights from narrative theories and methods into social practice theory (SPT). We argue that narrative may provide a set of theoretical and methodological tools to better represent, capture and advance understandings of the cultural and meaning dimensions of social practices at multiple scales and temporalities. However, we also acknowledge some key differences between these theories and offer some thoughts on the possibility of resolving these differences. In the following paragraphs, we briefly outline: some synergies between theoretical approaches and the benefits to integrating narrative into SPT; points of tension and difference between them; and some future directions research into the built environment could take.

Points of commonality between narrative and social practice theories

We consider narrative here as a broad set of approaches that emphasise the importance of stories that underlie our experience, which in turn allow us to navigate and find meaning in the world. In this respect, narratives can be thought of at various scales, from the individual (autobiographical accounts that help us make sense of our lives) to the collective (shared myths and understandings of a culture or society; see Riessman, 2008 and Squire, 2008). Broad points of synergy between narrative and social practice approaches can be seen in their shared emphasis on lived experience, context and temporality (cf. Hards, 2012). Both theoretical lenses explore in different ways how individuals are immersed in the “flow” of life: where narratives reveal the unfolding of meaning via personal or collective experiences in the “lifeworld”, an exploration of social practices focuses attention on often habitual or routine interactions with the material world. Many narrative approaches are also consistent with SPT in their consideration of the embodied nature of narratives. Such approaches draw on the ideas of phenomenologists, which suggest that language constitutes an expression of bodily experience of the world, moulding experiences into a meaningful whole through interaction with the world. Narratives are therefore able to capture lived experience as temporally-bounded, physical beings. In their own way, then, both bodies of work explore the way we constitute our worlds and are constituted by them, opening up ways of analysing social phenomena and change that emphasise the socially constructed, contextual, fluid and negotiated nature of lived reality.

Among the benefits of integrating narrative into SPT is the potential to respond to recent calls for greater attention to both the under-theorised cultural dimension of practice on the one hand, and a rehabilitation of human subjectivity and agency in practice perspectives on the other (cf. Sayer, 2012; Spaaragen, 2013). These are key dimensions of social practices that, in the context of recent efforts to move away from individualistic, rational choice models, have been at risk of neglect in more recent practice-oriented literature. To this end, the field of narrative inquiry offers a variety of research tools that may refocus attention to these dimensions (cf. Clandinin, 2007), including the elicitation of personal narratives as a means of methodologically accessing the “sayings” of social practices. Ongoing work by Karen Henwood and her colleagues (Energy Biographies 2014) and Sarah Hards (2011) exemplify the use of narrative methods to elicit autobiographical accounts of the performance of practices over time to identify moments of opportunity during people’s lives (what Hards calls *transformative moments*) in which practices may be more amenable to adopt more sustainable configurations. For example, Hards’ work highlights significant life events (such as attending university or having a family) as key moments when practices are more likely to shift, often the result of a confluence of new information, emotions, relationships and contexts. These interesting projects highlight the utility of temporally-oriented, subjective, experiential perspectives in revealing processes of transformation and change in perceptions,

norms, agencies and competences which in turn have important implications for understandings of energy consumption over time.

Points of tension

Despite these benefits, however, narrative and social practice theories do not necessarily fit together seamlessly. Importantly, many narrative studies take what might be considered an approach of “methodological individualism” that social practice theories inherently challenge in their focus on practice as the unit of analysis. Conversely, many narrative approaches focus on individual experiences in depth, using personal stories of transformation and learning as a basis for understanding human experience. However, the use of individual narratives in SPT work may contribute to an understanding of the “sayings” or performance of practices as they change over time. In addition, it could be argued that a consideration of the dynamics of practice-as-performance (as distinct from practice-as-entity) necessarily involves understanding the perspectives and lifeworlds of practitioners themselves, least we not forget that it is people who “do the integrating”. In this respect, it could be possible to maintain a practice theoretical analytical lens while adopting a methodologically individualized approach to exploring the lived experiences and meanings of “those who do the integrating”. Such work can potentially complement more structuralist explorations of the dynamics of practices-as-entities at broader scales of analysis.

Furthermore, the study of narratives is not limited to the individual, but may refer to the broader “meta-narratives” that exist at societal or cultural scales. An example of narrative work at this scale is Emery Roe’s (1994) narrative policy analysis, which is used to explore the conflicting “stories” of public policies and their interaction to form broader meta-narratives around complex environmental issues. Roe’s intention is to reveal how these narratives are formed, which voices or positions are given priority, and thus the inherent power dynamics embedded in such decisions. Integrated within an exploration of practice, this teasing out of institutional, municipal or even national narratives around certain issues can help to reveal the logics and even ethics embedded in certain policies, programs or initiatives that guide or shape certain social practices. For example, one might look at how a certain policy narrative of sustainability translate into specific technologies or programs. Explored this way, the performance of certain practices represent the way such narratives are “acted out”, or the way daily habits and routines may materialise certain narratives as we move through space and time. Conversely, social practices may be explored as inconsistent or in contradiction with certain broader narratives, and in doing so may essentially represent “counter-narratives” that shift or overwrite those at higher levels.

A second and perhaps greater point of tension is that many narrative theories do not explicitly consider materiality, instead focusing on what can be considered the meaning or engagements dimension of practice. This is important, as a valuable contribution of SPT has been its incorporation of the material (including infrastructures, technologies and artefacts) as an important dimension of our practices. One way to begin to reconcile these would be for narrative studies to consider the very material consequences of broader policy or other meta-narratives, which act as guides for the way things ought to be. Narrative is not a simple account of ‘what someone does in the world but what that world does to that someone’ (Mattingly in Riessman, 2008, p.22), in other words a tool for understanding the bidirectional influence between the social and the material. Integrated into practice approaches, an exploration of these narratives could offer insight into why certain technologies or paths forward are selected.

Future directions

Despite some burgeoning attempts at their integration, the potential of different theories of practice for cross fertilisation with narrative forms of inquiry has yet to be fully explored. Several potential avenues lay ahead: for example, Bourdieu’s theory of the social reproduction of practice might be usefully combined with a narrative inquiry perspective to unpack the structuring effects of sociocultural narratives on the adoption of routines and habits. One way to approach this might involve exploring more explicitly the links between cultural narratives about appropriate ways of doing and differing dispositions or socio-culturally derived ways of performing practices between various social groups and cultures. Similarly, Foucauldian perspectives on practice could offer a means for advancing thinking on the interrelations between power, narrative and practice; for example, in the way dominant organisational or institutional narratives intersect

with, guide, or contradict the more localised performance and experiences of practice. More specifically, however, we offer two avenues forward for further exploration.

First, greater attention could be paid to the way narratives are realised in and through embodied practice. For example, the evolution of policy or institutional narratives can be explored as they manifest and/or become inscribed in a specific place; for example through the selection of certain technologies or infrastructures used to create a built environment. These could then be explored in terms of how the performance of social practices in place either support or contest these dominant narratives, and in doing so realise (or “sediment”) other narratives around certain ideas (such as sustainability) or places (such as a neighbourhood). In this way, daily habits and routines can perhaps be explored as the materialisation of certain narratives (or counter-narratives) as we move through space and time (see Westerhoff and Robinson, 2014).

Secondly, narrative-based tools could be used to shift practices in accordance with research and policy agendas of eliciting sustainability transitions. The creation of participatory processes using narrative and storytelling tools as foundations are increasingly being used to create opportunities for generating new, collectively shared narratives that resonate more broadly and encourage feelings of agency. As noted by Williams *et al.* (2003, p.36), ‘storytelling within group and community development work allows people to reveal and strengthen new communal narratives, and to (re)construct communities as empowered rather than disempowered collectives’. Creating a space for sharing stories may also serve to build trust and communication through the cultivation of understanding diverse experiences and values within a city, neighbourhood or organisation, which in turn create opportunities for shifting “community practice”. These approaches to narrative in participatory processes expand beyond researching energy pasts and presents to providing innovative ways to elicit and share personal, collective and/or institutional narratives about potential energy futures. For example, Doyle and Davies’ (2013) innovative study incorporated narrative elicitation tasks into a “practice-oriented participatory” backcasting methodology to involve a wide range of expert stakeholders in explorations of possible future practice scenarios that go beyond traditional technocentric visions of sustainable futures. The authors found that the future-orientated narrative and backcasting methodology was extremely useful in facilitating the discursive and collaborative construction of innovative alternative narratives and visions for how basic household practices can be performed in different ways in the future. We believe that to pursue these lines of inquiry, or indeed a broader inquiry into the potential of a combined narrative/SPT approach, could yield useful results for the achievement of sustainable practices in the built environment.

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TN 4 – How do material objects transcend the boundaries between professional and domestic practices?

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Introduction

Sustainability-oriented interventions in the built environment tend to involve interactions between many different practices. When aimed at the domestic sector, these interactions between professional and domestic practices play an important role in influencing the potential success of these interventions. A range of approaches has been developed that yield insights into organizational and domestic practices, and the “everydayness” within and between these (e.g. Wenger, 2000; Lamont and Molnár, 2002; Nicolini, 2009; Janda and Killip, 2010; Hargreaves, 2011; Nicolini *et al.*, 2012; Karvonen, 2013). From these earlier studies, the role of objects in and across practices emerges as central to understanding (aspects of) the *connection* between professional and domestic practices.

This Thinking Note explores this role further, using the example of LED lighting – an iconic example of a sustainability-oriented intervention in the built environment. A widely acknowledged problem with this kind of intervention, which relies on technical efficiency improvements as a means to reduce the environmental impact of consumption, is the phenomenon of rebound effects. In spite of improved energy efficiency of lighting technology, energy consumption for the use of light has been shown to be increasing due to an increased consumption of light (e.g. Herring and Roy, 2007; Evans *et al.*, 2012).

The exploration is structured in the following way. First, a number of central concepts from literature are introduced. Next, we discuss how and to what extent these concepts shed new light on the dynamic relationship between professional and domestic practices in processes of intended change. We explore whether such concepts for approaching relations between professional and domestic practices through objects are helpful with regard to making effective sustainability interventions, and what emerge as central themes for the development of practice-oriented approaches for that purpose.

Concepts for approaching relations between professional and domestic practices

This section distils a number of concepts from the literature that suggest approaching the relation between professional and domestic practices through objects. However, due to limited space we will for the purpose of this Note primarily concentrate on the main concepts proposed by Nicolini *et al.* (2012).

In the context of organization studies, Nicolini (2009) advocates for materiality and objects to play a more central role in practice theory, and argues that more work is needed to conceptualise how practices hang together. Building on these arguments, Nicolini *et al.* (2012) elaborate on the role of objects in relations between (professional) practices, and argue for the advantages and limitations of focusing on objects for understanding these relations. The paper builds on the idea that ‘material technologies and artefacts play a central role in organizing processes’ (p.613). This idea has become a ‘characterizing trait of contemporary social studies of technology, with authors such as Latour arguing that the stability of human social orders beyond particular contexts of action can only be explained when one allows for the work performed by objects’ (Nicolini *et al.*, 2012, p.613.). However, drawing on Star, Nicolini *et al.* (2012) argue that ‘although the material dimension of objects matters, such materiality derives from action, not from the sense of prefabricated stuff or ‘thing’ness’ (p.613, end). Materiality of objects is therefore only “there” or intelligible when practices are performed. Because ‘practice is a multifaceted and multi-dimensional phenomenon’ (Nicolini 2009, p.1395), Nicolini *et al.* (2012) advocate the use of different kinds of theoretical lenses to understand objects and materiality and their changing role and function over the course of collaboration. The lenses, they suggest, are “boundary objects”, “epistemic objects”, “activity objects” and “material infrastructures” (for further definition, see Nicolini *et al.*, 2012).

Similarly, Wenger (2000) discusses boundaries between “communities of practice”, which is useful to relate to Nicolini *et al.*’s focus on collaboration between different actor groups because it also refers to the role of objects. Wenger (2000, p.233) argues that ‘At the boundaries [of communities of practice], competence and experience tend to diverge: a boundary interaction is usually an experience of being

exposed to a foreign competence [...]. If experience and competence are too disconnected, if the distance is too great, not much learning is likely to take place either'. Whilst it would be an over-simplification to suggest that "the professional" and "the domestic" are, in themselves, communities of practice, Wenger's application of the idea boundary objects (artefacts, discourses, processes) operating at the boundaries between distinct practices clearly resonates with suggestions made by Nicolini.

Consequently, meetings and dynamics between professional (organizational) and domestic (everyday) practices may be captured if one looks at what happens at the boundaries of these practices, and how knowledge, use, competences and meanings are shared, mediated and negotiated by approaching objects through a range of lenses. Boundary objects – those that are recognized across practices, but perceived and related to in different ways within them (Star and Greisemer, 1989) – seem to form a particularly important concept, but we will also explore the relations through "epistemic objects", "activity objects" and "material infrastructure", which are elaborately introduced in Nicolini *et al.* (2012).

The example of LED lighting

This section will briefly explore the advantages and limitations of centralizing objects in discussing relations between professional and domestic practices, by taking the object of the LED light bulb as an empirical example and using the conceptual lenses suggested in the literature, which we have briefly presented above. Together with energy labels and the ban of incandescent bulbs, the LED light bulb has taken centre stage in the European policy approach to sustainable consumption and production, involving efforts to improve energy and environmental product performance and to foster uptake by consumers.

An incipient investigation reveals that domestic (LED) lamps play a role in many different practices, including professional practices of R&D, design and installation, policy making, environmental campaigns, sales and recycling and practically all domestic practices. From this wide range of practices, it turned out to be very difficult to identify distinct sets of professional and domestic practices to explore relations between. Even in the light of a particular objective such as reducing energy consumption for domestic lighting, a wide variety of more and less directly related professional and domestic practices come to the fore, such as publishing and reading, legislation and voting, shopping and packaging design to name a few. For the sake of this Thinking Note, however, we choose to go deeper into relations between professional interior design and domestic practices for making a "good" home. This choice was made because changing ideas of what a "good" home is like seem to have a direct relation to increases in the consumption of light. For discussions of complex relations between practices we refer to the Thinking Note on Systems of Practice.

LED lamps as objects play a role both in practices of interior designers and domestic practices of making a home. It is ambiguous, however, to what extent the light bulb, or even light, acts as some kind of material boundary object between them. They may form part of each, but play a lead role in neither. It is therefore interesting to look further into how lighting is negotiated across these practices through doings and sayings, for example by looking at the boundaries of (communities of) practices, and where practitioners "meet". One of the ways in which interior designers and home-making may "meet" is through stylised photos of designer's projects in magazines and catalogues. Here, lighting is part of the "made" home. It may be more insightful to use these objects as the way through which our practices are related, and look at them through the different lenses selected earlier.

Exploring the role of such photos as *boundary objects* would imply considering their multiple interpretations and studying how they are translated into actual interiors and in particular, their lighting patterns. It might then be relevant to look into the texts accompanying them, the carrier's context they are received in, and ask questions about what forms of interior design and types of homes they render as inappropriate. Viewing photos of interior designs as *epistemic objects* further seems like an interesting exercise. The 'deep emotional holding power' (Nicolini *et al.*, 2012, p.614) ascribed to them may imply an important role for them in shaping domestic interiors. Such photos however, do not fit the idea of *activity objects*, because they are too concrete to be seen as 'emergent, fragmented and contradictory' (for further elaboration, see Nicolini *et al.*, 2012, p.614). Their underlying ideas of a "good home" might form such an object though and be studied through this lens. Finally, thinking about the *material infrastructures* involved in the relation between professional and domestic interior design practices highlights the role of the media through which pictures of 'good' homes reach householders.

In concluding, changes in ideas of what a “good” home are like – and the appropriate lighting patterns that form part of this – are formed within communities of professional interior designers. Their ideas reach and engage with domestic practices of homemaking through stylised photos of interiors and their accompanying texts, in a variety of media. When aiming to reduce domestic energy consumption for lighting, it may thus be argued that these particular ‘meeting points’ might be an effective place for intervention. Whether it is the most effective place – this set of practices was selected relatively randomly from a wide range – and what such interventions might look like remains open.

Final thoughts

To conclude, in this Thinking Note we have picked up on the suggestion of Nicolini *et al.* (2012) to combine practice theory with a number of additional concepts to shed new light on relations between (professional and domestic) practices, and to centralise objects as bridges between separate contexts of action. Our brief illustrative presentation on LED light shows that such an exercise can highlight so far underexplored opportunities for intervention, but also that it has clear limitations. Any material object plays a role in a plethora of related practices and so far, there is little guidance on making a useful selection within these. It also became clear that changing your focal object may be necessary when going into depth on a particular relation. Which material objects should be centralised? In this regard, care has to be taken to prevent these objects to become topics of study in isolation. Objects obtain their meaning and role only when integrated into performances and Nicolini *et al.* (2012) highlight that object boundaries can differ, depending on what role the object plays, and when it plays that role. Verbeek’s (2006) elaboration on Akrich’s (1992) concept of scripts and how material artefacts inhibit and invite certain actions and interpretations might be helpful here.

Finally, returning to Wenger’s discussion of boundaries raises questions of how objects facilitate knowledge exchange between relatively separate communities of practice and what role they play in the processes of learning. In this regard, a focus on objects may be supplemented with an analysis of “brokers” (people who may introduce aspects of one practice into another) by Wenger (2000). Within the built environment, the movement of boundary objects between the professional and domestic is often facilitated by such brokers, for example, the intermediaries highlighted by Janda and Killip (2010). One example of this is interior designers and sales assistants that sell lighting products along with the practice and ideals of ‘home’ that they have come to represent. Thus, one suggestion to extend the current discussion of boundary objects would be to consider the brokers tasked with facilitating these transitions.

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TN 5 – Can ‘systems of practice’ help to analyse wide-scale socio-technical change?

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This Thinking Note explores the emerging concept of ‘systems of practice’ (SoP) as an approach to help understand wide-scale socio-technical change. Specifically, the Note: (i) discusses how the concept of SoP has merit for analysing processes of change (and stability); (ii) considers the methodological challenges associated with empirical research framed by the concept; and (iii) explores the applied implications of SoP for policy interventions and attempts to encourage broad, lasting socio-technical change for sustainability.

As noted by Watson (2012), the concept of SoP was developed partly in response to critiques levied at theories of social practice (SPT). These included firstly, SPT’s empirical focus on single practices being performed in situated locations, whether at home, in the office boardroom, or on a construction site. The adequacy of SPTs to account for, and enable interrogation of, broad socio-technical patterns has therefore been questioned (e.g. Brand, 2010). Secondly, claims have been made that SPT conceptualisations focus on stable socio-material phenomena and overlook change processes (e.g. Geels, 2011). As we discuss, the SoP concept responds to these two criticisms by shifting empirical focus away from isolated practices and giving precedence to practice dynamics.

Additional concerns relating to application of SPT purport that practices are merely abstract theoretical constructs that have limited relevance in the real world, or alternatively hold that, when it comes to interventions in social life, practices offer little that is new. In response, scholars have begun to consider how SPT can help to analyse and attempt to steer societal transformations towards sustainability (e.g. Watson, 2012; Shove *et al.*, 2012; Shove and Walker, 2010; Spaargaren, 2011; Spurling *et al.*, 2013). The concept of SoP has consequently been advocated as a way to analyse interconnections and overlaps between practices, and a means to better understand how governing practices are implicated in the reproduction, reinforcement and transformation of social life.

Whilst SoP have much interesting potential, the concept requires refinement. Further, research on SoP currently remains in the realms of theory rather than empirical analysis. This Thinking Note seeks to provide useful responses to these two challenges.

What explanations of change do SoP offer?

Convincing arguments have been made for the adoption of a SoP approach as a means to research socio-technical change and to help better understand how, and the extent to which, transformations to sustainability can be governed. Whilst some research has suggested that there is potential to understand systemic change by examining points of intersection between practice theory and the multi-level perspective (MLP) (Hargreaves *et al.*, 2013), we argue that SoP alone competently accounts for and can explain socio-technical systemic change, and that combining these different theories ‘muddies the waters’, not least because SoP advocates a flat, as opposed to hierarchical, ontology. As such, we adopt Watson’s definition of a system of practice (below). This definition contends that SoP hold promise for identifying points of intervention that might create positive momentum in recruitment to desirable, or defection from undesirable, practices respectively (Shove *et al.*, 2012, p.63; Watson, 2012, p.493);

‘Practices (and therefore what people do) are partly constituted by the socio-technical systems of which they are a part; and those socio-technical systems are constituted and sustained by the continued performance of the practices which comprise them...Changes in socio-technical systems only happen if the practices which embed those systems in the routines and rhythms of life change; and if those practices change, then so will the socio-technical system... [As such] any socio-technical transition has to be a transition in practices’ (Watson, 2012, p.488-489).

Methodological considerations associated with SoP

In order to learn about SoP, their dynamics, and their implications for interventions for sustainability, certain kinds ‘of data and styles of enquiry are required’ (Shove *et al.*, 2012). Whilst not attempting to be exhaustive, here we make suggestions as to how SPT research can move beyond a reliance on qualitative,

small-scale studies that focus on the ‘lifecycles’ of specific practices (Pullinger *et al.*, 2013, p.8-9) to explore interactions between multiple practices and elements. We draw on examples to demonstrate how such research is already underway. Studying practice links and overlaps, can enable identification of different underlying SoP that can then be explored in more detail (e.g. via comparative cases). Studying the extent, strength, direction and density of connections between practices highlights opportunities to steer practices and SoP in more sustainable directions. Methodological approaches might therefore include studying:

(i) *Practice bundles/complexes and their inter-connections*: Research should seek to understand the systemic relations between practices, and bundles of practices. Research approaches might identify a target practice that can act as an entry-point to explore connections, or might focus on a particular locus of practice intersection. For instance, Hargreaves *et al.* (2013) studied a local food co-operative and analysed the interrelations occurring between cooking, shopping and food-growing practices.

(ii) *Changing dynamics of practice*: Attention to processes occurring within SoP can enable exploration of the emergent properties of complex practice systems, and the role of positive feedback effects in creating path dependency (Walker, 2012). Whilst this is a complex area, life-course graphs, time-use data and oral histories have been employed to study how practices-as-entities grow/decline in popularity over time. Such approaches might be expanded from single practices, to make SoP dynamics the analytic focus.

(iii) *Variety in practice composition and performance*: This aspect of SoP could be studied through in-depth case-study research. For instance, part of Macrorie’s PhD research looks at the diverse ways in which tenants of a low-carbon housing development maintain their domestic heat comfort having moved from traditionally ‘thermally leaky’ houses. Widening the focus from occupants’ experiences, the research also considers how construction practices and housing policy-making practices (that form part of the SoP in question) change over time. Survey-based research (e.g. Pullinger *et al.*, 2013) and analysis of larger data sets (e.g. Anderson, 2011), offer alternative ways to reveal variety in practice at varying geographic scales.

(iv) *Geographically dispersed practices*: International comparisons of the timings and dynamics of practice performance can provide insight on the circuits of reproduction at play in SoP. A number of studies have explored this area. For instance, research has looked at the trajectories of reading practices across multiple countries (Southerton *et al.*, 2012), and how bathing practices and water consumption varied between Japan, India and the Netherlands (Kuijjer, 2014).

(v) *Detection of trends*: If practice research aims to better understand systemic socio-technical change capable of influencing many, or all, domains of daily life, then analysis should include attempts to detect signs of large-scale changes or movements, and to identify distinctly shifting practices (e.g. increased dependency on energy-related services). This calls for cross-sectoral analysis (Shove *et al.*, 2012, p.163).

What do SoP mean for attempts to encourage wide-scale and lasting socio-technical change?

There is much to say on this topic. Given limited space we focus on three points, which in our opinion offer promising insights for those concerned with promoting wide-scale and lasting socio-technical change.

(a) SoP highlights how resource intensive patterns of practice are produced and held in place by multiple, and sometimes seemingly unrelated, infrastructures, institutions and policy domains. For example, understanding why the energy demands of commercial office work have increased in recent years, might be concerned less with the practices of influential individuals, and more about understanding the broader dynamics of SoP in which practitioners are caught (e.g. Falconbridge and Connaughton³). Such analysis can demonstrate how technologies, infrastructures and organisations (e.g. facilities managers, manufacturers, developers, standards bodies) are implicated in more energy-intensive working trends.

(b) SoP draws attention to complexity, and highlights that practices are related to one another in ways that go beyond common-sense understandings. These connections help to identify previously obscured ways of intervening in practice, and also alert us to the fact that interventions in everyday life will frequently have unanticipated consequences. Given this, there is scope to attend to ways in which interventions generate reactions, interactions and resistances across the practice system. This is methodologically challenging, but the approaches outlined above (particularly i and ii) offer ways forward.

(c) SoP have histories. That is to say that the relationships between practices that exist in the world today were different in the past, and will change again in the future. Some aspects of these pasts have

³ <http://www.demand.ac.uk/research-themes/theme-3-managing-infrastructures-of-supply-and-demand/3-2-negotiating-needs-and-expectations-in-commercial-buildings/>

obdurate qualities (Hommels, 2005). Building standards and regulations are one example of this phenomenon (though other examples include infrastructures that are the product of redundant standards or policy legislation that has association to a different time and place). Because of these obdurate qualities interventions can never be considered as ‘one-offs’, but rather they are part of a dynamic world that is always, in part, shaped by previous initiatives and knowledge. A recent example can be found in the Code for Sustainable Homes (CSH) (DCLG, 2010). There was no discussion about room size (which has energy implications) when the CSH was developed, as this had been set out in building regulations already in existence. We can see then that, what is, and is not, viewed as a plausible site of practice intervention in the present is, in part, framed by previous modes of understanding and ‘ways of doing’.

Final thoughts: Does the concept of SoP offer a way forward?

The concept of SoP offers a potential way forward for the future application of SPT in terms of; scaling-up individual practices, analysing practice relations, being open to the unintended consequences of interventions in practice, developing ways to understand wide-scale socio-technical change, and considerations of how practices in one time and place have implications for other times and places. This conceptualisation has implications for methodology, potential sites of intervention, and for governance approaches (i.e. it calls for a more reflexive approach when intervening in practice). Analysing the complex relationships and linkages between practices, their elements, and the ways in which practices bundle together, that shape and can be reinforced by SoP, is undoubtedly a difficult task. However, theorists argue that it is not only possible (Watson, 2012), and able to provide a means of countering critiques of SPT, but also that SoP illuminate new opportunities for analysing and potentially intervening in the *status quo* to encourage environmental and social sustainability.

This Thinking Note has developed the concept of SoP, however many questions and concerns that cannot be answered here remain. For instance, in what ways can SoP be usefully defined (size/ complexity/ interconnections/ duration/ number of carriers)? How are the boundaries of a SoP drawn, at what scale, what is included/omitted and who draws these boundaries? Is it possible for analysis to tackle multiple systems of practice, and if so, how are SoP inter-related within the ‘plenum’ of practice (Schatzki, 2011)? Are there particular conceptual tools or methods that might foreground SoP or parts of SoP (for instance, complexes/bundles or ‘ecologies of practice’ (Shove *et al.*, 2012))? Can we ever have a full understanding of the practice system, and does this matter? How can change in a SoP be understood? Finally, can analysis of flows, and ‘sinks’ or ‘stoppages’, linking practices and their systems be undertaken and how useful might knowledge of this ‘connecting medium’ prove?

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TN 6 – The many faces of feedback: Beyond the kWh

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Forms of feedback, whereby individuals can learn about past performance in order to modify future activity, feature both in everyday life and in future visions of ‘smart utopia’ (Strengers, 2013). Within the field of energy, feedback mainly refers to provision of electricity use information to consumers (e.g. In-Home-Displays [IHDs]). Yet energy feedback is only ‘one among many forms of feedback that are integral to everyday practice’ (Strengers, 2013, p.92) and thus energy use itself. Whilst Strengers suggests three modes of feedback (sensation; social; material), in this Note we discuss seven: sensation; social; material; performance; cognition; policy and politics; and theory and research. In Table 1 we present these modes and *some* of the ways they might interact. This table is intended as a thinking exercise to emphasise the interactive multiplicity of feedback, with each cell detailing the relationship between two modes (though we note that inter-mode relationships are rarely limited to just two modes, often working in tandem). Instead of referring to the table explicitly, our following discussion cuts across the points made in the table, with a focus on three themes that are salient to energy feedback: knowledges; temporality; and actors.

Knowledges and energy feedback

Conventional energy feedback approaches provide certain kinds of knowledge for a certain (imagined) consumer – the rational decision-maker, or ‘Resource Man’ (Strengers, 2013). This focuses on knowledge: (1) held by consumers; (2) as an individual attribute; (3) as know-what (facts); (4) that is cognitive/conscious; and (5) that is assumed to drive behaviour in a one-directional, linear, causal fashion. We argue for consideration of more diverse forms and understandings of knowledge:

- Knowledge relevant to energy consumption is not only held by consumers, but by other agents within systems of provision/consumption. For example, knowledge held by materials (e.g. smart controls that learn household routines) and policy-makers (e.g. when they learn from past policies) (Pierson, 1993).
- Knowledge is not only an individual attribute, but a social phenomenon. No act is truly “individual”, with information “fed back” on individual actions being understood relative to wider social practices.
- Knowledge relevant to energy use is not only ‘know-what’ but also ‘know-how’ (practical understanding), with individuals learning new (or reinforcing old) ways of performing practices through experience (see the Thinking Note on Know-how). The accumulation of skills can also produce either inertia or change in policy (Pierson, 1993).
- Knowledge can be cognitive/conscious, but can also be embodied or experiential. Knowledge involved in energy feedback can take the form of sensory experiences (e.g. closing the curtains and feeling less of a draught) (Wilhite and Wallenborn, 2013).
- Rather than regarding knowledge simply as a “driver of behaviour”, knowledge can also be understood as embedded in practices – both emerging from and enacted through performances (as discussed in the Thinking Note on Know-how).

Temporality of feedback

Pantzar and Shove (2005) note that a crucial feature of feedback technologies is that they serve to (re)produce practices by connecting the past, present and future. Feedback offers information about past activities to aid decisions in the present about how to undertake future activities. However, it is clear that far from having a simple and singular temporality, feedback operates across multiple temporal scales and possesses various (ir)regularities and rhythms. For example, Table 1 incorporates forms of feedback that are pervasive and inescapable as well as those that are sporadic and infrequent. Further, it contains forms of feedback that operate: (a) instantaneously and call for rapid behavioural reactions; (b) over delayed time-scales (from minutes/hours to several decades) and that might permit slower, more formal and procedural responses; or (c) more gradually through iterative and cumulative processes. To date, very little research has considered the multiplicity of feedback; for instance, how different feedback temporalities operate in different ways, or how they interact with and feedback to one another. We may speculate, for

Table 1 – Some of the relationships that constitute feedback relevant to domestic energy consumption

	Performance ('Doing')	Sensation ('Feeling')	Cognition ('Thinking')	Materials ('Objects & things')	Social ('Societal standards')	Policy & politics ('Governing rules & actors')	Theory & research ('Explaining & investigating')
Performance	Habit formation, lock-in, learning, self-monitoring (i.e. past actions shape current/future actions).	Sensations arising from past performances affect future performances. <i>E.g. iteratively 'managing' space heating through 'doing' (adjusting thermostat) and 'feeling' (thermal comfort).</i>	Thinking about past performances affects future ones. <i>E.g. through reflecting on information provided by IHDs.</i>	Things are designed for practices; scripting and the agency of products direct everyday life. <i>E.g. washing machine settings define options as "daily"/"Eco".</i>	Standards created and maintained via personal and societal performance, and vice versa. <i>E.g. cleanliness conventions shape how often one launders.</i>	Policy monitors and governs performance, which can help establish new or reinforce existing ways of 'doing'. <i>E.g. roll-out of IHDs → micro-managing resource consumption.</i>	Data collected about performances (<i>e.g. frequency of appliance use</i>). Research methodology used to collect data may influence performance (<i>e.g. household diaries as an intervention in household practice</i>).
Sensation	-	Becoming accustomed to a sensation, conditioning and "tolerance", creating lock-in or ratcheting. <i>E.g. Becoming acclimatised to a warm home.</i>	Sensations → beliefs (<i>e.g. I'm cold, so must be draughty windows</i>), and beliefs → sensations (<i>e.g. open windows for healthy cold air</i>).	Interaction with materials produces sensations, which potentially affects materials' use. <i>E.g. electric blanket gives pleasant warmth, hence used repeatedly.</i>	Norms emerge about desirable sensations, and can affect people's sensations. <i>E.g. Westerner perception that clothes are only clean when laundered in hot water.</i>	Sensations can steer policy priorities, and policies can attempt to govern sensations. <i>E.g. standards such as ASHRAE or Passivhaus are based on the sensation and governance of thermal comfort.</i>	Sensory feedback considered important in some theories which influences the methodology (<i>e.g. sensory ethnography</i>) used and subsequent theory building.
Cognition	-	-	Ways of thinking become self-reinforcing. <i>E.g. heating control myths.</i>	Material interaction produces thoughts, which can affect material use. <i>E.g. feedback from IHD prompts thinking about high energy bills, affecting when and how IHD is then used.</i>	Beliefs about norms affect people's actions (<i>e.g. I believe others use more energy than me, so I don't need to reduce my usage</i>); this in itself creates new norms. Also, communities absorb/disseminate individuals' ways of thinking.	Beliefs affect policy through democratic processes. Policy also sends messages that may shape individual thinking (<i>e.g. pricing can make energy a valuable resource</i>).	Many studies examine beliefs about energy and its use, but widely shared assumptions about energy also guide research. <i>E.g. beliefs that consumers use energy rationally → feedback related interventions.</i>
Materials	-	-	-	The emergence of certain materials can lock us into that and/or complementary materials. <i>E.g. gas central heating reinforces the 'need' for a gas pipeline network, and vice versa.</i>	Norms co-evolve with technological change. <i>E.g. Increasing prevalence of air conditioning in Australia has influenced and been influenced by changes in shared understandings on thermal comfort and ventilation.</i>	Policy governs design and infrastructure (<i>e.g. policy → Building Regulations → zero carbon buildings</i>), and policy is also influenced by existing materials (<i>e.g. old inefficient buildings → UK's Green Deal</i>).	Research can draw on and influence material design and infrastructure (albeit via its policy recommendations). <i>E.g. Behaviour change theories influence design of IHD. Equally, analysis of IHD use may influence theory and research.</i>
Social	-	-	-	-	Norms can be inherently self-reinforcing. Communities act to negotiate and share norms. <i>E.g. conspicuous consumption as a status symbol.</i>	Policy sends messages and can (dis)empower certain groups. Policy is also driven by collective concerns and policy-makers' own norms. <i>E.g. smart meter initiative suggests a means to effectively manage energy use.</i>	Data on norms and communities is gathered, and research can perpetuate or challenge norms. <i>E.g. wording of survey questions can reinforce consumption norms</i>
Policy & politics	-	-	-	-	-	Policies breed policies, either through lock-in and inertia, or learning and backlash. <i>E.g. EU 20:20:20 → UK energy policy → smart meter roll-out.</i>	Various forms of policy/research relationship such as framing, analysis, and evaluation. <i>E.g. policies influence government research funding priorities.</i>
Theory & research	-	-	-	-	-	-	Lock in and inertia in research practice. Learning and building on past research. <i>E.g. meta-analyses of energy feedback studies.</i>

example, about the kinds of responses they lead to (from gut instincts to formal procedures) or about how long-lasting effects might be (from shocks, trends, to paradigm shifts).

One point that is clearer is that there is a dominant focus on ‘real-time’ feedback provided to individuals (at home or work) by IHDs, justified on the basis of individuals needing energy use information as urgently as possible to enable them to make reductions (e.g. feedback via appliance or dwelling energy ratings are too long-term; energy bill feedback is delayed). However, a focus on instantaneous feedback foregrounds particular issues (e.g. wasteful, discretionary, domestic energy) and courses of action (e.g. immediate, small-scale, individualised ‘choices’) whilst other, arguably more significant, feedback loops are ignored.

Feedback’s multiplicity of actors

The predominantly examined feedback loop between information and building occupants centres on one type of (imagined) actor, Resource Man. Yet even within this narrow conceptualization of feedback, it is clear that numerous actors are involved in a multiplicity of (in)direct feedback loops. For example, households collectively interpret and negotiate feedback information (e.g. debate thermostat settings). Feedback mechanisms also ensure households are connected to actors beyond the home; for instance, IHDs feed back energy use to households and energy suppliers, who both use it for different ends. Further, socially, IHDs feed back normative messages on domestic energy management (i.e. monitoring, measuring).

Thus, numerous different actors are involved in various feedback loops at individual and collective levels. This is exacerbated by practices often transcending space, meaning that feedback loops inevitably operate over a variety of spatial scales, and thereby establish interconnections with multiple actors across multiple sites. These different actors tend to be enrolled into different kinds of feedback loops (Table 1) that afford them different degrees of agency to actually effect change over different spatial scales.

In addition, not all the actors involved in feedback simply send/receive feedback. Feedback is not always between one person/group and another, but it can also flow through actors. These intermediaries can act as gatekeepers of feedback (e.g. parliamentary committee reviewing a policy; a family member explaining heating system performance). This raises questions regarding multi-actor relationships, trust, framings and interpretation, and further problematizes the linear, individualistic assumptions of energy feedback policy.

Closing remarks

By emphasising instantaneous behavioural responses undertaken by individuals, we argue that traditional energy feedback approaches provide an illusion of choice and agency, whilst masking a range of other, arguably more important, feedback loops and configurations of actors, such as those we have briefly highlighted in this Note. We contend that current forms of energy feedback create and normalise particular problem-framings, and focuses attention on ‘effects’ rather than ‘causes’. As Spurling (2014) argues, crucial feedback relations between theory, research and policy (e.g. what counts as appropriate questioning; what serves as legitimate evidence; how policies should be evaluated) are ignored as policy interventions remain firmly wedded to particular problem-framings and approaches (e.g. reliance on quantitative energy feedback). As a result, we call for further research – both conceptual and empirical – that seeks to examine how energy feedback is but one part of a wide range of different, yet simultaneous, feedback loops that operate through a range of temporalities and actors. We also advocate deeper discussion on the interconnections between these feedback loops because, whilst Table 1’s thinking exercise may give the impression that the seven modes of feedback are distinct, they are not. Finally, given the centrality of forms of feedback to the ‘smart energy utopia’ (and across future visions of everyday life more broadly), we think it is crucial that policy actors are engaged in discussion about how policy variously ignores or accounts for (and indeed is itself bound up in) the multiple inter-linked feedback loops identified herein.

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TN 7 – Conceptualising codes and standards in the built environment

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Why consider codes and standards?

Codes and standards are a ubiquitous but often overlooked element of the built environment. Imrie and Street (2011, p.2) observe that, 'there is no part of the design and development of the built environment that is untouched by the plethora of rules, regulations, standards, and governance practices, relating to building form and performance'. This might encompass the standardisation of technologies (for example, appliances and whole buildings requiring particular energy performance ratings), but also the practices of those involved in operationalising such codes and standards (for example, building designers and construction intermediaries). These standards apply to safety, health, security, resource consumption, environmental quality and a variety of other issues. The prevalence of codes and standards in this domain makes it important to consider how their role can be more fully conceptualised. To this end, the following discussion independently considers three different theoretical viewpoints: theories of practice, governmentality and Actor-Network Theory. These theoretical perspectives prioritise different themes; illuminating how codified and standardised technologies influence how we interact with the built environment. The tensions and similarities between them are drawn out in the concluding discussion. Positioning three theoretical perspectives together in this way yields valuable insights for future investigations into the role of codes and standards.

Conceptualising codes and standards

Theories of practice:

Several practice proponents acknowledge the significance of 'rules' in shaping practices. Schatzki (2002) identifies explicit rules or 'formulations, principles, precepts and instructions that enjoin, direct or remonstrate people to perform specific actions', governing what and how things should be done (Schatzki, 2002, p.79), codes and standards might be considered as one element of these rules. In making a distinction between: 'explicit rules', and the 'rules of social life', Giddens, (1984, p.21) makes reference to 'techniques or generalisable procedures applied in the enactment/reproduction of social practices'. Rules can be standards, theories and recommendations developed by influential commercial or institutional organisations, which can hold the same status as many laws, becoming the source of new common understandings about appropriate and inappropriate practices (Strengers, 2009). Hence, one way of conceptualising codes and standards in the built environment are as part of a system of policies and regulations that can be said to collectively form a set of 'rules' (Giddens, 1984) which feed into and shape 'regimes of practices'. Through this feed-in process, codes and standards play a significant role in determining the competences and meanings within the practices of professional groups designing for the built environment which in turn shape the material context for domestic practices *within* the built environment. This is not a one-way process; indeed, the writing of codes and standards is a practice. Thus, what is written into codes and standards is shaped by, for instance, social expectations and norms (e.g. rhetoric around sustainability and energy efficiency) of how that practice is performed.

The contextual performance of practices means that the 'one size fits all' approach of many codes and standards is open to appropriation in different ways. Despite this variation, the inadvertent, and wide-reaching impacts of standards has been noted by Shove and Moezzi (2002), who highlight the global transfer of energy-related standards, noting that 'the diffusion of standards ... involves a diffusion of the culturally and historically specific assumptions and conventions embodied in them' (2002, p.276). Thus, whilst practices cannot solely be determined by codes and standards, through this strategy, we may channel practices in certain (not always desirable) directions. More recent work has developed a more 'systemic' take on practices, which seek to account for the way in which specific practices are connected to, and shaped by, both intimately and distantly situated ones (e.g. Watson, 2012; also see Systems of

Practice Thinking Note). This systemic approach allows for a deeper understanding of how one standard or code could ripple through various practices. In particular, acknowledging the way that codes and standards have differing impacts amongst both those tasked with writing, designing and implementing them, and those using standardised technologies.

Governmentality:

In this theoretical perspective codes and standards are conceptualised as part of the notion of ‘technologies of government’ (ToG). According to Dean (1996), a ToG is formed through an assemblage of different techniques of government, technical objects, actors, financial and other resources and sociotechnical forces. In these complex assemblages of heterogeneous mechanisms, machines – as well as texts, codes, timetables and other technical artefacts – can contain programmes for the direction of conduct (Dean, 1996). Furthermore, through this lens, Government employs ‘a variety of techniques and forms of knowledge, that seeks to shape conduct by working through our desires, aspirations, interests and beliefs...’ (Dean, 1999, p.11). Schweber (2013) identifies four ways in which policies and techniques inflect or transform professional understandings and practices: visibilities, knowledge (regimes), techniques and identities. The concept of ‘visibility’ draws attention to the way in which certain issues are rendered visible and given definition (whilst obscuring others). Furthermore, it highlights encouraged (and discouraged) ways of seeing and understanding, and how certain responses are considered ‘acceptable’, all of which might be reflected in codes and standards. For example, a study of engineer’s professional practices found that, despite the engineer having a rich overall engagement with the design, including consideration of material consumption and sustainability, the only topics on which the engineer engaged with his client were those of comfort and safety made ‘visible’ in codes (Chilvers, forthcoming). The governmentality lens also draws attention to ‘knowledge regimes’ – the types of reasoning at play and to the way in which they affect behaviour (Dean, 1999, p.31). These might be technical, commercial, practical, bureaucratic and/or ethical considerations. However, the concepts of ‘knowledge’ and ‘technique’ draw attention to the type of knowledge produced and deployed therein and the mechanisms by which the mode of reasoning is translated into action, and are therefore important.

Actor-Network Theory (ANT):

ANT offers a lens through which to trace the associations between heterogeneous actants within networks. In the built environment, these actants include the rules, standards, human designers and engineers, but also the buildings, tools and technologies that might enter the scenes of building design, construction and use. In the design and production of a new entity, its prospective users are configured (Woolgar, 1991, p.59). In this way, both technologies and texts (that is, manuals, guides and instructions) script their users, or ‘steer user action in certain directions while counteracting it in other directions’ (Jelsma 2003). Importantly, the perceived value of analogies with textual scripts implies that the interaction does not fully determine end-user behaviour, rather: ‘Text moves the actor who is reading it or acting it out, but the text is translated and given meaning by the actor while (s)he is reading it or playing it out’ (Jelsma, 2003, p.106). Indeed, the anticipated actants of these inscriptions (in our case those expected to implement the codes and standards, or live in the houses shaped by them) may subscribe to them, or perform the opposite, a de-inscription (Akrich and Latour, 1992). Reactions are shaped by a great many factors and contesting scripts from the multitude of actants within the built environment, each playing a role in shaping the scene. For example, a heating engineer might be expected to modify heating controls in accordance with Part L of the Building Regulations, however, in the domestic setting, it is actually the building occupant, the arrangement of the existing heating system, and the property itself that script the engineer’s actions. This ANT lens focusses us on a ‘scripted socio-technical landscape’ which makes certain trajectories of action more or less acceptable and achievable (Jelsma, 2003) and of which codes and standards form a part.

Reflections on three theoretical lenses

All of the conceptual schemes and vocabularies reviewed are usefully applied to the study and description of the role of codes and standards. We can observe that all sensitise us, in some way, to the role of codes and standards in the built environment. Here, we see different mechanisms by which some

things are made 'visible', legitimated or made easier over others. In particular, the treatment of technologies is distinct in the three frames. Theories of practice suggest that technologies can only have meaning through the performance of social practices. Meanwhile, similarities can be drawn between Governmentality's treatment of technical artefacts (along with codes and texts) as 'containing programmes for the direction of conduct', and ANT's suggestion that these contain scripts which steer the user in certain directions. Although the notion of following 'scripts' might be interpreted in ways that focus somewhat narrowly on a linear transfer of constraints from designer to user, the ANT lens elaborated herein sensitises us to the much broader landscapes of resistances that are constituted by a range of human, textual and material actants. Foucault's theory of governmentality also offers useful insights, highlighting the way in which certain issues are made 'visible', and rendered acceptable, in the writing of codes and standards. This idea of visibility complements ANT's socio-technical networks offering an understanding of how these are negotiated and translated.

Furthermore, these lenses offer some insights into the wider impacts of codes and standards. Whilst the idea of a 'scripted socio-technical landscape' (as per ANT) might allow us to understand how and why anticipated end users of codes and standards may or may not subscribe to these scripts as intended, this favouring of the 'anticipated end user' might blinker the analyst's awareness of wider influences in the socio-technical landscape. Nevertheless, this is dependent upon how one's network boundaries are drawn. A systems of practice approach could usefully broaden our view to consider the interconnected nature of seemingly 'standalone' practices. If codes and standards are viewed as a part of practices, then we might more deeply understand how these are shaped by and are shaping practices. In contrast, the 'knowledge regimes' highlighted by the governmentality approach underline the constitutive role of reasoning in determining the outcomes of codes and practices.

Whilst insightful, this discussion has not afforded the opportunity to explore certain aspects of codes and standards; for example their production, definitions, and relationship to informal codes and standards (e.g. dress codes). Furthermore, for future analysis, the Note has highlighted the difficulty of picking just one theoretical lens. Instead this choice may be determined by the point of study in the overall role played by codes and standards. It is important that we recognise the ways in which these conceptualisations sensitise, but also limit us if we are to build, and appropriately utilize, the conceptual toolkit we need to develop a better understanding of role played by codes and standards in the built environment.

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TN 8 – Time and practice

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Introduction

Thinking about the relationship between practice and time presents practice theorists with new opportunities for engaging in many of the questions already raised by the PBES Network, such as: How do practices change? What is the relationship between ‘everyday’ and ‘professional’ practices? How do performances of practices situated in time and space come to constitute entities that exist across time and space? Thinking about time and practice is integral to understanding how practices become established, how they are maintained, as well as how they change and perhaps become obsolete. Therefore, this Note aims to demonstrate the fundamental connection and relationship to practice and time in order to show that how this relationship is framed has important implications for our conceptualisations of social practice, for how we employ particular methodologies to study practices, and for the positioning of potential responses to the kinds of questions sketched above. In what follows we give first a brief overview of some different ways of conceptualising and methodologically approaching temporality in social scientific scholarship and then reflect on what temporally oriented inquiry means for the analysis of social practices.

Conceptualising time and practice

First we present a selection of philosophical perspectives, in order to give an all too brief advertisement for the wealth of untapped resources that exist for developing any number of theories of practice and time that might help us answer different kinds of questions in novel and interesting ways.

Throughout the history of philosophy, understandings of time have been thoroughly intertwined with different understandings of human *being*, subjectivity, practical activity, ‘consciousness’, or for our interests, social action / practice. For Aristotle, for example, time was the time of nature, dependent on changes in nature and the cosmos, and external to human categories of understanding. For medieval scholars, time was defined not in relation to the changing of nature, but in relation to an infinite God, creating human temporality as finite and mortal, and therefore the human being as a particular kind of moral agent and subject. For Kant, on the other hand, time was an inner construct, a mental category that allowed phenomena to appear.

Bergson ([1889] 2008), in bringing many of these ideas together, theorised that there were therefore two kinds of time. The first he called ‘spatialised’ time, or clock and calendar time understood as successive moments coming from the future to the present and fading into the past. The second he called ‘duration’ (*la durée*) or ‘flow’, understood as a subjective experience of time where past, present and future ‘things’ are experienced “all at one stroke”. For Bergson then, at the same time a film can be objectively 2 hours long it is also experienced subjectively as long, short, thrilling, boring etc.

We readily encounter this kind of analysis of time both in our everyday lives and within psychological and sociological accounts of the re-production of practices. Thus a particular ‘commonsensical’ view of time, based on assumptions emphasising an individual, subjective observer, and fundamentally an experiencer of time, who exists outside of, but who is also capable of affecting, the objective duration of actions across time, often forms the basis of contemporary conceptualisations of temporality. For example, Southerton (2003) argues that it is possible for practitioners, motivated by subjective experiences of calm and rushed, harried and relaxed temporalities, to employ labour saving technologies such as microwaves, dishwashers etc. in order to manipulate objective time by squeezing domestic practices into short durations, or ‘hot spots’, creating extended ‘cold spots’ of time for relaxation.

Bergsonian inspired analyses such as Southerton’s highlight the fundamental relationship between practice and time and have already been put to good use in environmental policy arenas (e.g. Southerton *et al.*, 2011). However, it should be noted that such conceptualisations only represent the tip of the iceberg of ideas about time that could inform how we think about the spatio-temporal organisation of practices.

Since Bergson, a number of writers have challenged this ‘commonsensical’ view of the subjective and individual experiencer of time (much in the way that theories of practice have sought to de-centre the individual) by re-framing the human subject and thereby necessarily re-conceptualising time. Examples

include Heidegger's re-framing of human subjectivity as *Dasein*: human *being* as inseparable from the world and thus from temporality; Nietzsche's notion of Eternal Return: cyclical time that moves us away from thinking in terms of doers to concentrate on deeds; and Deleuze's inversion of the Bergsonian understanding of sameness and difference: not only does time rely on change, but change itself can be thought of as the one thing that never changes.

So, whilst Schatzki's (2010) development of a Bergsonian inspired account of timespace, that equates performances with 'duration' and entities with 'spatialised' time, provides an analysis of how practices have changed and might change over 'history', it should be clear that further or alternative, carefully developed, ontologies might shift the terms of engagement in responding to further questions that we have encountered so far in our network.

Researching time and practice

In thinking about how we might link philosophical concepts with empirical endeavours, it must be noted that any shift in thinking about time has particular implications for the context of the substantive focus of any empirical research. In this respect, quantitative and qualitative approaches offer different insights into the temporal organisation of practices and dynamic processes of change at different scales of inquiry.

For example, large scale quantitative studies drawing on "big" data, such as historical, longitudinal time-use survey or expenditure data, can be utilised by researchers seeking to capture the "time-traces" of practices-as-entities at an aggregate scale (cf. Browne *et al.*, 2014). Such methods offer tools for representing changes in the 'pulse' or collective socio-temporal rhythms of society *over time*, and have advanced understandings of the ways in which changes in the pace of daily life intersect with wider changes in the direction of global change. However, they are little suited to explorations of subjective and experiential temporalities in practice.

Ethnographic approaches, on the other hand, offer a means of investigating multiple temporalities and different subjective experiences of time through in-depth, qualitative and more holistic methods of inquiry. Auto-ethnography, walking interviews, personal diaries and visual methods such as video, timelines, life-grids and artwork are just some of the approaches that can be drawn on by researchers seeking to understand temporal experience and *performativity* in practice.

Understanding practice-as-performances is one way of accounting for the organisation of practices-as-entities that make up everyday life. However, accessing subjective experiences of multiple temporalities is particularly problematic, as subjects rarely consider temporality in this way. One innovative example that shows that these kinds of accounts are both significant for and able to contribute to the study of the spatio-temporal arrangements of social practices is Morosanu's (2014) work on domestic practices and time. One of the participatory methods that she employed, the 'Five Cups of Tea' activity, which asked participants to self-interview themselves with video, while having a cup of tea, shed light on the multiplicity of temporalities of practice in lived experiences of everyday life. She found that the practice of having a cup of tea created a marked as a time of stillness, during which people put on hold the activities that they were doing, and when they did not check the time. The stillness in these recorded experiences of having a cup of tea at home, in solitude, had self-reflective qualities, enabling people to consider the variety of temporalities that had structured their day.

As this example demonstrates, researchers seeking to explore time and practice need to pay careful attention to the ways in which methodological processes, and the conceptual ideas informing them, shape what kinds of data can be generated, as well as the types of inferences that can be drawn.

Reflections

When thinking about temporal inquiry in practice it is noteworthy that methodological innovations continue to lag behind conceptual ones (Rau and Edmondson, 2013). Often, traditional research methods fall short in terms of their ability to measure dynamic elements that are important for temporal inquiry. Innovative methods are needed to ensure that everyday life, as well as its extensions into energy pasts and futures at various scales, can be represented to the best effect (Butler *et al.*, 2012; Henwood and Shirani, 2012).

The challenge, then, is to open up conversation and debate amongst sustainability researchers on the methodological implications of temporally-orientated inquiry for researching practices in the built

environment. Theoretically, this will require developing, concepts of time and practice together to help us think about the synchronisation and co-ordination of performances of practices in time and space and at the same time, the spatio-temporal organisation of practices and the various degrees of fluidity and flexibility that sustain and underpin dynamic processes of change. Methodologically, it will involve thinking creatively about how we might address the challenges associated with representing the temporal organisation of practices and dynamic processes of change through subjective experiences of practices-as-performances and objective temporalities of practices-as-entities, and perhaps beyond, to multiple temporalities.

One way forward might be to seriously engage with Shove's (2009) suggestion that "practices make time". In this piece Shove imagines a kind of methodological and conceptual toolkit that would be required to understand the spatio-temporal arrangements of practices in everyday life. She presents three 'tools' to investigate different aspects. The first analyses the degree to which a given practice complex requires synchronous societal performance through a Societal Synchronisation Index (SSI), the second get at the social spatio-temporal distribution of practices through a Chart-Atlas of Contemporary Practice (CACP), and the third measures the rate of change in bundles and complexes of practices through a Fossilisation Innovation Transformation Index (FITI).

Accounting for the synchronisation, distribution and fossilisation of systems of practice, from a perspective that practices *make time*, is an ongoing project in the field, but significantly shows that any consideration of social practices cannot ignore that practices fundamentally happen *in* objective time, whilst simultaneously they create and reproduce subjective experiences of temporality. Understanding and potentially thinking beyond this subjective / objective approach to issues of time might well point us to further measures and to further questions for understanding the dynamics of practice and change, perhaps around disruption and stasis, stagnancy and fluidity or design and the everyday. At any rate, we argue that to think about practices is to think about time and that not only should researchers of social practices be aware of this in their own work, but that the question of which concepts of time can be employed to answer certain kinds of research questions, and with what ramifications, is one that those working with theories of practice need to address.

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TN 9 – The role of ‘Communities of Practice’ within the built environment

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Trends in CoP and how the concept could be taken forward

This Thinking Note explores Communities of Practice (CoP) as an approach for understanding why, and how, the built environment, and social life, is interpreted, and engaged with in particular ways (and not others). The concept provides a way to understand how ‘modes of doing’ are generated, evolve, and can fall in/out of favour – with varying consequences for environmental and social sustainability. CoP has potential for analysing how, and why, practitioners (including householders, but also encompassing professional practitioners and influential decision-makers) are recruited to and/or defect from, more (and less) resource-intensive practices. As such, the concept has relevance for the built environment, where CoP are evident at a number of scales; from the individual household, to organisational approaches, nationally agreed design and construction practices, and the spread of internationally-shared cultural practices.

Whilst CoP offers distinct opportunities for attempts to govern environmental sustainability, it has prompted several critiques. Most fundamentally, some critics contend that ‘[t]he appeal of community has tended to obscure the importance of practice’ (Brown and Duguid, 2001, p.203). It is this critique that we address here, by building on synergies between CoP and SPT which we believe deserve greater analysis and application. Other critiques levied at CoP include first, that the concept is increasingly applied with a reductive focus (Amin and Roberts, 2008). Second, claims exist that CoP fail to fully account for power relations operating in practice (e.g. Roberts, 2006). Yet it is clear that how boundaries of a CoP are drawn, who draws them, and what level of interaction constitutes shared-ness, will vary, dependent on practice and the practitioners involved. Additionally ‘...boundaries between communities of practice... are flexible, continuously shifting, porous in nature and difficult to identify’ (Roberts, 2006, p.631). Third, concerns exist that whilst CoP can account for a gradual accumulation of knowledge about ‘ways of doing’ over time, the concept struggles to explain rapid shifts in practice (e.g. Roberts (2006), building on Mutch (2003)).

Acknowledging these limitations and misinterpretations, this Note provides insights into the application of CoP for better understanding practice dynamics, trajectories, performance and artefacts within the built environment. After reviewing the characteristics of CoP and establishing synergies with theories of social practice (SPT), we consider benefits associated with using the concept. Methodological issues are discussed, before we conclude with consideration of future CoP applications within the built environment.

Characteristics of CoP and synergies with SPT

The concept of CoP emerged from anthropological studies by Wenger (1998) and Lave and Wenger (1991). Their performance-based, collective approach to learning provided a distinct contrast to cognitive studies and pedagogical studies of learning. Wenger describes CoP as forming the ‘simplest social unit that has the characteristics of a social learning system’ (Wenger, 2010). CoP help individual practitioners bridge the gap between knowing *what* and knowing *how* (to undertake a task), with reference to the approaches and actions of other members of the community. Definite associations between CoP and theories of social practice (SPT) can be made, as it is only through this collective performance of a practice, that accrued knowledge becomes embodied, and can be ‘carried’ forward as part of modified ‘ways of doing’.

The characteristics of CoP were originally defined by Wenger (1998) as mutual engagement, joint enterprise and shared repertoire. However, CoP can now be defined by three crucial traits: domain, community and practice (Wenger *et al.*, 2002). A CoP has a shared domain of interest and knowledge, with members of sharing a certain competence that distinguishes them from non-members. Within the domain, knowledge and ideas are shared, and relationship building is fostered, to strengthen the notion of community. CoP can be more or less self-conscious; they might take the form of explicit eco-housing meetings designed to share skills for communal living, or might comprise housing construction workers sharing tips and insights for low-carbon builds over regular lunch-breaks. Importantly, within a CoP, core knowledge, accepted frameworks and stories are distributed, maintained and evolve as part of a ‘practice’ – i.e. a commonly understood way of doing (Wenger *et al.*, 2002). Here practice includes the transfer of

tacit knowledge, embodied understandings and shared worldviews by practice performance within a historical and social context (Wenger, 1998). Not only then do CoP offer opportunities for theoretical development of SPT, but an understanding of practice is ‘critical to CoP analysis’ (Duguid, 2005, p.109).

Benefits of CoP and applications of the concept within the built environment

CoP offer a rich, opportunity for theoretical, and applied, development of SPT, because they reveal insights into the relations between practitioners, performances and practices. They provide a key site for practitioners to encounter ‘elements of practice’ – such as norms, images and rules – and to develop their understandings and competences. CoP offer ‘spaces’ within which to explore exchanges between variably skilled practitioners and their carried practice elements. Most SPT fail to investigate the mechanisms of social interaction and knowledge development that result in the recruitment of practitioners to specific forms of practice and practice trajectories. In contrast, CoP bring the practice carrier and their career (including their identities and knowledges) into focus, without reverting to methodological individualism.

Although SPT emphasises the social, collective nature of practices, CoP shed light on what this actually means in terms of everyday ‘doings’, revealing how practices are negotiated through repeated, collective performances. CoP can also help explore novelty in practice, since they offer protected sites and situations within which innovations can emerge and develop. Furthermore, boundaries of CoP (where different CoP meet and overlap, and where CoP encounter mainstream practice) can form exciting arenas for change and creativity. When seeking to promote the uptake and transmission of more sustainable ‘ways of doing’, better understanding processes of situated learning within CoP could provide the means to better understand the dynamics of ‘practice substitution’ – when recruitment to more sustainable practices and defection from less resource intensive practices occurs (or *vice versa*) (Spurling *et al.*, 2013).

The social sciences have drawn on CoP to explore the components and dynamics of shared ‘ways of doing’, in a variety of different built environments, including the private spaces of home, as well as the office, the shopping mall, and the construction site (e.g. Hitchings and Day, 2011; Hitchings, 2013; Tutt *et al.*, 2013). To date, there has been limited focus on understanding the role of CoP in initiating and propagating environmentally sustainable communities (Bradbury and Middlemiss, 2014). There also appears to be great potential for empirical studies that seek to build on synergies between CoP and SPT.

Methodological approaches for researching CoP

Fundamental to the methodological approach we advocate is the need to place ‘practice’ at the centre of our analytical lens, whilst recognising that CoP enable greater consideration of how practice performance is undertaken and by whom. Taking the starting point of a unique practice – be that, everyday ways of achieving heat comfort in an air-conditioned office (Hitchings, 2013), adopting the ‘rules’ of a co-housing scheme, or mastering new principles and methods of building low-carbon homes (Macrorie *et al.*, 2014) – places distinctive elements and ways of performing a practice at the forefront of analysis. Expanding analysis out from the ‘target practice’ to consider how practitioners become recruited to/defect from practice, opens up the potential range of CoP existing across time, across physical geographies, and between mediums (e.g. for instance virtual communities). Whilst acknowledging that CoP themselves evolve and therefore vary in their shape, accessibility and purpose, attempts to delimit and describe CoP would consider questions such as, ‘what is it that makes this particular way of doing distinctive?’ ‘What different forms of this practice exist?’ ‘What does being a member of this community entail?’

Once having identified the practice and community of interest, empirical approaches would aim to better understand the form, trajectory and dynamics of the target CoP, as well as how inter-relations occur with other CoP and mainstream ‘ways of doing’. Researchers might trace how new, or modified, practices and their elements, become more/less distributed through shared and repeated undertakings (for instance, why do resource-intensive assumptions about everyday life increasingly underpin the design of contemporary residential properties?). Attempts could be made to ‘catch’ practices at different stages of stability and flux and in different states of association to one another (Shove *et al.*, 2012 p.158) (for instance, comparisons might be drawn between the development of practical knowledge in variably experienced water-saving residential communities). Questions could be asked around what leads new carriers to be recruited to a community and for existing members to defect, as well as whether opportunities for intervention exist through enhancing, curbing, or modifying such membership processes (for instance, what prompts individuals to engage in collaborative consumption, e.g. joining a car-club?).

Particular attention might be placed at the boundary edges of CoP, where practices might differ from the 'mainstream', and innovations in practice might more commonly occur. As such, opportunities could stem from studying links between isolated CoP and investigating what different CoP can learn from one another or from acting together (for instance, how might Passivhaus developers, co-housing developers, and rammed earth building groups, be able to inform mainstream residential construction?).

Potential applications of the CoP concept

Though the subject of 'practice-based interventions' is complex, we propose that CoP could help inform policy initiatives and practice in the field of the built environment. We suggest the following ideas and questions. (i) Studying the 'changing contours' of specific CoP can help to understand mechanisms involved in defection and recruitment processes and can play a part in encouraging shifts from less to more sustainable forms of practice (Shove *et al.*, 2012 p.160). For example, we can explore how workplace communities shift thermal-comfort practices in less energy-intensive directions by analysing how employee interactions determine what is seen as normal and desirable (Hitchings, 2013). (ii) CoP encourage deeper understanding of transformative and reflexive social learning processes and the tacit ways in which knowledge/competences grow and shared meanings are negotiated. CoP can play a key role in this learning, helping to spread sustainable images, competences, and materials (as well as ways of using them). For example, whilst acknowledging that dominant and environmentally detrimental CoP deserve attention, Bradbury and Middlemiss (2014) suggest CoP in grassroots organisations can build 'skills for sustainability'. (iii) We can also explore the potential for novelty, both within CoP, and at their boundaries or intersections. Which CoP (or intersections) promote sustainable innovations - whether through introducing new elements or providing modified forms of practice - and how can these be supported? We can challenge *status quo* assumptions held by practitioners and communities, by opening unsustainable CoP up to negotiation. (iv) We can also study the density and character of social bonds in CoP (Shove *et al.*, 2012, p.160), and ask: what social relations might enable lower impact ways of life? Links can be strengthened within sustainable CoP and/or we can attempt to establish new CoP for sustainability. Opportunities for a less resource-intensive built environment might also stem from nurturing links between practitioners and forging learning within/amongst communities (e.g. 'sustainability brokering' – Leach *et al.*, 2012; Hitchings, 2013).

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