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Managing professional jurisdiction and domestic energy use

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ABSTRACT

Professionals involved in organizing and undertaking domestic works, such as extensions, maintenance and refurbishment, have an important role in influencing how homes are configured and how occupants live within them. Despite this, the professional identities of these actors, and their impact on domestic energy use, is often overlooked. In response, this paper argues that one useful way of examining their influence is to consider how professional identities shape everyday working practices in relation to clients. Data from two UK interview and observation studies are combined: one with heating installers and the other with architects. The data are analysed using concepts from Abbott's 'system of professions' framework that focuses on how the routine working practices of professional groups are born of how they see themselves and the tasks for which they are responsible. This comparison provides insights into how these two groups manage their professional 'jurisdictions' during their client interactions and what this means for policy-makers and industry representatives hoping to influence their work in pursuit of less carbon-intensive living. It also points to the value of further in-depth studies that explore how the routine management of professional jurisdiction impacts upon domestic energy use in a range of contexts.

KEYWORDS

architects; domestic buildings; domestic heating; energy demand; heating installer; professional roles; professions; socio-technical; space heating; working practices

Introduction

The 2015 Paris agreement set out an ambitious international action plan to limit global warming. Reducing the energy used in buildings is essential for achieving wider emissions-reduction goals. In the UK, buildings accounted for approximately 35% of greenhouse gas emissions in 2015 (CCC, 2016), and 87% of the present housing stock will likely still be in use in 2050 (Boardman, 2007). This makes the retrofit of existing homes a key objective for those hoping to reduce carbon emissions. Despite efforts to improve this housing stock, gaps between the expected and the actual energy consumption of a building after retrofit have been identified. These 'performance gaps' have been attributed to problems with the building fabric and the installed technologies, but also to the practices of building occupants (Bordass & Leaman, 2001). However, it is also important to consider the actors involved in the refurbishment and improvement of existing buildings (Janda & Parag, 2013), whose working practices may serve both to help and to hinder attempts at improving energy performance.

Though it has been suggested that policies seeking to deliver low-carbon buildings often fail to consider the role of those expected to implement them practically (Janda & Parag, 2013; Owen, Mitchell, & Gouldson, 2014), there has been an increasing recognition of the importance of engaging effectively with construction professionals. For example, the UK's Department of Energy and Climate Change's (DECC) Heat Strategy includes a voucher scheme to incentivize training for those installing low-carbon heating systems (DECC, 2013). However, the focus still rests on setting energy-efficiency standards via the building regulations and stipulating codes of practice for technology installation (DECC & BSI, 2012). There is little consideration of the everyday working practices of the professionals that such strategies hope to influence. This is despite the fact that a better understanding of these practices could potentially lead to more effective suggestions about how these groups may be encouraged to support more sustainable home lives in their work.

There is consequently a need to 'unpack the social production of (un)sustainable buildings from design

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through construction to commissioning' (Schiellerup & Gwilliam, 2009, p. 801). In response, this paper investigates the professional identities and client interactions of two key actors who influence energy demand in buildings: architects and heating installers.[1] Although quite distinct in their tasks, both professions take a central role in influencing domestic energy demand, particularly with regard to space heating. The design crafted by the architect can have a major impact on thermal performance through their decisions on orientation, glazing, shading and insulation levels, whilst, in selecting and fitting central heating technologies, the heating installer directly influences the system that consumes the most energy of all household appliances (DECC, 2016, table 3.07). Yet the professional practices of architects and heating installers and how they manage their client interactions has so far been overlooked by policy-makers seeking to influence their practices.

The paper begins with how building professionals have featured in energy research, highlighting their potential influence on domestic energy consumption, before detailing the importance of client interactions within this. Next, how the everyday work of architects and heating installers can shape domestic energy use is elaborated before detailing the two empirical studies on which this paper draws. These involved interviews with these professionals and observations of their working practices. The data produced are then analysed using ideas from Abbott's 'system of professions' (Abbott, 1988) framework. Here the focus is particularly on how professionals' 'jurisdictions' are maintained during routine client interactions. The discussion considers how industry and policy stakeholders might engage with these professional practices and how future social researchers might pay more attention to the everyday working lives of relevant building professionals.

The role of professions in domestic energy consumption

Why professional interactions with clients matter for energy consumption

Building professionals that have a role in influencing domestic energy consumption include those working in the construction, refurbishment and management of buildings (Janda & Parag, 2013). Alongside a series of individual investigations into construction professionals including architects (Fischer & Guy, 2009; Janda, 1999), designers (Zapata-Lancaster & Tweed, 2014), actors across the repair, maintenance and improvement (RMI) industry (Gram-Hanssen, Heidenstrøm, Vittersø, Valdorff Madsen, & Hove Jacobsen, 2016; Killip, 2011; Owen & Mitchell, 2015; Owen et al., 2014) and heating installers (Banks, 2000a, 2000b; DECC, 2014), two special issues of *Building Research & Information* have shed a light on how these actors and their client interactions might have important energy use implications. The first special issue,[2] investigating the 'new professionalism' that may be observed amongst those working in construction (Bordass & Leaman, 2013), suggested that a focus on rules and regulations, alongside a shift from trust to accountability, has undermined the authority of building professionals amongst the public. A recurring suggestion in this was that to achieve more sustainable buildings, construction professionals need to have a common remit in their work. Hartenberger, Lorenz, and Lützkendorf (2013) suggest that a common sustainability goal could help to foster a shared identity amongst them, whilst Hill, Lorenz, Dent, and Lützkendorf (2013) also call for a common ethical framework, which includes sustainability. The second special issue[3] focused on the retrofitting of owner-occupied homes (Gram-Hanssen, 2014). A key finding from one of the papers was that dialogue between experts and householders might help to minimize energy performance gaps in retrofitted properties. This led to the suggestion that experts should include energy information specific to the property when discussing retrofits with householders (Vlasova & Gram-Hanssen, 2014).

Of particular importance is the way in which these professionals can enable the uptake of new technologies and mediate the consumption practices of building occupants (Moss, Medd, Guy, & Marvin, 2009). In the UK, Owen et al. (2014) argue that trades people, including builders, heating engineers, plumbers and electricians, will collaborate, sometimes with the householder, to identify appropriate technology solutions. Studies in other countries have also recognized that professionals provide advice which can influence the future use of new domestic technologies. In both Norway and Denmark, those involved in the sale, installation and maintenance of heat pumps have been identified as sources of 'instructive information' on how to use these devices (Gram-Hanssen et al., 2016; Winther & Wilhite, 2015, p. 602). However, Gram-Hanssen et al. (2016) suggest that the degree of information exchange largely depends on the individual, partly because, for Danish heat-pump installers, this advice provision is not part of any regulatory framework. If, as this evidence suggests, the professional largely determines the type of interaction they have with building occupants, it is important to understand how they go about this.

How professional identity might influence client interactions

Beyond guidelines and regulations, interactions with clients could be effectively influenced through a more subtle appreciation of professional cultures. Janda (1999) interviewed architects and engineers a decade after they participated in an energy-efficiency demonstration project. She found that they worked according to quite distinct knowledge systems, with architects working in 'qualitative, abstract, and subjective' ways, whilst engineers were more 'quantitative, ordered, and absolute' (p. 6). In turn, she suggested that these professions may have different ways of justifying their solutions to clients. Meanwhile, Fischer and Guy (2009, p. 2591) suggested that 'time-pressured' engineers provide standardized responses, while architects strive for bespoke solutions. They note that this potentially makes the translation of regulations into design a highly contested process for these professions. Thus, professionals have distinct cultures that can shape their interpretation of regulations and ways of working. However, research has not yet focused on the routine organization of small-scale domestic works, or looked in a detailed way at how exactly, during these processes, client interactions unfold. With this in mind, architects and heating installers are now considered as two professions who, in their everyday work, deal directly with building occupants in ways that may influence domestic energy consumption.

How architects and heating installers shape domestic energy use

Architects have been recognized as important actors in the transition to low-carbon buildings. However, existing research has largely focused on sustainability assessment tools such as building information modelling (BIM) (Azhar & Brown, 2009; Hepner & Boser, 2006; Kisilewicz, 2007), and on how policy, through legislation and building regulations, has been adopted in architects' work (Fischer & Guy, 2009; Zapata-Poveda, 2012). During interviews, architects identified that increasing regulation has resulted in growing burdens of compliance and complexity, but also opportunities for getting clients to choose 'better' buildings (including increased energy efficiency, for example) (Fischer & Guy, 2009). However, this study did not investigate how architects interact with clients to encourage particular building features. Additionally, Ryghaug and Sørensen (2009) argue that architects' privileging of aesthetics over carbon emissions might act as a significant barrier to energy efficiency in buildings, but do not detail how, amidst this prioritization, architects shape clients' expectations. Further, residential projects with private clients form the largest proportion of work for 'the vast majority' of architectural practices in the UK (RIBA, 2014, p. 1). Despite their client interactions directly influencing the design of homes, architects (particularly those in micro-enterprises) remain underrepresented in the research literature (Murtagh, Roberts, & Hind, 2016).

Heating installers have also been recognized as having an important role in determining the choice and use of central heating technologies. Through a quantitative survey with householders about the installation of condensing boilers, Banks (2000a, 2000b) found that over half left the system choice, make and model to the installer, but that a 'substantial fraction' make these specifications without the installer's input (Banks, 2000b, p. C10). Through focus groups with building occupants about their use of central heating controls, Rathouse and Young (2004, p. 24) identified 'widespread agreement' amongst participants that installers did not have the time to explain properly and that this was 'not really' part of an installer's job. However, a recent randomized control trial of the provision of advice to householders about heating controls identified heating installers as suitable messengers of information about effective operation, suggesting that they are 'seen as competent independent sources of advice' (DECC, 2014, p. 8). Meanwhile, Wade, Shipworth, and Hitchings (2016a) have identified how installers can influence the use of domestic heating systems through the ways in which they draw on certain idealized visions of particular client groups when selecting and explaining heating controls.

Therefore, evidence exists that the interactions between occupants and both architects and heating installers will influence domestic energy consumption. However, there is little knowledge of how these professions' interactions with occupants are shaped by their professional identities during their everyday work. As such, this paper now considers how architects' and heating installers' performance of professional identity during client interactions might influence domestic energy use.

Methods

This paper brings together two research projects investigating how professionals routinely do their work: one on architects and another on heating installers. The data on architects were collected in a small-scale pilot project, whilst those on heating installers come from a wider ethnographic investigation. Aspects of the second study have been reported by Wade et al. (2016a, 2016b) and Wade, Hitchings, and Shipworth (2016). Although of

different scales, both studies involved the qualitative, in-depth examination of everyday working practices. The aim for each was richness of understanding, rather than statistical generalization. In this respect, both studies were adding to a growing body of interpretivist work on building professionals in relation to energy (*e.g.*, Gram-Hanssen et al., 2016; Janda, 1999; Janda & Killip, 2010; Owen et al., 2014). Both studies combined interviews with the observation of client interactions, with the latter proving particularly helpful in identifying fruitful lines of interview questioning about actions which these professionals might otherwise relatively unthinkingly undertake.

Through discussion between the authors, some interesting similarities and differences in how these professions interacted with their clients became evident. Abbott's 'system of professions' (Abbott, 1988) framework was identified as providing concepts useful for the interpretation of these. By unpacking how different professional practices guide occupants' energy practices, this approach contributes to the aims of this special issue, and by investigating the practices of construction professionals, it responds to calls for 'wider examination' of those working in the built environment (Bordass & Leaman, 2013, p. 6). Each project is now detailed, before the paper outlines how ideas from Abbott's framework were used during the analysis.

Investigating heating installers

The method for this ethnographic investigation, conducted between 2012 and 2013, is detailed in full in Wade et al. (2016a). The following account focuses on the aspects of the investigation of most relevance to the installer–client interactions presented in this paper. These insights were captured by shadowing installers in domestic properties on 30 occasions and conducting 20 semi-structured interviews with them. A snowball approach, including building rapport with informants at industry events and training sessions, was used to access potential participants. This approach, which relies in part on self-selection, is likely to have yielded participants who were particularly interested in maintaining and updating their expertise (through attending training sessions), highly regarded or confident in their work. All the research participants were male and had been in the industry for over 10 years. The sample included self-employed installers and employees of microenterprises[4] working primarily in private homes. It also included staff from several medium-sized organizations who had contracts with registered social landlords for the installation and maintenance of heating systems across their housing portfolios. As such, the observations included watching installers interacting with both homeowners and tenants. In this respect, face-to-face communication tended to be limited to initial consultations and final commissioning when the system is set up and its operation is explained to occupants. There were several observations for which the client was not present. The interviews, which lasted between 45 minutes and three hours, were conducted at a site of each participant's choosing; all were audio recorded and transcribed verbatim.

Investigating architects

The smaller architect study has not previously been published and took place between 2015 and 2016. More detail on this study can be found in Murtagh, Roberts, and Hitchings (2016). The initial intention in the study design was to observe meetings between architect and client on eight different projects. However, a number of architects conducted much of their client interaction via e-mail. Thus, the final study comprised observation of a meeting between architect and homeowner on four architects' projects, inspection of the e-mail stream on projects of four different architects and semi-structured interviews with eight architects. Three participants were recruited via personal networks. The remainder came from an e-mail invitation sent to registered architects in the Greater London area. All the architects were either sole practitioners or in micro-firms of up to five employees, and all were selected as having substantial domestic building experience. Of the eight participants, three were female. During recruitment, many architects sought to protect their interactions with clients and were not prepared to grant access to the meeting, citing client privacy or commercial sensitivity as reasons for this choice. Those who agreed to participate were therefore likely to have been more open about and confident in their professional role. There was no evidence that these participants were particularly favourable towards sustainable construction. Data collection centred on the point when the architect presented initial designs to the client,[5] for projects concerned with minor works (particularly RMI) on properties ranging from three-bedroomed semi-detached homes in suburbia to a substantial rural property. The interviews and the observations lasted between one hour and 90 minutes; all were audio recorded and transcribed verbatim.

Approach to analysis: applying a 'systems of professions' framework

Qualitative analysis requires reflexive consideration of the influence of the researcher. In both cases, data

collection was overt, and ethical approval was obtained prior to commencing fieldwork; pseudonyms have been used throughout to protect participants' privacy. With all field notes, audio recordings, photographs and documentation being collected with the participants' knowledge, it is unavoidable that the presence of the researchers may have influenced the data collected. However, both studies were positioned as opportunities to learn about the practices of these professional groups more generally, rather than foregrounding particular aspects of their work, thus limiting bias to how the participants presented themselves.

Abbott's 'system of professions' framework summarizes a profession as an organized occupational group in which experts apply a specific body of knowledge to individual cases, and for which entry is restricted via required training and qualification (Abbott, 1988, p. 8). Within this, different professions have, at particular points in time, a set of socially defined tasks that they lay claim to, control and are bound to, otherwise labelled as their 'jurisdiction'. This jurisdiction can be claimed through formal structures such as education, professional training, recruitment and licensing (which exist for both architects and heating installers in the UK[6]), but it is also done through how professions act. In particular, professions may present themselves in specific ways in order to claim authority and the right to perform work in the way they see fit. Abbott describes these socially recognized tasks for which particular groups are responsible as their 'public jurisdiction'. Analysis commenced by familiarization with the data through reading and rereading, coding each segment and then grouping according to these ideas from Abbott. The data from the heating installer and architect studies were managed and analysed using MaxQDA and NVivo, respectively.

Qualitative approaches have previously been combined with the system of professions framework to investigate building professionals and how their role might need to change to achieve low-carbon refurbishment (Janda & Killip, 2010; Nösperger, Killip, & Janda, 2011). In particular, these authors use Abbott's notion that changing general knowledge (*e.g.*, an increased awareness of climate change) amongst those external to a profession can create 'new' socially legitimate problems to suggest that building professionals' existing roles may need to expand to encompass new competencies (*e.g.*, energy assessment), existing competencies may become the preserve of other professions, and new roles and competencies may be needed (Janda & Killip, 2010). These approaches have also been applied to compare the work of architects and engineers in the US (Janda, 1999). Building on this, and capitalizing on the strengths of our partly observational methods, the following analysis emphasizes professions' interactions with clients, and how public jurisdiction features during three processes of work: diagnosis, inference and treatment.

Maintaining a public jurisdiction through the processes of work

Diagnosis, inference and treatment refer to a profession's claims to classify a problem, to reason about it and to take action on it, respectively (Abbott, 1988). Each of these activities includes either direct interaction with clients or drawing on information collected from them. Diagnosis is a process of building a picture of the client's needs and placing this into the professional knowledge system. At this point the professional may collect evidence that they deem to be relevant for making decisions about the problem. During inference the professional considers the available evidence to arrive at potential solutions; this application of professional knowledge can be obscure, for example, where tacit knowledge is applied. In particular, there is a balance to be struck in performing too little or too much inference: too little may suggest routinization to the client (and thus a lack of sensitivity to their individual case); too much may make the work difficult to follow for an outsider to the profession. In treatment, professions seek to secure support for their suggested solutions, and then act on them. In doing so, they may use strategies of client interaction to encourage the acceptance of their proposed solutions. This may be another delicate process involving both adapting to the client by, for example, using less specialist language and offering tailored advice or taking charge of the situation when appropriate. To provide an initial exploration of the utility of Abbott's framework for understanding professionals' performance of public jurisdiction to clients, the following data have been thematically organized according to how architects and heating installers interact with their clients during the processes of diagnosis, inference and treatment.

Data: how architects and heating installers interact with clients

Demonstrating expertise and discerning client requirements during diagnosis

At interview, both architects and heating installers noted their position as experts. For example, one architect, Peter, said that some clients suggest 'you're the professional, we want you to tell us what to do'. Similarly, several heating installer participants highlighted that clients employed them as 'the experts' and asked for

recommendations. However, the ways in which they performed this expertise during diagnosis was different for each group.

Architects

Architects are tasked with developing design solutions for clients. Diagnosis here was generally based on one meeting with the client and a general inspection of the property. A key objective during this process was to establish rapport. To achieve this some architects positioned themselves as equal to their clients. As David noted, 'I would say that it really is a joint effort. […] I tend to think that it's my design, but I won't be able to get there without the client.' Richard also acknowledged this, stressing that the client is 'the expert in what they want'. Another strategy was to 'read' their clients, making assumptions about their requirements, lifestyles, aspirations and budgets and then acting on them as a way of demonstrating understanding. As Richard noted, 'you don't go and suggest an Ikea kitchen in [a home] where you're actually sitting at a mahogany island bar with a granite worktop'. In this regard, their status as a professional depended on much more than technical competence. It also rested on an ability to ask the right questions, demonstrate their ability to discern a client's lifestyle and desires, and make recommendations appropriate to them.

Heating installers

Similarly, an important element in heating installers' diagnosis is determining the central heating technologies that would best suit the client's needs and the property's requirements. In these processes, the installer would listen to client requests, but their professional performance as an expert also featured strongly. For example, Carl, a self-employed installer, suggested that walking customers through possible solutions during this process was an effective way to demonstrate expertise, and get clients to 'come round' to his recommendations. Installers could be flexible in their design choices depending on the client's requirements, *e.g.*, finding boilers with the dimensions to fit within client-specified locations. However, some would exclusively fit particular brands and products and some would install products without discussion. For example, Amir explained: 'if a customer doesn't ask us about it, then we just stick these things in because we know they need 'em'. However, determining what to install could also include collaboration with the client and developing an understanding of their lifestyle. For example, Matt discussed recommending his preferred heating control, but also noted that 'at the end of the day it's up to the customer'. In line with Abbott's ideas, these heating installers might also demonstrate their expertise by revealing certain elements of their practice to the client. For example, Tim said that during a survey he would take measurements in the property and perform sizing calculations[7] in front of the customer because 'by being open with people they trust you'.

For both groups, the performance of public jurisdiction during diagnosis included a mix of strategies acquired through experience of interacting with clients and solving problems specific to different properties. This included collecting information about clients, but also making assumptions about what they would want. Expertise was also demonstrated through asking the right questions, and making recommendations appropriate to clients' requests and perceived needs. This combination of information and ideas would then feed into the process of inference, where they are combined with specialist knowledge as professionals work towards potential solutions.

Working with both regulations and professional preferences during inference

In inference, architects and heating installers combine information and assumptions about clients with their professional knowledge, including regulatory requirements, for working towards appropriate treatments. However, again they did this in different ways.

Architects

For some architects, designing to meet the building regulations was so entrenched in their professional jurisdiction that it was not deemed necessary to discuss this with clients:

Interviewer:	I noticed [in the observation] that the clients did mention insulation […] is that something that you've already thought about at this stage of the design?
Peter:	No – when they mentioned it I thought about it […] unless they've specifically said, 'we want it to be much better than standard', it would comply with Building Regulations.

In this case, the client raising the topic of insulation could have presented an opportunity to introduce more energy-efficient options; however, for this architect, ensuring compliance with the building regulations was sufficient. This practice was mirrored by Paul, who said, 'I make sure it meets the [building regulations] and I don't see it as being a minimum standard, I see

the minimum requirement as being a good standard'; and Gina, who noted, 'unless a client has specifically said "I really wanted to be super insulated", I would just go with standard, to comply with the Reg[ulations]'. The understanding here was that designing to meet regulations was simply part of the architects' professional jurisdiction. However, not all the architects adopted this approach. For example, Jean explained: 'I did specify over and above what would be required through the Building Regulations because I think that's actually a prudent thing to do.' Either way, the architect, rather than the client, was largely in charge of how regulations featured in inference.

Then, in discussing options, architects would also draw on certain ideas about what was most important to supply. Layout and light were particular features in each observed meeting (almost always in some detail) but, and of especial relevance for energy consumption, little or no consideration was given to heating. For example, David used light to frame his meeting with the client, noting 'the first thing that [he] really wanted to say […] was this question of getting sunlight into the building'. Meanwhile, Richard emphasized how particular design features would help to create enough light:

> we've got a hipped roof, which means it [is] sloping on all sides, with a roof light over the top […] so we can get some daylight deep into this area here.

Their sense of the significance of light may, of course, be shared by their clients. However, if the client had other priorities, these may have been harder to insert into the discussion.

Heating installers

Fitting systems according to the building regulations was regarded as a fundamental part of heating installers' work, and in some cases these were cited to support installers' public jurisdiction. In particular, the regulations were used by some participants to describe how decisions had been made about what to install, and where to fit it. For example, in explaining where he would be fitting thermostatic radiator valves (TRVs), Shane noted that he would not add one in the hallway because 'you can't put a thermostatic rad[iator] valve where the [thermo]stat is going to be, that is Part L of the reg[ulations]'. However, installers noted that the requirements stipulated in the regulations might be a source of contention for clients who could assume that the installer was using it as a 'selling point' to promote additional items for financial gain. For example, whilst surveying a property, Jack explained that he would put TRVs on each of the radiators; he justified this to the client by noting 'a lot of people think that heating installers just add them on for a bit of extra money, but they are recommended by the government now', thus alluding to the best-practice guidance to include these devices and securing his professional position.

Alongside regulations, there were other aspects of the central heating system that provided the focus of installers' client interactions. As noted above, one of these was cost, *e.g.*, installers discussed selecting products to fit within the client's budget. This featured at the end of one survey when Simon relayed his proposed treatment to the occupant, highlighting that there would be a new boiler and new, larger radiators. Rather than providing further technical information, Simon focused on cost ('[you] should see a difference in [your] bills'), but also comfort ('it will be nice and warm for you'). In maintaining his public jurisdiction, Simon adapted to the client, discussing the issues that were of importance to her (she had previously commented on these), and sidestepping the technical detail of what would be installed. For Tim, ideas of cost and comfort provided an opportunity to bring energy efficiency into the conversation. He explained that he would ask 'how much would you like to try to lower your energy bills?', and where the client is amenable, he would introduce zoning[8] and alternative fuels. Finally, installers cited clients' prioritization of aesthetics as an important factor in determining what to install:

> Interviewer: [S]o if they want a new boiler, how do you choose what boiler to quote for?
> Steven: Listen to the customer. […] They may not want […] that particular boiler in that particular space, they may want it in a space that is going to be too small for the boiler that you've got in mind, in which case, you've got to access a slightly smaller boiler.

Identifying technologies that would fit within the existing layout of the property, ensuring that any new additions would not disrupt the décor, and fitting like-for-like systems all featured as heating installers prioritized clients' aesthetic concerns during the process of inference.

Thus, for both architects and heating installers, inference depends on the building regulations, their professional knowledge and the topics they assumed were most significant for the client. However, what is important for the maintenance of public jurisdiction differs for the two professions. The building regulations featured less explicitly in the work of architects, whilst heating installers would refer to these frequently in justifying potential solutions. Within architects' professional preferences the topics of aesthetics and light dominated,

whilst for heating installers the focus lay in ideas of aesthetics, cost and thermal comfort. These distinctions derive from differences in the formal structures of these two professionals (*e.g.*, professional training, licensing and legal requirements), but also embedded ideas about what they are there to provide.

Managing the discussion during treatment

Following the processes of diagnosis and inference, professionals can relay proposed treatments to their clients. These are ideas about what should happen in terms of the work to be carried out and how the property should be lived with thereafter. Both architects and heating installers were found to negotiate according to their own priorities when proposing potential treatments to clients. This was done in subtle ways associated with how different options were discussed.

Architects

This negotiation of potential treatments became apparent during a meeting when the client mentioned underfloor heating, a technology which can offer improved energy performance over radiator systems (CSE, 2012):

> Client: Heating-wise, can you just have underfloor heating […]?
> Peter: […] I think most of the time [it] doesn't really work very well. Erm, to make it work properly you'd need to strip out the existing […]
> Client: […] I mean everything's coming up anyway, isn't it?
> Peter: Because it also depends on how much space, but, you know, it's, it's all achievable […] if it's something that you, […] really want […] let's show it on the drawings and we'll let the builders cost it. Erm, if you need to adjust if because of the costs, then you know you can always go back to radiators.

Whether the underfloor heating system would indeed have been less effective in this case is unclear. However, in Peter's introduction of cost issues, he is reminding the client of his expertise, and potentially deterring them from their suggested solution. For some architects, these discussions included navigating between technical terms and more straightforward language, typically with reference to drawings. For example, when discussing a new roof design, Peter explained:

> the various options […] would be a gable to the back […] it's just like that all the way to the back. You could hip it, which means that it would slope back towards the house and then back that way as well. Or you can have a flat roof with a lantern at the back perhaps.

With this weaving between technical terms and their explanations, it might be suggested that Peter is working to ensure that the client fully understands the proposed options. Thus, architects might relay proposed treatments in ways that encourage the client to select their preferred solutions, and using language that allows the client insight into particular aspects of the professional jurisdiction.

Heating installers

The demonstration of public jurisdiction for heating installers might result in a limited, or more one-sided, exchange of information about the products being fitted in client homes. For example, whilst outlining his proposed treatment, *i.e.*, the positioning of the new central heating system, Sam was talking the client through how the pipework would be installed:

> Sam: […] we can pick up the hot and cold water under there […] we can run the condensate pipe to […] the sink. We'd have to run a gas pipe […] back to your meter.
> Client: Okay, and that's feasible?
> Sam: Yep […] it might be at high level and round, or we might go that way round with it […] above the door and then we can run it into this cupboard and into the meter.
> Client: Right, okay.

This survey was brief; whilst relaying his suggested treatment, Sam maintained the use of technical language ('condensate', 'gas pipe', 'hot and cold') and did not explain these terms. Upon returning to the property for the installation, the client expressed confusion over the pipework and how it would be connected, suggesting that he had not fully understood the suggestions Sam had made. However, other installers would work to explain different aspects of the central heating system during treatment, identifying this explanation as part of their public jurisdiction. In particular, heating installers are required to explain the use of central heating controls during commissioning.[9] In this treatment phase, installers might focus on concepts that they believe the client will understand, such as comfort, or simply use more straightforward terms. For example, Roy said that he would 'explain in very, very layman's terms', suggesting that he sought to use common language in front of the client in order to maintain the acceptability of his recommendations.

These data demonstrate that whilst maintaining their public jurisdiction as experts, architects and heating installers both attempt to provide descriptions of proposed treatments in terms that clients will understand. However, they can also deploy technical language and

claim authority in ways that can influence which features of their work clients are granted access to and able to shape. In this way, the distinct priorities and preferences of these professions is apparent in their different strategies for presenting treatments.

Discussion: implications for policy-makers and industry

One of the aims of this special issue is to understand how different groups associated with design and construction might shape the energy consumed in buildings. With this in mind, this paper has used Abbott's three processes of work: diagnosis, inference and treatment, to explore how architects and heating installers in the UK maintain their public jurisdiction when interacting with their clients. During diagnosis, these professionals collect information about what clients could want, asking appropriate questions but also making assumptions based on previous experience. Inference included drawing on the building regulations and professional knowledge to identify potential solutions that aligned with professional priorities. Finally, proposed treatments were relayed using terms that architects and heating installers believed clients would understand, but also technical language and authority which influenced the topics that were discussed. Despite the suggestion that these professionals are suitably positioned to encourage less consumptive ways of living, energy rarely featured explicitly in their talk with clients. If neither professional nor client raises the topic of energy, then it may not get discussed, whilst clients who are interested might have these matters set aside. This leaves the question of how energy consumption could more fully feature in architects' and heating installers' conversations with clients in future.

Janda and Killip have highlighted that achieving change in the built environment is reliant on 'redefining established skills, work practices, and professions on the ground' (Janda & Killip, 2010, p. 124). Arguably, if seeking to change professional practices, it is essential to start from their existing priorities, concerns and ways of working. The qualitative, observational approaches applied here have revealed some of the quite distinct ways in which architects and heating installers actually maintain their public jurisdiction when interacting with clients. Indeed, as Abbott suggests, 'a profession […] derives social prestige from meeting clients on its own, rather than their own, ground' (Abbott, 1988, p. 47). For architects, this 'ground' includes visually beautiful homes, whilst for heating installers this includes creating a thermally comfortable environment in a cost-effective way. Future work from academics, industry and policy-makers might engage more with these professionals to understand how energy can effectively feature *within* their everyday work and interactions with clients.

In particular, this will require observation of these professionals during the everyday performance of their work, but also engaging with them about what solutions would be appropriate. One such strategy adopted by Bowden et al. (2012) is action research, which was used with plumbers to develop tools to help initiate conversations about saving water within their everyday interactions with clients. This approach, combined with Abbott's stages of work could be useful in identifying appropriate moments for intervention that fit within these professionals' existing practices, and how the topics discussed with clients might be extended beyond aesthetics, comfort and cost. Strategies could include tools to prompt energy talk with clients (for plumbers, this included a short client survey, and tea bags with water consumption information on them). Further, the formal structures of these professions, including initial training, continuing professional development and standards of qualification, might be modified to position energy talk as a fundamental part of practice.

Beyond this consideration of individual professional–client interactions, Abbott (1988) suggests that professions should be considered as part of an interacting and evolving ecology, or as a 'system of professions'. This framework provides a structure through which to consider the position of these groups within a wider system of those collectively making the built environment. Within this system, both architects and heating installers might contribute to the same goal: buildings that consume less energy. In this respect, in considering the energy performance of buildings alongside the interconnected nature of construction work, others have argued for a shared identity (Hartenberger et al., 2013) or ethical framework (Hill et al., 2013) amongst construction professionals. However, for those hoping to take steps towards turning such ambitious visions into a lived reality, it is important to be aware of the specifics of how particular professionals work.

Applying Abbott's ideas in the two empirical contexts studied here highlights the importance of any such strategy being sensitive to the different jurisdictions that construction professionals work within and seek to maintain. Both architects and heating installers are busy and focus on the topics that they prioritize for getting their work done; these do not always include energy. Although the building regulations were common to both professions, these were not referred to in the same way by both groups. In some cases compliance was taken as a given and not discussed with clients; in others this was made explicit and used as a justification for

particular treatments. Indeed, construction professionals can talk about the building regulations in a way that suits their professional jurisdiction, and refer to the parts of most relevance to them (*e.g.*, Part L, Part M). However, the building regulations do act as an overarching frame to which construction professionals refer. As such, basic building regulatory requirements should seek to maximize energy performance standards across all parts, rather than leaving this goal in the realm of 'best practice' or relegated to in specific sections.

Conclusions

Improving the energy efficiency of the existing housing stock is of major importance in achieving national carbon-reduction goals. This paper has demonstrated how, although heating installers and architects are well positioned to act as advocates of energy efficiency, the performance of their public jurisdiction can sometimes stand in the way of them doing so. For architects, being professional was about rapport and aesthetics and not distracting clients with things that got in the way of these. For heating installers, it was about demonstrating their expertise and not troubling clients with apparently unnecessary aspects of the system and its use. The findings pinpoint the challenge for change as potentially jeopardizing previously successful ways of establishing rapport and professional authority. However, they also highlight the need to work with existing jurisdictions to encourage them to evolve in ways that push the promotion of less energy-demanding ways of living in buildings closer to the heart of their practice.

As this special issue highlights, there are many stakeholders other than occupants whose actions should be considered in order to minimize performance gaps in the retrofitting of properties. This paper has provided some insights into the practices of heating installers and architects in the UK as a means of highlighting the value of examining the routine management of public jurisdiction amongst professionals. Other professional groups operating in different contexts will likely see themselves quite differently and have quite different ways of working with their clients to maintain these visions. Rather than adopting a priori assumptions about the extent to which these actors might play a role in domestic energy consumption, it is important to develop deeper understandings of the relationship between how these professionals see themselves and how they work. Future research could adopt the combination of interviewing and observation applied here in order to collect insights on how easy it might be for different professions to incorporate energy saving into their everyday working practices. Combining these methods with the systems-of-professions framework may be one fruitful way of developing research on this topic. This could reveal strategies for engaging with professionals that are all the more effective for having been derived from an attempt to understand how and why they routinely perform their work in the ways that they currently do.

Notes

1. The term 'heating installer' is used throughout to refer to those performing the selection, installation and explanation of domestic central heating systems. These individuals are also known as 'heating engineers' by the UK heating industry, and they possess the relevant qualifications and registration required to perform these tasks.
2. See http://www.tandfonline.com/toc/rbri20/41/1/.
3. See http://www.tandfonline.com/toc/rbri20/42/6/.
4. A microenterprise is defined as 'those employing fewer than 10 persons and whose annual turnover and/or balance sheet does not exceed EUR 2million' (EC, 2003, p. 39).
5. The Royal Institute of British Architects (RIBA) Plan of Work is described as 'the definitive UK model for the building design and construction process' (RIBA, 2013). It defines seven stages before the occupied use of a building. Stage 2 is the concept design. In this stage, preliminary design drawings are prepared. Once agreed, design moves into greater detail in the subsequent developed and technical design stages.
6. In the UK, to use the title 'architect', an individual currently undertakes five years of university training, at least two years of supervised practice and a final professional examination in order to be registered by the Architects Registration Board (ARB). The training is accredited by the RIBA. Ongoing training constituting continuing professional development is required for architects in practices that are RIBA registered. In order to practice legally, heating installers must be listed on the Gas Safe Register. For this, they must first demonstrate their abilities through completing the Nationally Accredited Certification Scheme for Individual Gas Fitting Operatives (ACS). This assessment is completed after initial training (*e.g.* a vocational qualification and apprenticeship), and must be repeated every five years.
7. The correct sizing of both the boiler and radiators is crucial for achieving an efficiently operating system. The basis for sizing calculations is that to achieve a particular temperature within a property the heat output of the system must equal the property's heat loss through the building fabric. Calculating the heat loss requires measuring the room dimensions, inputting standard *U*-vales for building elements and assuming an internal design temperature for each room.
8. Zoning is the provision of multiple independently controlled space heating zones, *e.g.*, the separation of upstairs and downstairs. It is regarded as 'good practice' to zone any property with a total floor area above 150 m^2 (DCLG, 2013, p. 18).

9. The installer's Commissioning Checklist should be completed by someone listed on the Gas Safe Register at the end of the installation. This document asks the heating installer to confirm that 'the operation of the boiler and system controls have been demonstrated to and understood by the customer' (HHIC, 2014).

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