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Citation:

V Morland, K and Breslin, D (2023) Resolving learning paradoxes within a UK new-build housebuilder. *Construction Management and Economics*. pp. 1-21. ISSN 0144-6193 DOI: <https://doi.org/10.1080/01446193.2023.2260909>

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Document Version:

Article (Published Version)

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To cite this article: Kate V Morland & Dermot Breslin (29 Oct 2023): Resolving learning paradoxes within a UK new-build housebuilder, Construction Management and Economics, DOI: [10.1080/01446193.2023.2260909](https://doi.org/10.1080/01446193.2023.2260909)

To link to this article: <https://doi.org/10.1080/01446193.2023.2260909>



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Published online: 29 Oct 2023.



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Resolving learning paradoxes within a UK new-build housebuilder

Kate V Morland^{a,b}  and Dermot Breslin^c 

^aLeeds Sustainability Institute, Leeds Beckett University, Leeds, UK; ^bSheffield School of Architecture, The University of Sheffield, Sheffield, UK; ^cRennes School of Business, Rennes, France

ABSTRACT

The build quality of new UK homes is negatively affected by poor quality management practices during the construction process. By implementing stringent quality management (QM) standards, housebuilders can improve build quality but implementing these organization-wide changes relies on housebuilder staff, designers and sub-contractors learning new working practices. This paper explores the tensions which emerge within housebuilders, as they implement new QM procedures. A longitudinal qualitative case study was conducted, where time was spent with housebuilder staff in three regional offices, two years apart. Methods include participant observation, semi-structured interviews and a review of organizational documentation. The findings highlight several learning paradoxes which arise at different stages of the housebuilding process and show how actors manage (or cope with) these paradoxes through their daily practices. This includes processes of simplifying and applying, improvising and problem-solving and aggregating and analyzing. Whilst these either-or approaches enable staff to resolve the immediate tensions that arise from different organizational processes, they often fail to meet longer-term learning objectives, detrimentally affecting build quality over time. Without structural changes to the way volume housebuilders annually report to both the UK Government and their shareholders, organizations in the UK housebuilding sector face challenges in reconciling different learning processes.

ARTICLE HISTORY

Received 1 September 2020
Accepted 14 September 2023

KEYWORDS

Organizational learning;
paradox theory; housing;
quality management;
defects; routines; time

Introduction

In the UK, as current housing demand exceeds supply (Construction Industry Council 2010), private volume housebuilders have been pressurized and incentivized to build more new homes (Wilson 2021). Between 2012 and 2019, the ten largest UK volume housebuilders increased the number of new homes built annually (GOV.UK 2018) but build quality was negatively affected by poor quality management practices during the construction process and increased the number of defects present (Jingmond and Ågren 2015).

Research suggests that housebuilders can address the problem of poor construction practices and reduce defect rates by implementing robust quality management systems (Love 2002, Davey *et al.* 2006, All Party Parliamentary Group (APPG) for Excellence in the Built Environment 2016) using systematic production processes to remove some uncertainty while increasing product uniformity (Heras-Saizarbitoria and Boiral 2013). Within the sector, construction organizations are adopting and deploying new approaches to improve the

quality of both their products and processes (Eriksson 2019, Staples and Spillane 2019). However, the individual and collective learning process necessary for new quality management procedures to be implemented across a housebuilder's operations highlights the importance of organizational learning (OL) beyond basic feedback within housing projects.

Housebuilders dance to the tune of different and sometimes conflicting institutional and organizational processes. On the one hand, their operations are aligned to following a specific sequence of construction stages that make up each housing project's life cycle. On the other, primacy is given to the annual financial calendar. These asynchronous processes can create conflicting demands and tensions for housing organizations, and as a result, learning paradoxes can arise (Smith and Lewis 2011). There have been several recent calls from organization and management scholars to better understand how actors manage such complex paradoxes through everyday practices and routines (Putnam *et al.* 2016, Cunha and Putnam 2019). Therefore, we set out to answer the research question; *How do actors in the*

CONTACT Kate V Morland  k.morland@leedsbeckett.ac.uk  Leeds Sustainability Institute, Leeds Beckett University, Leeds, UK

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housebuilding sector manage learning paradoxes through their everyday practices? To address this gap, we adopt a practice-based approach (Feldman and Orlikowski 2011) to study the learning processes of quality management (QM) standards within a major UK housebuilder. Drawing from the findings of a 2-year longitudinal qualitative ethnography, we show how various actors manage learning tensions at different stages of the housebuilding process.

Our findings highlight different learning paradoxes at distinct stages of the housing project life cycle, and different approaches used by actors to resolve these tensions. These paradoxes arise due to conflicting demands caused by *within-project* learning, *between-project* learning and *financial calendar deadlines*. First, and at the beginning of the housebuilding cycle, we show how actors are faced with a disconnect between the routines they have accrued from different housing projects, possibly across different organizations, and formal rules and procedures developed through learning processes within the organization at hand. Actors manage this tension through a process of simplifying and applying, as they interpret explicit organizational knowledge and apply this to the complex conditions faced on site. Second, and as the housebuilding project progresses, actors are further subject to the financial calendar through the need to meet specific annual deadlines. The asynchronous nature of financial calendar reporting and project deadlines, thus creates a paradox, which actors address by improvising and problem-solving. Finally, with the closure of the housebuilding project, actors are moved to work on new sites, constraining their ability to reflect on lessons learned and thereby feed into wider project-based learning. Actors seek to resolve this tension through a process of aggregating and analyzing, as they step back and reflect on project experiences, and then share and analyze knowledge across projects.

The findings of this study thus add to our knowledge of how actors manage learning paradoxes through their everyday practices. This research also highlights specific difficulties in resolving learning paradoxes through practices (Smith and Lewis 2011, Cunha and Putnam 2019), showing for example, how such short-term fixes fail to resolve longer-term tensions and paradoxes, with the persistence of repeated defects over time. The paper is structured as follows. First, a brief review of the literature is presented, providing an outline of OL in housebuilding defects and paradoxes. Second, an overview is given of the research methods. The main findings are presented and critically evaluated through the lens of paradoxes

and practice. Finally, conclusions are drawn with implications for policy and practice.

Theoretical background

OL in housebuilding

Housebuilding defects are discrepancies which occur when a specific building part fails to meet the original design requirement or standard specified (Love 2002), and can be caused by the poor workmanship of one or more sub-contractors involved in the housebuilding process (Roy *et al.* 2005, Sandanayake *et al.* 2022). Defects are more likely when the construction configuration is new or unfamiliar to those building it (Davey *et al.* 2006), especially as sub-contractors work across different housing sites (Baiche *et al.* 2006). Reducing defects, therefore, involves both collective and accumulated learning between many disparate groups. OL is a collective, social process as individuals learn within groups (Crossan *et al.* 1999), teams (Edmondson 2002) or between organizational levels (Jones and Macpherson 2006, Zeimers *et al.* 2019). While scholars debate the exact ways in which OL occurs across and between these levels (Crossan *et al.* 1999, Zietsma *et al.* 2002, Lawrence *et al.* 2005, Jones and Macpherson 2006, Berends and Lammers 2010, Akinci and Sadler-Smith 2018, Limba *et al.* 2019), one element is present and inherent to the success or failure of the overall OL process; time. Time creates different points of reference within learning cycles, and when multiple learning processes co-exist across projects, organizations and hierarchal levels, competing tensions and learning paradoxes can emerge.

The notion of time in OL can create tensions as organizations adopt different rhythms when conducting learning activities (Berends and Antonacopoulou (2014). Particularly when “clock time”, where time is perceived quantitatively as the linear passage of homogenous equal units, dominates organizational activities (Crossan *et al.* 2005). In contrast to this, housebuilding follows a repetitive pattern of multiple concurrent cycles, as each house on a site is built following the same specific sequence of construction stages. This perception of time as a “life cycle” is predictable yet the length of each stage is imprecise (Ancona *et al.* 2001). The dominance of annual financial reporting based on clock time deadlines in housebuilding can make it difficult for organizations to learn to reduce defects inherent in the building process. Over time, this reactive problem-solving becomes part of a housebuilder’s working practices (Koch and Schultz 2019). Subsequently, learning between projects is limited, as successes and failures

from a project are rarely collectively reviewed by those involved in a project's life cycle, despite studies highlighting their value (Von Zedtwitz 2002, Way and Bordass 2005, Kululanga and Kuotcha 2008, Opoku and Fortune 2011, Paranagamage *et al.* 2012, Eaton 2014, Shokri-Ghasabeh and Chileshe 2014). In the absence of such formal reviews, housebuilders are left to learn reactively from defects and errors, as when each annual financial reporting event occurs, it conflicts with each housing site's project life cycle (Morland 2020).

OL in housebuilding is further compounded by the involvement of multiple stakeholders in the building process including designers, e.g. architects, landscape architects, engineers and a multitude of building trade based sub-contractors. As a result, hundreds of different individuals and organizations are involved at different stages of a project's lifecycle without overlap, for varying durations, with each player reliant on the other. Working in this way requires a sub-contractor to add to the previous work of others, adding layers to form a finished product. If the work of an earlier sub-contractor is poor or takes more time than originally envisaged, it detrimentally affects the layers that follow. To maintain a steady construction pathway, a sub-contractor is given a limited time to work, and if the workmanship quality is sub-standard, the housebuilder staff have a small window of time in which the sub-contractor can carry out rectification works. In other words, there is little tolerance on site to strive for precision if it is not met first time by a sub-contractor, as the workmanship will be covered up by those that follow. The fragmented and disparate nature of piecemeal sub-contracting, inherent to the construction industry, impedes the implementation of new quality management procedures in housebuilding, resulting in rigid and non-overlapping boundaries between multiple sub-contractors' responsibilities (Roy *et al.* 2005). Consequently, each organization is often only knowledgeable of its own quality standards, and not those of each housebuilder they work for. Therefore, each organization seeks to achieve their own goals throughout a construction project's life cycle, which may or may not tie in with a housebuilder's goals. Ultimately, if there are no points in time during a project's life cycle where designers and sub-contractors verbally communicate as their work overlaps, little learning occurs between them (Styhre *et al.* 2006).

Paradoxes in OL

Paradoxes arise when an individual is simultaneously presented with incompatible or contradictory demands (Smith and Lewis 2011, Jarzabkowski and Lê

2017), and this can relate to conflicts in the roles they perform and the groups they belong to (Jarzabkowski *et al.* 2013). Often performing paradoxes emerge as an individual carries out daily activities (Smith and Lewis 2011), and this is especially the case as they learn. Learning can result in future actions and decisions being incompatible with those of the past, thereby creating learning paradoxes. When coexisting processes of learning and reporting are themselves asynchronous, as in housebuilding, the possibilities for multiple coevolving paradoxes are increased.

Prior research illustrates how actors manage paradoxes through their daily activities (Jarzabkowski *et al.* 2007, Feldman and Orlikowski 2011). El-Sawad *et al.* (2004), for example, explore how managers use rhetoric and "doublethink" to manage belonging tensions between being the loyal manager and grass-roots employee. Jarzabkowski and Lê (2017) show how managers construct and respond to performing paradox through their everyday practice of humour. Actors can moreover develop conventions which reflect how rules are interpreted to manage paradoxes. In this way conventions incorporate specific information about how to align competing sides of the paradox (Kozica and Brandl 2015).

It is unclear, however, how an individual manages tensions arising from multiple learning processes. Learning disrupts the temporal continuum of knowledge within an organization, as the future diverges from the past. In itself, reconciling the tension between past and future is a significant challenge, and past research has shown how actors improvise their practices to address paradoxes between an organization's past strategic plans, practice and knowledge and unimagined futures (Cunha *et al.* 2020). However, do these improvisations resolve underlying learning paradoxes? Furthermore, how does an individual resolve tensions between concurrent learning processes that involve multiple stakeholders? To address these issues, this study sets out to answer the question; *How do actors in the housebuilding sector manage learning paradoxes through their everyday practices?*

Methodology

Research setting

The case organization is a UK-based volume housebuilder. The organization's workforce is apportioned across a number of offices in different geographic regions. Each regional office comprises seven distinctive teams, defined by discipline and role in the overall housebuilding process: Development,

Technical, Commercial, Build, Customer Care, Sales and Finance. Therefore, each housing project's life cycle timeline follows the same production linear sequence: The Development Team is responsible for feasibility and concept design, Technical Team for detailed design and working with designers, Commercial Team for procurement and managing sub-contractor tenders, the Build Team for construction and sub-contractor management. The Sales Team liaises with potential customers and sorts all legal matters, while the Customer Care Team look after customers and resolves their post-occupation concerns. The Finance Team oversees regional office spending. Each Regional Team's activity is overseen by Team Director and collectively supervised by a Regional Managing Director (MD). The Regional MDs report to an Executive Management Team within Head Office. A dedicated Quality Team sits within the Executive Management Team. Their role is to ensure housing site designs comply with statutory requirements, plus develop and implement organization-wide quality management policies to improve build quality, and reduce the risk of defects occurring. A Project Team comprises select staff from Development, Commercial, Technical, Build (which includes a Site Manager), Sales and Customer Care teams plus designers.

Case organization selection was purposive, as the Quality Team had rolled out a new set of QM standards across the organization, intending to reduce defects in new homes, and therefore considered a good exemplar to study learning paradoxes within a housebuilder setting (Eisenhardt and Graebner 2007). How the new three-part QM standards (Figure 1), were learned through day-to-day practices at an operational level was explored across three regional offices (Region 1, 2 and 3).

Firstly, a *Handbook*, illustrating through photographs, the quality standards each sub-contractor had to meet with their work during a project's life cycle. Secondly, a *Local Inspection* regime for Site Managers to follow. As the Housebuilder constructed a house in 12 defined life cycle stages (Table 1), Site Managers and their team were now asked to complete a form to officially sign off specific stages. This was done either on a paper form and kept in the site office (Regions 1 and 3 during Wave 1 of data collection), or digitally on an electronic tablet and saved virtually on the Housebuilder's IT network (Region 2 during Wave 1 and all three regions during Wave 2).

Lastly, a one-off *Quality Team Inspection* of all regions' housing sites during construction was

conducted by a member of the Quality Team to identify where and how the new quality standards were being met on site. Staff responsible for a housing site's design and construction, i.e. Technical Manager and Project Architect, plus Site Manager and Build Team staff were asked by the Quality Team to attend and participate in these inspections. Quality Team Inspections were timed to suit the project's life cycle and not to occur at the housebuilder's financial year-end.

Methods

To understand how actors managed learning paradoxes over time, a longitudinal qualitative approach was adopted (Chia 2002). Given our focus on the everyday actions of individuals, we also adopted a practice perspective (Feldman and Orlikowski 2011, Parmigiani and Howard-Grenville 2011) identifying and tracking the changing routines used by different actors (Pentland and Feldman 2005). This allowed us to observe behavioural changes to a specific routine (the implementation of the new QM standards) between fieldwork visits, and as a result local learning (Argote 2013). In this way, the study focuses on the relationship between the principle of identified routines, the context surrounding their performance, and the formal documents associated with them (Feldman 2000, Feldman and Pentland 2003).

Each regional office was studied in two waves of data gathering over two years (Saldaña 2002). Participants from both the strategic (Head Office) and operational parts of the Housebuilder (Regional Offices) were selected for each wave to provide insight into how the QM standards were being learned (Rubin and Rubin 2005). One or two housing sites were selected from each study region where the QM inspections were being carried out. The number of sites studied depended on whether the same housing site was still under construction during both Wave 1 and Wave 2. If the housing site had finished, the Wave 1 participant, if still employed by the housebuilder, was re-interviewed and observed at their new site.

For six weeks between October 2015 and February 2016 (Wave 1) and a further six weeks between October 2017 and February 2018 (Wave 2), a combination of 41 semi-structured and ethnographic interviews were conducted (Spradley 1979, Qu and Dumay 2011), talking to and shadowing (Czarniawska-Joerges 2007) staff across three of the Housebuilder's regional offices, as well as staff from Head Office. Regional office participants were selected from the Technical, Commercial, Build and

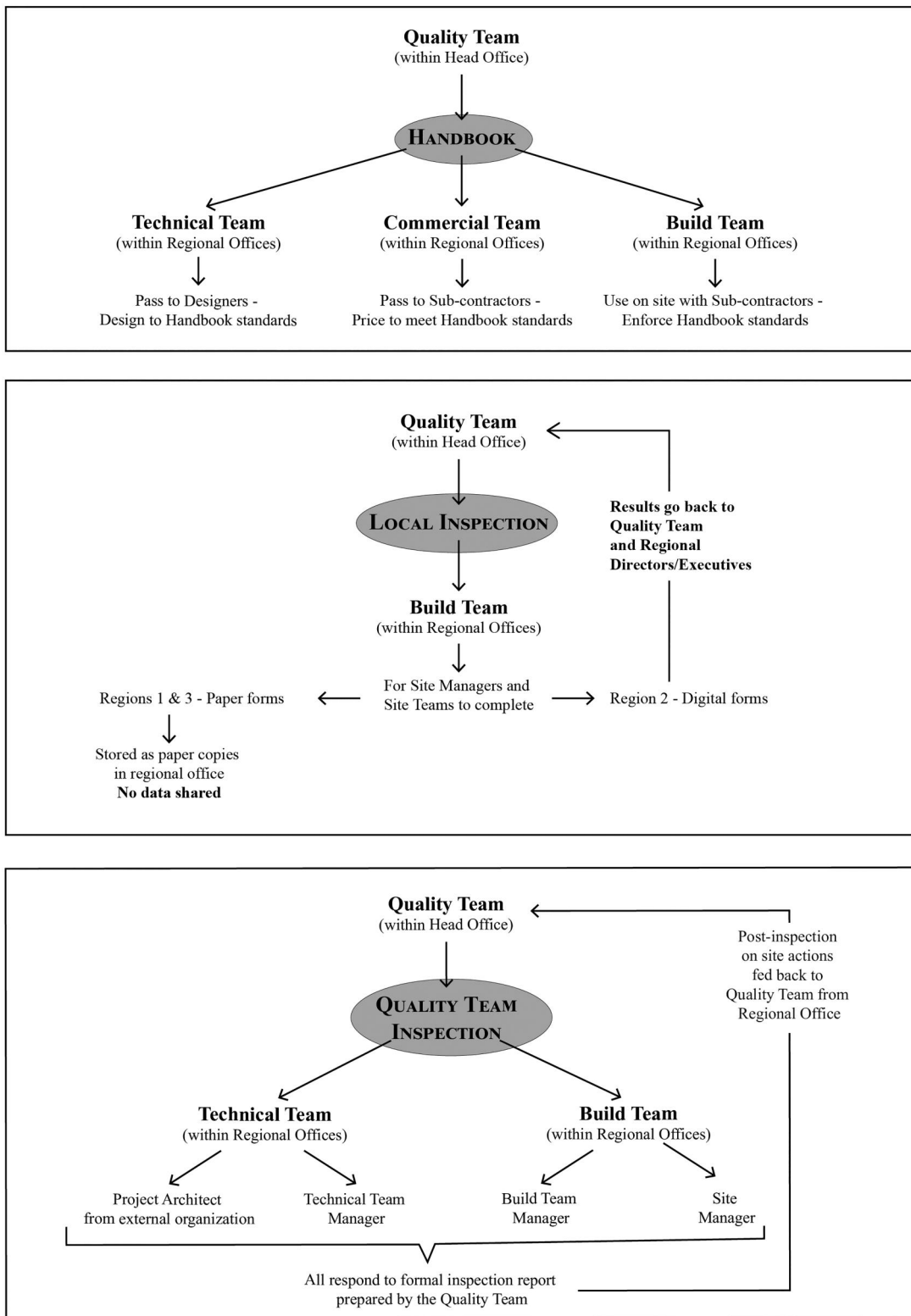


Figure 1. Three parts of the Housebuilder's new quality management routine.

Customer Care Teams as they were working on housing sites. Table 2 shows the breakdown of staff interviewed and observed. Across the two waves of data collection, 18 participants were interviewed, or interviewed and observed, twice. For these interviews, participants were

given a summary of their interview from Wave 1 and asked to talk about what had changed concerning the QM standards across the housebuilder organization and what they had learned. As the lead researcher had a background in the housing industry, they were able to

Table 1. 12 Construction stages of a house and the Local Inspection stage sign offs required in each study region.

Construction stage	Description	Paper forms Wave 1: Regions 1 & 3	Digital tablet Wave 1: Region 2 Wave 2: All 3 regions
1	Foundations		
2	Floor slabs		X
3	Walls		X
4	Roof timbers		
5	Roof tiles	X	X
6	1st Fix plumbing and electrics	X	X
7	Plastering		X
8	2nd Fix plumbing and electrics		X
9	Testing services	X	X
10	Decorate		
11	Finish and clean		X
12	Pass final inspection	X	X

Table 2. Breakdown of staff interviewed and observed during the study.

Region	Team	No of participants (semi-structured interview)		No of participants (semi-structured interview and participant observation)		No of participants (ethnographic interview and participant observation)		Total – whole study
		Wave 1	Wave 2	Wave 1	Wave 2	Wave 1	Wave 2	
1	Technical		<u>2</u>	1		2		3
	Commercial	1		1	<u>1</u>			2
	Build			1		2	<u>3(2)</u>	4
	Customer Care				1			1
								10
2	Technical	1		1	<u>1</u>			2
	Commercial			1	<u>1</u>			1
	Build					6	<u>5(1)</u>	10
	Customer Care		<u>1</u>			1		1
								14
3	Technical			1	<u>2</u>	2		3
	Commercial	1	<u>1</u>					1
	Build			1	<u>2(1)</u>	1	2	5
	Customer Care	1	<u>1</u>					1
								10
	Head office	3	<u>3(2)</u>	2	<u>1</u>	1	<u>1</u>	7
	Number denotes participants spoken to in Wave 1 (2015–16)		Total number of participants – Wave 1					13
	Number in bold underline denotes those spoken to again in Wave 2 (2017–18)		Total number of participants – Waves 1&2					18
			Total number of participants – Wave 2					10
			Total number of participants – Study					41

relate with participants and gain specialist access to views and behaviours, with what (Collins 2004) describes as “interactional expertise”.

Semi-structured interviews were generally conducted in an office environment and lasted between 45 minutes and two hours. However, where site conditions prohibited formal interviews, ethnographic interviews took place instead. These shared “many features with a friendly conversation” (Spradley 1979, p. 9) and were often conducted while walking across housing sites throughout periods of participant observation, using a voice recorder and lapel microphone to capture the conversation. Photographs were also taken during these conversations. Participants were observed during office hours for between one and three days as they carried out their daily work activities on one or more projects. To mitigate the Hawthorne effect

(Chiesa and Hobbs 2008), participant responses were cross-referenced with organizational documentation for inconsistencies. Also, enough time was spent shadowing participants that it was possible to observe them behaving differently from what they described when interviewed. Here, it was possible to investigate any inconsistencies by discussing them with participants through further ethnographic interviews.

While some participant observation took place in a regional office, most days were spent on housing sites, shadowing regional Build Teams’ Site Managers. Interview questions focused on the QM standards, the participant’s familiarity with them, their day-to-day application of the QM standards and their thoughts, plus feelings towards learning to adopt and enforce them.

Alongside this, formal documentation relating to the new QM standards was reviewed (Langley 1989,

Pentland and Feldman 2005). This comprised the new handbook, procedural guidance (describing how and when the new inspections were conducted), completed inspection forms and reports, and minutes from meetings attended while shadowing participants. At the end of each day, field notes of the Researcher's observations were written up, along with a summary of the day's activities. Table 3 shows an overview of the data collected during the study.

Analysis

A bottom-up approach was initially taken in the data analysis, examining the responses of participants across the different teams, sites and projects and grouping these into emergent themes. Coding proceeded in several stages. First, interview transcripts were coded using NVIVO to identify emergent themes in the words of the participants (Corley and Gioia 2004, Gephart 2004), which were then compared between interviews to identify common themes. As the researcher progressed through each interview transcript, the text was examined to both identify occurrences of previously created themes, and to create new themes (Appendix Table A1). By coding the responses of different actors in different teams, comparisons were made across participants and situations. At the same time, field notes were organized around

emergent themes. Following the first-level coding, significant themes were identified, and relationships between these were explored and organized (Charmaz 2006). Taking a temporal bracketing approach (Langley 1999, Langley *et al.* 2013), these relationships centred around three key stages of learning at the beginning, during and end of the project life cycle. These project stages were distinguished by a number of characteristics including; the temporal orientation, knowledge transfer, level of learning and participants (see Table 4).

To make sense of these emergent themes we drew on research across a range of literatures. Through an iterative process, theoretical insight therefore gradually emerged by distilling evidence alongside relevant literature (Locke 2003). Initially, we focused on the notion of OL and time. We thus conceptualized the different stages of learning outlined above through the concepts of time (Ancona *et al.* 2001) and OL (Berends and Antonacopoulou 2014). This process highlighted important tensions at different stages of the project life cycle. However, it failed to shed new light on how these tensions emerged and how actors managed them. We, therefore, expanded our search, and explored the additional concept of paradoxes, from which we developed the notion of actors managing multiple tensions through their everyday practices. In this sense, it can be surmised that our analysis followed a largely abductive approach (Van de Ven 2007).

Table 3. Overview of data collected during the study.

Data type		Wave 1	Wave 2
Audio files (Including semi-structured interviews)	Total time	62 hrs 19 mins	100 hrs 39 mins
Documentation	No.	79	128
Images	No.	46	169
Field notes and reflective journal entries (made electronically in OneNote and WordPress)	No. files	71	40

Table 4. Summary of temporal tensions and the practices to manage tensions.

Temporal tension	From organizational to local learning	Disruption of financial calendar reporting	From local to organizational learning
Cause of temporal tension	Tension caused by intersect of <i>between-project</i> and <i>within-project</i> learning, through the application QM standards to housing projects on site	Tension caused by interruption of project cycle by financial year end, and resultant short-term fixes to meet year-end targets	Tension caused by post-project evaluation, and collective reflecting on lessons learned across projects
Temporal orientation	From past to present	Within the present	From present to future
Practice to manage tension	Simplifying and applying Involved simplifying and interpreting chunks of written instructions, and application to situation on site.	Improvising and problem-solving <i>Ad-hoc</i> , in-the-moment improvisations to resolve immediate problems through short-term fixes.	Aggregating and analyzing Involved sharing and reflecting on collective project experiences, then aggregating and analyzing knowledge across projects.
Knowledge transfer	From explicit, written HR standards to implicit, site knowhow	Using implicit knowhow to improvise and solve in-the-moment problems	From implicit, on-site experience and knowledge to explicit, written guidelines
Level of learning	From global and organizational to local learning (strategic to operational)	Local, on-site and short-term learning through improvisation (operational)	From local and site-based to global and organizational learning (operational to strategic)
Key participants	Site Managers, Housebuilder staff, Designers, Sub-contractors	Project Team, Site Managers, Sub-contractors	Quality Team, Project Team, Site Managers, Technical Team

Findings

Examining the emergent themes from the study's analysis, it was found that different paradoxes arise as QM standards were learned at the beginning, during and end of the housing project life cycle. These three learning paradoxes take place in a specific order as an individual participates in a single project's life cycle; i.e. *as they join a project team* and are not familiar with the housing site or its history; *during the construction process at the housebuilder's financial year-end*, when actions become repetitive through familiarity but disrupted to meet financial reporting targets, and lastly, *at the end of the project*, when it has ended and their attention shifts to another housing site.

From organizational to local learning – simplifying and applying

The first learning paradox arises at the intersection between organizational learning between and across projects, and the local learning of Housebuilder staff and sub-contractors within projects (Figure 2(a)). It was seen that individuals managed this tension through a process of *simplifying and applying* (Table 4), in a context of limited time available for actors, and Site Managers in particular, to learn about their new housing site, and the new QM standards applied across the organization. For instance, in Region 2, where Site

Manager turnover was high, participants expressed concerns that new Site Managers were given little preparation by Regional Executives before starting in post and were expected to meet the Housebuilder's challenging targets shortly after. Even experienced Site Managers had to familiarize themselves with a huge amount of new information early in the construction part of a project's life cycle. As a Region 1 Technical Team member describes:

Site Managers are there to deliver units for [the Housebuilder]. That is [their] core purpose of being there – the details and the technicalities that come along with it. "Can you please read those 5,000 drawings and make sure it happens. But it isn't the same as the last 10 jobs you've done, it's a bespoke project and the [Building] Regulations have changed" ... Every job seems to be a learning curve and it's very onerous.

Consequently, those new to a project, regardless of the region they worked in, had to undergo a steep project-based learning curve in a short space of time.

This process of simplifying and applying was characterized by a number of features. First, conditions on the housing sites visited highlighted how Housebuilder staff relied on implicit and informal verbal communication during projects to convey new information and knowledge between themselves and sub-contractors, rather than reading explicit written instructions. This mode of communication was seen to be simpler, faster

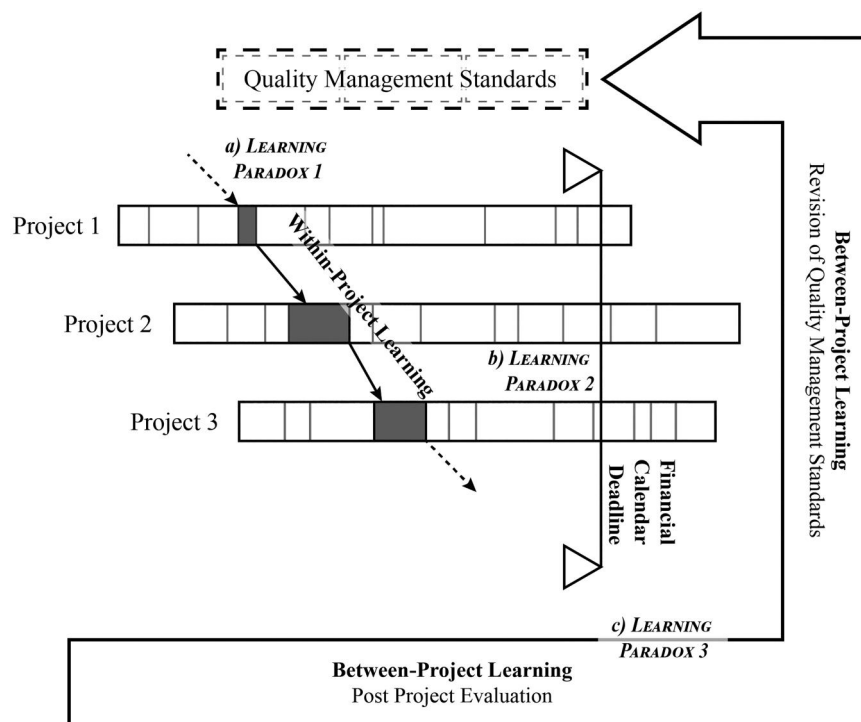


Figure 2. Learning paradoxes within the Housebuilder Project Cycle.

and more applied to the situation-at-hand especially with the arrival of multitude sub-contractors. As the Quality Team expected Housebuilder staff to enforce the new QM standards and hold both designers and sub-contractors to account, staff could not just be aware of the standards, they needed to know them well. Housebuilder staff therefore had to understand both the complex site issues together with the new QM standards in a way that they could confidently communicate to others at one point in a project's life cycle and check that the standards had been followed at a later point in the same project's life cycle.

Simplifying and applying explicit written instructions involved a process of interpretation, which was resource-intensive, especially at the start of an individual's experience of a project's life cycle. To learn the new QM standards, different participant behaviours were observed in each region. During Wave 1 in Region 1, Housebuilder staff relied on the Quality Team to simplify written instructions, and subsequently to tell them how to implement the QM standards, as opposed to Housebuilder staff directly reading and interpreting the Handbook and formal guidance for themselves. This simplification process also involved the chunking or fragmentation of information, as staff appeared to be limited with regards to the number of new instructions they could receive before reaching a saturation point. For example, at the start of a Quality Team Inspection, Project Team staff were attentive and listened while the Quality Team member pointed out and described how to correct a specific construction detail that had been built incorrectly. To improve collective understanding, participants used implicit verbal communication, hand gestures, made reference to the physical detail by pointing parts of it out to others and sketched a revised construction detail on paper. Once everyone understood the point, the inspection continued. However, after an hour, energy and enthusiasm visibly waned, with Project Team members looking tired and becoming distracted by the complexity of project-based activities happening on site. Subsequently, staff disappeared to make phone calls and participants began joking among themselves.

In Region 2, the process of simplification and application was assisted by technology, as staff completed the Local Inspections using newly introduced digital tablets. Some actors struggled with the new technology, and to cope with this, some Site Managers delegated the responsibility to their often younger and more IT-literate Assistant Site Managers, whilst carrying on with site business as usual. In so doing, they split

responsibilities between themselves, for managing the tension between organizational and within-project local learning. However, communicating progress with photographs of completed construction stages to Regional Executives and the Quality Team, placed Site Teams and sub-contractors under additional pressure to perform. As this Region 2 participant describes, the use of the tablet highlighted poor quality but also where Site Teams were not enforcing the quality standards set out in the Handbook:

I took 550 photographs [of an apartment block], I sent it all to the Build Director and he went, "what the f-- is this?" And I went, "somebody told me this was finished", ... That's what I found. I've given the Build and Site Manager two weeks to sort it out.

In Region 3, individuals appeared to dismiss attempts to engage with wider QM standards. Several participants described how they disagreed with parts of the Handbook and disliked the Quality Team interfering with their practices. For example, one Site Manager put a copy of the Handbook on a lectern next to the door in the site office. This was for anyone to "refer to" if they were unsure of the quality level expected.

In summary, whilst some staff did not attempt to manage this temporal tension between *between-project* learning at the organizational level and *within-project* local learning (Figure 2(a)), others acted to simplify written codes and instructions, and then apply these to the complex conditions on site. This simplification process involved the rapid interpretation and chunking of information, which made it more manageable for application to site conditions. Site Managers and Project Team staff further used a range of verbal and visual communication. On the one hand, individuals were expected to be fully cognizant of the rules and procedures contained in the QM standards. On the other, the project included a multitude of staff and sub-contractors who worked across projects, sites and organizations, and who had limited time to learn the full details of the newly introduced routine. Simplification and application through verbal and visual communication helped individuals fast-track this learning process, and interpret the QM standards, albeit partially. As a result, Housebuilder staff often struggled to effectively communicate new QM standards to sub-contractors and designers, or effectively check that the work of others met the standards required.

During Wave 2, the Housebuilder made several changes to their practices, which participants described as beneficial. Across all regions, the Quality Team simplified the QM instructions, and introduced new A5 booklets for each chapter of the Handbook,

which were given to sub-contractors to keep in their back pocket on site. This way, sub-contractors had a simplified visual reference at the coal face when seeking clarification on a construction detail.

In Region 2, the tablet-based Local Inspections were seen as normal and, as one Region 2 participant described, this had resulted in improved quality standards during the construction life cycle of a housing site:

I spent today with [Region 2 Participant H]. It was good to catch up with him again two years later. He feels build quality standards have improved, that the site staff are using their tablets more. He gave me an example of when a Site Team used their tablets all the way through a housing site's construction lifecycle, and they only had about four snagging items at the end. The Site Manager there uses his tablet religiously and as a mobile phone, Researcher fieldnotes (19 January 2018)

Conversely, in Region 3, Site Managers still had reservations about the QM standards. On one housing site, the Site Manager did not know where their Handbook was and had not added the new pages to it following an update. On the same site, Project Team members were discussing how to amend a problematic construction detail without realizing that the issue had been resolved by the Quality Team and illustrated in the Handbook.

The disruption of financial calendar reporting – problem-solving and improvising

When Housebuilder staff became familiar with parts of the new QM standards, they found it challenging to put these into practice during a project's life cycle. This was due to the constant pressures to meet the Housebuilder's financial goals. The Housebuilder was obligated to report the number of completed homes and profit to their Shareholders and the Government on the same specific date every year. Participants referred to this deadline as "year-end". The asynchronous connection between this financial calendar deadline and project life cycles created a second learning paradox (Figure 2(b)). The arrival of year-end disrupted learning cycles, creating a series of short-term "problems" to be fixed, and this resulted in considerable stress for the individuals concerned.

The impact of this conflict was observed across both waves of fieldwork, with participants in each region recounting horror stories of varying severity. Individuals managed this tension through a process of short-term problem-solving and improvisation (Table 4), which often resulted in longer-term complications.

For example, during a Quality Team Inspection in one of the study regions, a mid-construction roof design change caused knock-on problems later on. The roof design was amended to speed up the construction process, with the intention of completing the houses in time so that they could be included in the Housebuilder's overall year-end figures. However, to meet this annual target, the Project Team dismissed organizational procedures, which required staff to follow a formal design change process. They argued that this formal process took too long to complete, given the impending year end. This resulted in the changes only being considered from a Technical, Commercial and Build Team perspective to meet the short-term problems faced by the deadline, as well as changing the duration and interaction of project life cycle stages. When the roofs were inspected by the Quality Team during a Quality Team Inspection, they discussed the potential longer-term defect risks with the Project Team. The most notable issues were the knock-on effects of changing the roof profile, as this detrimentally affected the upstand heights of associated roof lights. It also reduced the amount of insulation within the roof, producing cold spots and increasing the risk of condensation, thus negatively reducing thermal performance. The Quality Team member stated that the Project Team needed to follow the project's natural life cycle when making these types of decisions in future, given the longer-term quality implications of the changes overall, and that in this instance, it would have been better to build out the original design than make spontaneous changes.

This is where it's very easy not to look in every detail and the full depth of the effect that a change will have on all the elements of your construction. You need time to do that... there could be some saving on changing... but what also you need to consider is programme implications, fees, other risks of elements, delivery, material availability. All this. It's not strictly down to money... especially if you've already started. This is where the problem implications play a very fundamental role and this is where you guys, the Build Team, or your Executive, look at that change... and say, "No, I don't want that change now because that is going to have an effect on my programme and my [sub-contractors]".

This example suggests that latent defects could have been built into the homes which would be expensive to rectify if and when they emerge.

Managing the tension caused by year end through problem-solving and improvisation, was therefore seen to be short-term and ad-hoc, often involving local groups of actors, focusing in the present problem-at-

hand (Table 4). For example, during Wave 2, participants from the same region described how a lack of coordination between the gas network and the Housebuilder resulted in the area built for gas meters being unsuitable for their installation. As this was only realized a week before year-end, the Project Team decided to build a new outdoor shed to house the meters, which was built in one day. Consequently, the gas could be connected, and customers could move into their new homes at 6pm (6 hours before year-end).

Participants in the other study regions described the immense pressure they were under to meet ever-increasing construction targets, and that this conflict with project life cycles meant that they were unable to try new ways of working or ask sub-contractors to meet more stringent quality standards. Construction programmes were fixed, however, labour and material availability together with unforeseen events often caused sequencing delays. Therefore, if Housebuilder staff were to meet their year-end targets, and receive a substantial annual bonus on top of their salary, they had to accelerate the construction stage of a project's life cycle. To do this, they asked sub-contractors to truncate one or more of the 12 construction stages used to build a house, work alongside other sub-contractors carrying out work simultaneously to complete multiple construction stages at once, or work out of sequence, which could lead to one sub-contractor going back into a finished house to make good the work of another sub-contractor. In other words, the project life cycle was artificially altered to meet the demands of calendar deadlines, as one Head Office participant alludes to:

We leave things, let's say a bit of a foundation is left out but we just say, "oh we've done 90% of the foundation, yes we will just say that we've done that, move on, keep going through". So, to the outside reader of that report, it looks like everything is fine and then you come close to half-year or year-end... on-site they've got to do a lot of catching up of old foundations, snags and things which they either can't do, which is usually what happens, or they do really badly because they are just rushing through it because they are out of sequence and that's actually where the real big cost comes.

In addition, to reduce possible conflicts, Site Managers and their teams often omitted the new Local Inspection that was introduced. During Wave 1, participants in Regions 1 and 3 viewed the paper forms as superfluous to their workload, so they either rushed to complete them, thus filling them in incorrectly, or not at all. However, this change to project life cycle time went undetected by the Quality Team, as there was no formal way of centrally collecting

data from the forms. Conversely, Site Managers in Region 2 had no choice but to use the digital tablet and complete the forms, as a lack of compliance was visible to both Regional Executives and Head Office. Participants in Region 2 viewed the inspections as additional work, thus exacerbating tensions and adding to their already high stress levels as year-end approached.

During Wave 2, participants in Regions 1 and 2 described the issue highlighted above as occurring less, as they were using the tablets and that it was not possible to progress to the next stage if the last stage was not fully completed. Exceptions to this rule had to be signed off by a Regional Executive, who was then aware of the holdup. These tablets thus acted to control the behaviours of staff, reducing some of the localized, rule breaking activities mentioned above. In Region 3, where tablet uptake had been much lower between Waves 1 and 2, participants described having to rush homes for year-end and moving customers into homes that were not fully finished. This resulted in the Customer Care Team having to placate exceedingly angry customers.

However, Housebuilder staff learned to behave in this way to reduce the tensions caused by financial calendar deadlines falling unpredictably within project life cycles, as they received substantial financial bonuses when house production targets were met. This encouraged and incentivized staff to meet the short-term targets of year-end and deal with the fallout, rather than focus on the longer-term QM standards, as these were not recognized, nor financially rewarded. A Region 2 participant described the consequences of such actions:

If you don't make your numbers of the targets and the profit, your share price goes down and they [Housebuilder Executives and Shareholders] go mad. So, the first site [we visited] ... should not have had people moving into it when it did but they had to get it in for year-end. So, they got the figures, and they got the numbers and they got the profit. But now they are paying tenfold to make it right.

Despite meeting targets in the short term, often the homes rushed for year-end were wrought with defects that cost the Housebuilder significant sums to put right.

In summary, *financial calendar deadlines* produced a second learning paradox as individuals sought to simultaneously meet the requirements of such deadlines, and ensure *within-project* learning became longer-term learning over the project life cycle (Figure 2(b)). As noted, primacy in both waves of fieldwork was given to financial reporting processes, as Housebuilder staff

improvised rules and procedures to resolve the immediate problem at hand. Given the unpredictable intersection between financial calendar deadlines and a project's life cycle, each specific tension was unique, resulting in short-term solutions that had limited longer-term learning potential. Even when using the tablet to improve construction process efficiencies, Housebuilder staff were not always able to carry out their usual working practices within a project's life cycle, *let alone* be able to try something new within a project's timeline, such as enact new QM standards. In these circumstances, individuals either reverted to tried and tested means or substantially changed their normal working practices to get the end result; however, this was often detrimental to the overall level of build quality sought.

From local to organizational learning – aggregating and analyzing

As noted above, processes of *within-project* and *between-project* learning were largely separate within the organization. Whilst the former was experienced by individual Housebuilder staff and sub-contractors, the latter was driven by the organization's Quality Team and Head Office. This created temporal tensions which resurfaced at the end of each project when opportunities arose for post-project evaluation and reflection (Figure 2(c)). However, contrary to the tension experienced at the start of the project cycle, these tensions related to the transfer of local within-project learning to the wider organization (i.e. *between-project* learning). Opportunities for wider learning were limited by multiple resource constraints within the organization. For example, during Wave 1, towards the close of a project, Regional Executives assigned staff to other projects, therefore gradually reducing resource over time without a collective post-project review of multi-disciplinary successes and failures. This suggests the Housebuilder's relentless calendar deadline targets prevented staff from completing a project's life cycle through post-project reflection. In other words, the continual pursuit of the next deadline curtailed opportunities for post-project evaluation, and as a result, *between-project* learning by all staff concerned. This tension promoted an environment where the same mistakes were repeatedly made over time. In a striking contrast to their previous employment posts, one Head Office participant described how, at a strategic level, Executives only focused on future forecasting, as opposed to learning from the past:

Usually, everyone [in other organizations] comments to their neighbour about last month's figures but [this Housebuilder] is right at the extreme of business experience in the way it looks at things ... it's always been forward-thinking ... It's been a bit of a shock to the [Housebuilder] to actually look at what its done ... When you're looking at quality improvement, there's no point looking forwards, you've got to look backwards and see.

Without a set amount of time set aside for reflection at the end of each project cycle, Technical, Commercial and Build Team participants described how, during a project's life cycle, they learned collectively as a small team to informally improve both build quality and efficiency as they went along within each project, but in a way that did not necessarily reflect wider OL through the new QM standards. This was most prevalent on sites with bespoke housetypes, as opposed to standard designs. For example, construction details found challenging to build on the first house were changed on the next and refined on subsequent houses, with the most efficient design further repeated in subsequent phases. This adaptation process over a project's life cycle was reported by participants across all three study regions. Therefore, *within-project* learning slowly compressed a project's life cycle time through increasing efficiencies, in turn helping to reduce tensions caused by *financial calendar deadlines* noted above. However, the changes were rarely formalized, as Technical and Build Team members often agreed to changes informally with sub-contractors on site without asking designers to change their drawings. Consequently, *within-project* learning to improve construction efficiency did not necessarily correspond to *between-project* learning through the new QM standards. Also, learning this way was practice-based and informal, and not captured by the wider housebuilding community. Furthermore, the lack of time allocated to formal feedback at the end of a project's life cycle meant that designers were oblivious to which parts of their designs were challenging to build, so were unable to avoid using them in future. Similarly, the Quality Team was often unaware when individuals on site were unable to construct a standard detail or adhere to new QM standards in reality, so unable to rapidly modify QM standards for future use.

Despite the lack of formal post-project reviews, some individuals did manage this tension between local and wider organizational learning through a process of aggregating and analyzing (Table 4). For example, the Quality Team Inspections presented opportunities for reflection at the project team level

during a project's life cycle. In one study region, when the Technical Manager, Build Team Manager, Site Manager and Project Architect were asked by the Quality Team member whether they would repeat the roof design change, they were able to jointly pause and verbalize collectively what they would do differently next time the situation arose. This process allowed them to step-back from the demands of the day job, reflect on and share their collective experiences. This process was brought about by the Quality Team Inspection granting the Project Team a short reprieve from looming financial calendar deadlines, and with this, the space to learn the QM standards, making it a unique event in a project's life cycle. In other words, the Quality Team acted to decouple the project team from imposed deadlines, as they stepped outside project cycles to aggregate and analyze their collective learning across projects.

Technology was also used to facilitate this process of past-project evaluation. Tablet-based Local Inspections across housing sites informed subsequent improvements to the new Handbook at an organizational level, as the Quality Team and Head Office staff were better able to understand multi-regional site-based activities.

During Wave 2, the Housebuilder's organizational practices had changed but instead of carrying out post-project reviews, each region held meetings where Managers and Executives from each team thoroughly interrogated new projects at the design stage. These meetings highlighted potential inter-team clashes, so they could be mitigated before a site was submitted for planning. Thus, eliminating problems before they became potential defects to manage later. Also, the Quality Team was able to interrogate and analyze the data collated on the tablets together with their Inspections to identify problematic construction stages and details. They used this information to update the Handbook, as well as to conduct tablet training for regional Project Teams whilst carrying out Quality Team Inspections.

In summary, several temporal tensions were present in the studied organization, connected to the disruptive impact of financial deadlines, and processes of localized *within-project* and wider *between-project* learning. These processes were found to follow largely separate paths across both waves of fieldwork. The former was carried out by Project, Technical and Housebuilder staff as they learned throughout each separate project life cycle. The latter was managed by the Quality Team and Head Office staff as they attempted to learn between projects, through the development of the QM standards. Opportunities for an intersection between the two, and related temporal tensions, presented themselves

throughout the project life cycle, especially through Quality Team Inspections (Figure 1). However, during Wave 1 these opportunities were largely missed.

Individuals managed tensions through a number of means as discussed above. When faced with the need to connect organizational knowledge to local learning, actors simplified and applied knowledge, by interpreting chunks of explicit knowledge, and translating this through implicit verbal and non-verbal communication. When dealing with the disruptions of financial deadlines, actors problem-solved and improvised in the moment, focusing on short-term fixes, and at times, breaking rules with negative longer-term consequences. Finally, when attempting to connect local within-project learning to wider organizational processes, actors aggregated and analyzed local experiences. However, as noted above, the space needed for such post-project reflection was severely limited due to time and resource constraints.

Discussion

This study used a longitudinal qualitative ethnography of a UK Housebuilder to answer the question; *How do actors in the housebuilding sector manage learning paradoxes through their everyday practices*. A number of tensions were identified at different stages of the project life cycle related to three processes of; *within-project* learning, *between-project* learning and *financial calendar deadlines*. It was seen that the intersection of these processes created paradoxes, or conflicting demands on the goals of individual actors. In this paper, we show how actors managed these paradoxes through different practices, including; simplifying and applying, improvising and problem-solving, and aggregating and analyzing.

The organization-wide implementation of new QM standards in a private housebuilding context is often assumed to occur at a uniform rate over time, where staff are informed of new procedures to follow, given some training on how to apply them in practice, and that is it, job done, the roll-out is complete. This study shows that in practice the learning process is very different, hindered by the conflicts continuously taking place between different processes occurring at different hierarchical levels. By examining individual and collective learning at the start, middle and end of a project's life cycle, we show how learning paradoxes emerge and how actors attempt to manage resultant tensions. Failure to fully resolve these paradoxes results in new QM standards not being put into practice, with housebuilder staff, sub-contractors and designers unable to collectively connect each other's

actions with consequences to learn about holistically improving build quality. Overall, this means defects continue to occur on future projects. These findings thus point to important consequences of learning paradoxes, and the difficulties associated with managing these through practices.

Managing paradoxes through practice

Prior studies in management have shown how actors can actively engage with paradoxes through their everyday practices (Smith and Lewis 2011, Jarzabkowski *et al.* 2013). For example, El-Sawad *et al.* (2004) show how managers use rhetoric and “doublethink” to manage tensions between being the loyal manager and grass-roots employee. Jarzabkowski and Lê (2017) illustrate how managers use humour to construct paradox by interjecting a note of incongruity, difference, or inconsistency into the interactional dynamic. Others have conceptualized approaches to managing temporal tensions in particular, including improvisation (Cunha *et al.* 2020). Cunha *et al.* (2020) for example outline six structural conditions that might facilitate improvisation within such organizations, including; defining a coordinating purpose, developing empowering structures, nourishing teams, building self-confidence, developing vision and cultivating a culture of both spontaneity and order. This study builds on this research by identifying the everyday practices used by employees and managers as they tackle learning paradoxes, and related temporal tensions. First, practices of simplifying and applying seek to resolve tensions between prior organizational-level learning and current localized learning, by enabling actors to interpret explicit organizational knowledge and apply this to the complex conditions faced on site. Second, practices of improvising and problem-solving enable actors to resolve problems arising due to interruptions in project cycles caused by the arrival financial year end. Third, practices of aggregating and analyzing seek to resolve tensions between current localized learning and future organizational-level learning, by individuals either stepping back, reflecting on project experiences and informally sharing learning, or when local learning is captured digitally and analyzed for use at the macro level. The findings of this study thus add to our knowledge of how actors manage learning paradoxes through their everyday practices.

Earlier studies of paradoxes point to the enabling role played by practices, as everyday actions achieve *both/and* solutions, where both sides of the paradox can be attained through a virtuous cycle (Smith and Lewis 2011, Jarzabkowski *et al.* 2013). However, the

findings here present a different reality, highlighting the difficulties in resolving learning paradoxes in particular. In all cases, attending to one side of each paradox was achieved at the expense of the other, with longer-term consequences for the organization (Smith and Lewis 2011). For example, by prioritizing *financial calendar deadlines*, *within-project* learning processes were compromised and important parts of the QM standards were contravened or skipped. Equally, by decoupling *within-project* from *between-project* learning, lessons learned did not feed into longer-term OL.

As noted above, prior research has shown how practices can resolve the paradoxes of *belonging*, *performing* and *organizing* through *both/and* solutions (Smith and Lewis 2011). Why, therefore, did such approaches fail in the Housebuilder in question?

Managing learning paradoxes

Learning creates a discontinuity between the past and future, and managing resulting paradoxes requires the learner to (re)work new knowledge both into historical accounts of how things worked before, but also future predictions of action. Achieving continuity within this temporal continuum, through the very act of departure from it (i.e. the action or practice), makes the resolution of learning paradoxes particularly challenging. This challenge is compounded when multiple processes of learning intersect, as in the studied organization.

For example, as seen above, Technical and Build Team members altered designs within each project to improve the efficiency of the build process. This change led to a discontinuity between the designs used in the homes built first, compared to those constructed towards the end of the housing project. As a result, individuals had to learn new routines to execute those designs. However, when this *within-project* learning process is interrupted by *financial calendar deadlines*, short-term fixes are improvised to optimize reporting values, creating further discontinuities with homes built outside these deadline periods. Here actors search for *either/or* not *both/and* solutions (Poole and Van de Ven 1989, Smith and Lewis 2011), separating the competing goals presented by the paradox (i.e. *within-project* efficiency versus the number of new homes completed and sold for financial year-end). Each attempt to resolve a learning paradox thus further exacerbates tensions in a vicious, not virtuous cycle (Smith and Lewis 2011, Cunha and Putnam 2019).

Learning paradoxes, therefore, present a unique challenge for organizations, and managing them involves connecting different paths of knowledge (Sydow *et al.*

2009). For example, individual sub-contractors and Housebuilder staff enact certain routines which they have learned over time across different projects and even organizations. The more these routines are enacted and repeated over time, then the more path dependency developed that extends well beyond the specific project at hand (Cohen *et al.* 1996, Sydow 2021). Changing such routines involves both an unlearning of prior actions, as well as the learning of new behaviours, and in this sense, enacted behaviours represent the interaction of different paths.

In light of these issues, achieving a *both/and* resolution to learning paradoxes becomes challenging for the following reasons. First, learning a new routine involves time to interpret the new knowledge being communicated to actors during a specific part of a project's life cycle. Competing processes (e.g. *financial calendar deadlines*) can constrain this time available, resulting in a partial understanding of new behaviours. In the organization above, this compromised the Housebuilder staff's ability to understand new QM standards, *let alone* enforce sub-contractors to work in a way they may not want to, to meet the Housebuilder's higher standards. Jones and Macpherson (2006) describe sub-contractors learning in this confrontational way as "coercive", as they are instructed to "do as they are told". As Housebuilder staff may also lack understanding and expertise in a sub-contractor's field, asking the sub-contractor to change their behaviour could be challenging. Housebuilder staff may feel compelled to accept the sub-contractor's current (and potentially defect-laden) working practices, as a close and congenial interpersonal working relationship develops over project life cycle time to form trust between them (Levin and Cross 2004). However, once this enforcement pattern for the Housebuilder's QM standards is set, it becomes harder to change as the project's life cycle progresses. Over time, tensions generated by this paradox have reduced through the introduction of new organizational practices, however not sufficiently that a *both/and* resolution has been achieved.

Second, whilst fixes can be found to resolve immediate tensions between, for example, a looming *financial calendar deadline* and the introduction of new QM standards, these solutions are short-term in nature (Miner *et al.* 2001). Cunha *et al.* (2020) also show how actors improvise to resolve tensions between an organization's past strategic plans, current knowledge and unimagined futures. In this way, improvising is a means for individuals to cope with short-term crises (Crossan *et al.* 2005, Antonacopoulou and Sheaffer 2014), not long-term learning. Housebuilder staff, for

example, resolve related paradoxes by combining their collective knowledge to act quickly, rather than reading and enacting new QM guidance they have been given. At year-end, Housebuilder staff operate at what Crossan *et al.* (2005) describe as "full-scale improvisation", which means individuals "wade into situations with fallible knowledge, secure in the belief that they can recombine that knowledge by shifting their fallibilities around. Faith in their ability to 'make do' infuses confidence into their balance of knowledge and doubt" (Weick 1998, p. 59). Learning through improvising in these circumstances leads to situational learning and forms part of crisis management (Kim 1993). However, such fixes through improvising are ephemeral, only momentarily interrupting longer-term learning paths and can lead to other unintended consequences (Koch and Schultz 2019). This on-the-spot problem-solving, which is not codified for later learning, is not accessible to the organization and is often forgotten by individuals for long-term use (Macpherson *et al.* 2022). Managing tensions in this way does not address the key driver of *financial calendar deadlines* to the Government or housebuilder shareholders, where expectations, before the COVID-19 pandemic, were that both new home numbers and housebuilder profits would rise annually. While an increase in housing numbers is crucial to meet increasing demand, it does not automatically result in homes being built to high quality standards. Therefore, without challenging the current approach, housebuilders will continue to dance to this tune, as there are no structural mechanisms in place to facilitate systemic learning.¹ Given the long life cycle of housing projects, a short-term annual reporting mechanism is arguably not suitable for the housebuilding sector, as from a learning perspective, actors do not manage tensions long-term, they merely cope in the short-term.

Finally, resolving learning paradoxes involves full consideration being given to the wider paths of learning. Resolution, after all, involves a process of integration and reconciliation, not disruption. In other words, new knowledge needs to relate both to what has been learned before, but what has yet to come. In the studied Housebuilder organization, tensions between learning resulted in individuals having few formal collective opportunities to pause and use their experience over a project's life cycle to reflect on successes or failures. Elkjaer (2004) argues that learning only occurs if a relationship is established between action and consequence, which comes from individuals carrying out retrospective sensemaking of constructing, deconstructing and reconstructing meaning over time (Oswick *et al.* 2000). Between fieldwork waves, the Housebuilder

has developed a new approach to this process by using a new project team's collective experience to interrogate all stages of an upcoming project before it is set in stone, rather than at the end, thus managing tensions in a different way. Nevertheless, this approach is limited, as it does not include designers or sub-contractors. Styhre *et al.* (2006) assert little designer to sub-contractor learning occurs, as each learns through different learning mechanisms. This is exacerbated here as each is temporally separate across project life cycle time. With no feedback from the last project's sub-contractors, designers are liable to repeat the same actions, leading to the same defects repeating on site. Alongside this local activity, at a strategic level, the Housebuilder is using digital technology to improve both its end products and QM routine; an approach which has proved beneficial in other instances (Eriksson 2019, Staples and Spillane 2019). Again, tensions created by this paradox have diminished through the introduction of new organizational practices at different hierarchical levels, however not sufficiently that a *both/and* resolution has been achieved.

This suggests that to achieve *both/and* solutions, structural changes need to be made to clock time deadlines, rather than project life cycle stages. This has implications for volume housebuilders as their year-end deadlines are fixed. However, it is a point to consider, if the UK Government is aiming to meet its housebuilding targets without detrimentally affecting build quality and supporting OL.

Limitations and further research

The findings here relate to a single housebuilder organization as a case study. While three regional offices were selected as "mini-cases" to provide a holistic insight into the organizational environment (Eisenhardt 1989), it is arguable how generalizable the findings are beyond this study. We posit that the knowledge accrued here could be transferable elsewhere by the reader interpreting this research in light of their own experience, whilst considering the contextual conditions in which this study took place (Thomas and Myers 2015). Conducting similar research with other large UK housebuilders would provide insight into whether similar learning paradoxes are widespread across the sector and whether they are managed in the same way.

This study was limited to examining one organizational routine. The data collected went beyond this single routine, as many organizational processes are linked within the housebuilding process. One associated process of interest is whether meetings that take place at the beginning of a housing project (as described in the

text above) encourage OL in the same way as post-project review literature suggests. Exploring this avenue could provide volume housebuilders with an effective alternative, which is easier to carry out and more likely to take place.

Conclusion

This paper explores how actors in the housebuilding sector manage (or cope with) learning paradoxes through their everyday practices. It identifies the difficulties for organizations in resolving learning paradoxes through practices at three stages of the housebuilding process: beginning, middle and end. Examining the intersections between *within-project* and *between-project* learning alongside *financial calendar deadlines* points to the need for both practice-based and structural solutions to resolve learning paradoxes. For example, challenging the role of short-term financial deadlines in sectors with long life cycles at the strategic level, as well as digitizing site activity, quality inspections and construction progress to manage tensions at the individual and team levels.

Note

1. The recently introduced New Homes Quality Board Code of Practice may help support change as housebuilders adhere to it (New Homes Quality Board, 2023).

Disclosure statement

No potential conflict of interest was reported by the author(s).

ORCID

Kate V Morland  <http://orcid.org/0000-0003-4617-1326>
 Dermot Breslin  <http://orcid.org/0000-0001-8309-7095>

Data availability statement

Data available within the article or its supplementary materials.

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Appendix

Table A1. Illustrative evidence.

Main themes	Sub-themes	Representative quotes
Simplifying and applying	Insufficient time to apply new learning	<p>"I know a guy who is so busy he hasn't had a chance to stop and read procedures". Wave 1, Region 1: Participant C</p> <p>"I took 550 photographs [of an apartment block], I sent it all to the Build Director and he went, 'what the f— is this?' And I went, 'somebody told me this was finished', ... That's what I found. I've given the Build and Site Manager two weeks to sort it out." Wave 1, Region 2: Participant H</p> <p>"Just leave [the digital Local Inspection form on the tablet]; I'll sort it out... (sounding a little stressed) right, put a note on there. We can sit down and do one of these [forms] next week. We've gotta do them, we've gotta do them and it's one of those things, that when you do them, it will be fine. It's just you've got to get a chance to do them". Wave 1, Region 2: Participant O</p>
	Expectation to learn a lot of new information quickly	<p>"Site Managers are there to deliver units for [the Housebuilder]. That is [their] core purpose of being there – the details and the technicalities that come along with it. 'Can you please read those 5,000 drawings and make sure it happens. But it isn't the same as the last 10 jobs you've done, it's a bespoke project and the [Building] Regulations have changed' ... Every job seems to be a learning curve and it's very onerous." Wave 1, Region 1: Participant C</p> <p>"There's more people stacking shelves in Sainsbury's local than there is running a building site, you know? We have limited resources to manage all those and to get <i>all</i> those [construction] details right is quite some ask". Wave 1, Region 3: Participant L</p> <p>"There [are no organizational processes in Region 2], the [new individual] has got no idea where their function stands, what happened in the past. They are just chucked in the deep end and they sink mostly" Wave 1, Head Office: Participant W</p>
Problem-solving and improvising	Simplifying information to facilitate learning and reduce tensions	<p>"The good thing about the [Handbook] is that it is very visual isn't it? So, while you might not have English as your first language, you've got eyes!" Wave 1, Region 2: Participant H</p> <p>"The [Final Inspection] is codified across all Regions ... there are about 250 questions ... they are scored, so we have taken out some of the judgement ... The question is effectively referenced to the Handbook and within that you put a score. The Handbook tells you what is a small problem and what is a big problem ... Previously, it was like [Customer Care] team gods coming in and they could make their own mind up, which isn't good for Site Managers because if a Site Manager has got no confidence in what the pass mark is, then why should they bother? They might as well wait for the person to come up and see what they snag and then just do those snags. Whereas what we actually want them to do is build it right first time. Now that's all scored and reported. So, all the construction stages, quality and [Final Inspection] is all reported weekly and it goes to Site Managers, Build Team Managers, and Chief Executive, so everybody sees it". Wave 2, Head Office: Participant W</p> <p>I spent today with [Region 2 Participant X]. It was good to catch up with him again two years later. He feels build quality standards have improved, that the site staff are using their tablets more. He gave me an example of when a Site Team used their tablets all the way through a housing site's construction lifecycle, and they only had about four snagging items at the end. The Site Manager there uses his tablet religiously and as a mobile phone. Wave 2, Researcher fieldnotes (19 January 2018)</p>
	Negative consequences of meeting short term financial targets	<p>"[The Housebuilder is] a PLC company, so everything is based around the shareholders. So if you don't make your numbers of the targets and the profit, your share price goes down and they go mad. So the first site [we visited] ... should not have had people moving into it when it did but they had to get it in for year-end. So they got the figures and they got the numbers and they got the profit. But now they are paying tenfold to make it right". Wave 1, Region 2: Participant J</p> <p>"The only time I don't like [showing a customer around] is if I'm not happy with the house, which can happen. Especially at year-end. I had to do one and I couldn't</p>

(continued)

Table A1. Continued.

Main themes	Sub-themes	Representative quotes
		stop it because we were running out of time but you have to take a few deep breaths and talk through the issues that are still outstanding and just hope that they are happy with my charm! ... What I really want to do is walk someone into a house that I'm proud of and pleased with".
		Wave 1, Region 3: Participant L "The company served notice on customers that they would have to move in early or complete early i.e. at the end of [a specific month] and when they did move in early, it was very clear that their homes were rushed or not ready. So, once they realized that the reason everything had been brought forward and rushed was for year end, they were understandably very cross and the current low [customer satisfaction] score reflects this".
	Using local knowledge as a short-term fix to problem	Wave 2, Region 3: Participant X "You've still got the pressure of getting the units out ... you can't get an answer to anything, but you try and do things to move the job on ... We had an issue here with the roof ... it wouldn't stick. So, '[Quality Team] what do we do?', 'Oh, well, I don't know. I've never heard of it before'. So, we are left to sort it out for ourselves ... we've asked the question and none of you know the answer".
		Wave 1, Region 1: Participant A "This is where it's very easy not to look in every detail and the full depth the effect that a change will have on all the elements of your construction. You need time to do that ... there could be some saving on changing ... but what also you need to consider is programme implications, fees, other risks of elements, delivery, material availability. All this. It's not strictly down to money ... especially if you've already started. This is where the problem implications play a very fundamental role and this is where you guys, the Build Team, or your Executive, look at that change ... and say, 'No, I don't want that change now because that is going to have an effect on my programme and my [Trade Organizations]".
		Wave 1, Head Office: Participant T So far, Built Team staff from Regions 1 and 2 have complained of having to improvise on site, as often their queries go unanswered by the Technical Team. It seems that the level of improvisation is based on size of problem and Site Team's confidence in solving the problem. If it's something big – say structural, they go back to the Technical Team. If it's something small – say plasterboarding around a staircase, they can handle that. So, no one except Site Teams and sub-contractors know. The Commercial Team may find out if that sub-contractor invoices for it, as the extra work may or may not have been agreed. This suggests that the Technical Team may miss learning from these instances, plus, the attitude is, "it doesn't matter, it's a one off" but I have found examples where it isn't, and the problem has been tackled in a completely different way somewhere else by others.
	Adapting usual site practices to meet wider financial targets	Wave 2, Researcher fieldnotes (01 March 2018) "The [NHBC CML Inspection where the mortgage money is released] is the most important bit, isn't it? I don't care what they say about [the Housebuilder's Final Inspection], at the end of the day, it's the [NHBC CML Inspection] overall ... So, [rather than following the construction stage order] it will be the [Housebuilder's Final Inspection] one day, and [NHBC CML Inspection] the next, so it's all done ... I'll just do it the way I'm doing it".
		Wave 1, Region 2: Participant AE "We leave things, let's say a bit of a foundation is left out but we just say, 'oh we've done 90% of the foundation, yes we will just say that we've done that, move on, keep going through'. So, to the outside reader of that report, it looks like everything is fine and then you come close to half year or year-end ... on-site they've got to do a lot of catching up of old foundations, snags and things which they either can't do, which is usually what happens, or they do really badly because they are just rushing through it because they are out of sequence and that's actually where the real big cost comes."
		Wave 1, Head Office: Participant W The Site Manager is struggling with the tablet as his construction sequence is not catered for. When the information does go on, it'll go in one massive hit. He's plastering units with no roof, which the tablet doesn't cater for, as you're not supposed to plaster apartments when the building is not watertight. He talks about expectation to get finished vs getting the quality right ... He has used Handbook but finds it difficult to apply when sub-contractors are on top of sub-contractors - who deviated from the Handbook first? "[The Housebuilder] did when they asked me to finish plots", he says. So, you can't ask sub-contractors to meet Handbook standards when one sub-contractor causes problems or mess for another. Consequently, year-end sounded horrendous. It sounds like, for the Site Manager, the aim is to draw a line in the sand for this scheme and look forward to the next.
		Wave 2, Researcher fieldnotes (21 November 2017)
Aggregating and analyzing	Learning stays informal at local level	"We need to include the [sub-contractors] a lot more on the decisions that we are making ... half the time we don't involve them enough. Like we have had an issue

(continued)

Table A1. Continued.

Main themes	Sub-themes	Representative quotes
		<p>here with the roofing ... we've been talking about for ages, how we do it, with the Architect. The Roofer comes out, we have a meeting with him here, 'Why are you doing it like that? That's crap, it's never going to work. It's going to cause problems for you in the future' ... We've got these people that have got all of this knowledge, but we don't use them".</p> <p>Wave 1, Region 1: Participant A</p> <p>"You are building new housetypes all the time, it's a learning curve on that house ... When you build a housetype the first time, no matter how well it's designed, you will always find little teething problems or perhaps stuff you would do a different way. Then you update the drawing and the second time you build it, you incorporate that revision".</p> <p>Wave 1, Region 2: Participant I</p> <p>"We do tend to have little sit downs and usually when the next Site has started, and they will say right, do you remember what happened on the last one? Remember what happened on the last one? But there is nothing formal"</p> <p>Wave 1, Region 3: Participant K</p> <p>"The last job I did, the idea was, because it went really, really well, it sailed through. At the end of that, we all said, 'yeah, let's have a sit down before the pre-design meetings for this, and everything else, what went well and what didn't work?' ... [We didn't have one probably due to] a lack of co-ordination and no one has the will."</p> <p>Wave 1, Region 1: Participant A</p> <p>"What we don't have, which we should, is a project deconstruction meeting, where design teams and technical managers etc. everyone together, go through what went well and what didn't. And a four or five item action plan comes out of it ... You need everyone there to get a balanced view of what went well. These meetings used to happen, but they were sporadic and never been policy. People move on to the next project. It's tough to allocate time for them. They need to become company policy otherwise they won't happen".</p> <p>Wave 1, Head Office: Participant S</p> <p>"Usually everyone [in other organizations] comments to their neighbour about last month's figures but [this Housebuilder] is right at the extreme of business experience in the way it looks at things ... it's always been forward thinking ... It's been a bit of a shock to the [Housebuilder] to actually look at what its done ... When you're looking at quality improvement, there's no point looking forwards, you've got to look backwards and see".</p> <p>Wave 1, Head Office: Participant W</p> <p>'We should have said, if we do the change it's going to take us three weeks to come back with this ... but that didn't happen. It was let's just get on with it, get it done.' Wave 1, Region 1: Participant Ex 1</p> <p>'Now, as soon as we can see a [Final Inspection] report online, we can straight away see from the few comments, we can even from the photographs published on the report, often we can see coming from the five photographs that that [Final Inspection] should have failed ... All the low [Customer Satisfaction survey responses] you get [from customers], you can analyze the [Final Inspection reports] to say, okay, it correlates, the plot failed. It's not surprising that we got a low survey. Or if it passed the [Final Inspection], you can say, wait a minute, this passed and this customer reported a low scoring [Customer Satisfaction survey] and [the Customer Care Team member] just issued a 400 item list. Is somebody playing the game? So, if we want to interrogate and find out if somebody has been a bit iffy, we can do it ... Before, we had no insight, you could never go back and check anything. But it's just opened the door to be able to interrogate pretty much anything we want.</p> <p>Wave 2, Head Office: Participant S</p> <p>Today I observed a meeting where a project that had planning approval was being reviewed. In the room, there was staff from Development, Sales, Commercial, Technical and Build Teams, which included the potential site manager and the Regional MD. So, there was an opportunity for every team bar Customer Care to put their view forward on the scheme. You had consideration of build programme and crane locations against things like the market saleability of duplexes, the complexity of adding additional stories to listed buildings, materials, compound locations, planning conditions, remediation, marketing suite locations etc. Input from the various angles meant original plans proposed by one team were often amended against the consideration of others at this early stage.</p> <p>Wave 2, Researcher fieldnotes (09 November 2017)</p>
	Limited time or energy given to past project learning	
	Processes used to capture local learning	