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Abstract

Taking the global acknowledgement that projects (i.e. interprofessional working and learning) have become a prevalent form of organising work as its starting point, the paper first introduces the concept of *fractional ontological performance* to capture the conjoined working and learning dynamics associated with project work. Second, it argues that the issues encapsulated in this concept have, up until now, not been addressed in the field of workplace learning in research on interprofessional working and learning. Third, we suggest that the concept of fractional ontological performance offers a way to extend Hager and Beckett's work on 'complexity learning'.

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Working and learning in client-facing interprofessional project teams as 'fractional ontological performance'

Insights from consulting engineering

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Introduction

Over the last 30 years, it has been widely accepted that projects have become a prevalent form of 'organizing work' (Fough et al., 2020: 21) to such an extent that 'it is hard to imagine an organization that is not engaged in projects' (Nieto-Rodriguez and Evard, 2004: 4). This development has been accompanied by a recognition that projects presuppose interprofessional modes of working and learning rather than the continuation of the classic functional differentiation of professional work (Grabher, 2004). Over the intervening years, a number of writers have formulated concepts to encapsulate the distinctive features of: (a) project work, for example, 'temporary organizations' (Ludin & Soderholm, 1995), 'project networks/ecologies' (Sydow & Staber, 2002; Grabher & Ibert, 2012 and 'knotworking' (Engeström, 2008) and (b) interprofessional learning, for example, 'co-construction' (Engeström, 2008; Fenwick, 2016, 'common knowledge' (Edwards, 2010), 'immaterial expertise'

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(Guile & Wilde, 2018) and 'co-working' (Spinuzzi, 2012). Despite drawing on different theoretical and methodological traditions, a common assumption ran through the aforementioned research that projects and interprofessional learning were, despite their contingent and heterogeneous nature, centred on activities. During this period, there was, however, another rather subterranean argument in actor–network theory (ANT) that projects and interprofessional engagement in projects were *fractional* (Law, 2002), even though teams were concerned with delivering an 'object' (in Law's terms an outcome). Although this argument constituted a challenge to the aforementioned consensus, it remained subterranean because, on the occasions when ANT has been used, for example, Fenwick and Nerland (2014), Fenwick (2016), researchers maintained a centred conception of working and learning and explored their 'socio-material' implications.

In light of the aforementioned observations, the chapter makes a threefold argument. It first builds on an argument we have made elsewhere that members of project teams discussed in this chapter – client-facing interprofessional project work in consulting engineering – are concerned with making 'situated judgements' to resolve problems (Guile & Wilde, 2018; Wilde & Guile, 2021). Second, it follows Guile and Spinuzzi (forthcoming) and argues the contingent, intermittent and heterogeneous dynamics of client-facing interprofessional project teams' (C-fIPPTs) working and learning is best captured by the concept of 'fractionality' since team members are working, simultaneously, on more than one project. Third, the chapter concludes by recontextualizing (Guile, 2019) Law's (2002) concept of 'ontological performance' to identify the mode of interprofessional working and learning that frames and enacts fractional situated judgements. It starts by providing a summary of its conceptual frame, C-fIPPTs work frame and its methodology, before presenting and analysing a vignette of fractional working and learning.

Client-facing interprofessional project teams: conceptual, work and methodological frame

Conceptual frame

The first strand of our conceptual frame is our concept of client-facing interprofessional project teams (C-fIPTs). We formulated this concept to encapsulate what is distinctive about the form of work that consulting companies' (sometimes referred to as professional service companies; Empson et al., 2015) project teams undertake (Guile & Wilde, 2018). Consulting companies, in comparison with other types of private sector organisations, such as automobile, electronic and pharmaceutical firms, 'specialize in offering their expertise to other firms or conglomerations of financiers and firms' (Von Nordenflycht, 2010, 157): hence, they 'compete for contracts from clients' by tendering for work (Maister, 1993). C-fIPPTs, which can comprise members from different consulting companies, are therefore an 'assemblage' (Law, 2002) of expertise put together to accomplish the overarching goal or outcome with the client or their appointed project managers frequently become members of project teams: hence the term client-facing interprofessional project team.

Furthermore, influenced by Moulier Boutang (2012), we first accept that production is intimately tied to 'immaterial mediation' (Guile & Wilde, 2018, p. 522) – in the case of C-fIPPTs, testing out discursively and practically which ideas and suggestions are the most appropriate solution to the problem that team members have encountered, and placing a monetary value on those ideas and suggestions in one of two ways. These are within the project budget or by establishing or consolidating their reputation to secure further contracts for their services. Second, we use his term 'capture of externalities' to refer to the ideas and suggestions that crop up as team members deploy their collective intelligence and invention power to generate solutions to the problems they encounter while working together collaboratively. We have, however, supplemented Moulier Boutang's argument about the capture of externalities by identifying its requisite form of expertise – 'situated judgement' (Guile & Wilde, 2018; Wilde & Guile, 2021) – to explore how members of C-fIPPTs use artefacts – digital and traditional pen and paper and dialogue to communicate effectively with one another to resolve project-specific problems.

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The concept of situated judgement is predicated on our reinterpretation of Lave and Wenger's (1991) concept of 'situated learning' and Boltanski and Thevénot's (2006) ideas about forms of human judgement. In the case of the former, we follow Lave and Wenger and accept that all forms of human activity are situated. We temper this acceptance, however, with the recognition that the emergence of digital technology has fundamentally transformed the notion of co-presence and mutual constitution of a practice in spatially and temporally bounded situations. Consequently, digitally mediated and face-to-face situations 'exist simultaneously, inform and penetrate each other, sometimes joining to form a single situation while at other times co-existing without collapsing' (Schwartz, 2021, p, 14). This development therefore means Lave and Wenger's original definition of situation now encompasses activity that is occurring beyond but has an impact upon, a particular situation. In the case of Boltanski and Thevénot, we accept their argument that: (i) human interactions rely on different forms of justification; (ii) there are always different conceptions of worth or value playing out spatially and temporally in situations and (iii) different types of justifications, ultimately, have to be reconciled with one another. We have, however, 'recontextualised' (Guile, 2019) their argument, which pertained to political judgement, in relation to C-fIPPTs. Focusing on three – aesthetic, financial and technical – of Boltanski and Thevénot's six types of judgements, we reveal below how as members of C-fIPTs test out ideas and suggestions between them in accordance with different values they make collective situated judgements.

The second strand of our conceptual frame is Guile and Spinuzzi's (forthcoming) concept of *fractionality*. This concept, which has been derived from Law's (2002) original work, has been formulated to capture the working and learning dynamics associated with C-fIPPTs and similar project teams, as they engage with the object of their activity by *drawing things together without centering them* (Law, 2002, p. 2 italicisation in original). What is distinctive about C-fIPPTs is how the object of activity is first emergent and subject to constant negotiation and revision over time in the ongoing and shifting collaboration between specialists and their client over the course of a project. Second, team members engage contingently, intermittently and heterogeneously with that object as they come in-and-out of the project at different points and in different combinations, typically because they are working simultaneously on other projects.

To do so, members of C-fIPPTs contribute their specialist expertise by 'sustaining an economy of attention' (Knorr Cetina, 2010 to make and respond to suggestions in relation to the aspect of a project they are working on, before comingling suggestions to make situated judgements and 'passing that baton' (Law, 2002) on to other team members.

Consulting companies' work frame

In recognition of the large number of actors involved in multi-partner construction projects, the Royal Institute of British Architects, in consultation with other construction industry partners in the UK, has produced the *Plan of Work* (PoW) as a means to define the work process for complex projects and specify who is responsible for which aspect of a build. The PoW provides a central focus for the assemblage of members from multiple firms with different expertise that constitute project teams. The plan breaks a construction project into eight phases and specifies the main tasks and objectives as the project moves from the brief, through different design stages to construction and use. It is customisable rather than prescriptive. The PoW is therefore an 'interactive data object' (Schwartz, 2021, p. 24). That is a 'self-documenting' tool that project teams, which could be located in different cities, companies and disciplinary specialisms, can use to sequence their interactions and record their 'logjects' (log of their activity), to accomplish their stipulated outcomes in time and in the budget (Schwartz, 2021, p. 24). Project team members have, however, differing levels of involvement as the construction project moves through different phases. Typically, in the case of engineering consulting companies, the building services engineers and structural engineers stay with the project for most of the time, though they do not necessarily attend every meeting, while other specialisms such as fire and acoustics only contribute in particular moments when their expertise is required. To assist them to implement the PoW, project teams agree, what is referred to as, the 'scope'. This term denotes exactly how a C-fIPPT has translated the generic PoW framework into a project-specific work process which specified what each team member is responsible for producing and delineates the associated cost. It is thus crucial for establishing how the parameters of the contract agreed with the client are distributed across the project team.

The PoW and the scope are therefore socio-material artefacts that C-fIPPTs use to organise the assembled disaggregated collection of expertise who have fractional engagement with a project and its object of activity, to achieve its goals. In the case of the scope, it serves several functions. It states what work team members will produce and specifies the cost attributed to each group or personnel, thereby enabling budget management and helping diverse and multi-located project teams to organise their work responsibilities. This facilitates interprofessional working by not only demarcating roles and making expectations clear to the client but also creating a context to manage fractional engagement (i.e. coming in-and-out) and re-negotiation of either the object of activity or aspects of the scope designed to achieve that object via the capture of externalities. The scope therefore functions instead of a pre-existing working relationship for project teams that have not previously worked together and, as such, provides a 'systemic' framing for work. It does not, however, as we explain later, specify how work is undertaken and judgements made.

Methodological frame

The research referred to in this chapter, which was funded through a grant received by UCL Institute of Education's *Centre for Learning and Life Chances in Knowledge Economies and Societies* from the United Kingdom's Economic and Social Research Council, investigated interprofessional working and learning in project teams. The research, which has been reported on elsewhere (Guile & Wilde, 2018; Wilde & Guile, 2021), consisted of three phases. The first phase started with one professional services firm – a global engineering consultancy – *Dachell*. Via multiple scene-setting conversations with the executive team, we established the parameters for the research.

The second phase consisted of a series of hour-long interviews with engineers at the firm (n = 6); we initially focused on the activity they engaged in. The third phase, aspects of which are a focus of this chapter, is based on an extended observation of the work of a C-fIPPT that was a typical example of *Dachell's* current project portfolio of work, as well as in-depth interviews lasting between 1 and 3 hours with individual members of the team (n = 8).

In the case presented in this chapter, an architecture firm High-Arch won the contract – 'Student Central' – from a university and had between five and seven architects of different degrees of experience working on the project, depending on the phase. Additionally, specific engineering specialisms were subcontracted via a tendering process to other professional services firms and those team members joined a team whose membership varied depending on the phase of work being undertaken. Dachell was appointed to focus on the fire systems and to undertake specialist work on acoustics. Two structural engineers were also appointed from SFE, and three services engineers from the firm Jackson Hughes. The team was very international, including Europeans, New Zealanders, East Asians and British. Furthermore, cost consultants and project managers were appointed at the start of the project and landscape architects at a later stage in the project. The brief was to refurbish and update a series of university buildings that surround an inner courtyard. These buildings are old and do not meet the current needs of staff or students. The project site is in an English city, which has buildings dating to the 18th century. The streets are narrow, the buildings tall, and in close proximity to one another. The aim is to open up the courtyard and develop a multi-use space that will house staff offices and researchers as well as an auditorium and teaching rooms. There was a concern to maintain the 'look' of the existing buildings on the rest of the site. Due to its complex nature, and the need for many of the spaces to continue to be used during construction, the project has multiple phases which focused on different buildings in the courtyard. Thus, there are multiple stakeholders and users of the final product, and also an array of internal boards within the university structures, which have often meant long waiting times for decisions. The project was scheduled to take several years to complete and has been through a series of 'on hold' phases for a variety of different reasons. Consequently, project team members were working simultaneously, however, in different combinations on several projects all the time: experts move in and out of the projects as their expertise was required.

The methodological approach interwove principles from actor–network theory, social anthropology and cultural-historical activity theory. For the former, we supplemented the principle of following an object (Latour, 1987), with first Burawoy (2000) and Garsten and Nyqvist's (2014) call for ethnography to trace processes through a focus both on what people *do*

and the relation of multifaceted influences on their actions, such as the role of client's interests and concerns and the regulatory framework and so on, and second Edwards' (2016, p. 5) argument that objects of activity capture the purpose of professional activity or work and constitute a 'problem space' where team members work collaboratively to accomplish project goals: in this case, outcomes stipulated in the scope. Guided by these maxims, we followed Student Central as it developed, dipping into key moments such as design meetings and conducting reflective interviews with project team members about how their understanding of the brief, and how the functioning of the project team progresses through the life of the project. The aim was to explore the project as an object that 'unfolds' (Foot, 2002) through different processes, rather than as telescopic episodes, to investigate how professional work is done. Project team meetings were recorded, then transcribed to capture the specifics of the conversation, which are often technical. Fieldnotes taken during the meeting by the researchers focused on the actions, behaviours and interactions between the project team. Both are used in the reconstruction of the team meeting presented below to produce a rich account of the discussions. In common with many other construction projects, *Dachell* had been subject to a number of delays. The project had recommenced in May 2017, with the result that its time frame had been extended.

Analytically, we approached the observation below having the interplay of our conceptual frame and preliminary interviews in mind. Our observations aimed to identify evidence of the type of working and learning practices within project meetings. In doing so, we never assumed that every aspect of work in C-fIPPTs had an immaterial dimension and was concerned with capturing and trading externalities. Rather, such teams provide the context for this to happen. Thus, although, on the one hand, we were curious about the different forms immaterial activity took, the way the team made situated judgements and the different manifestations of fractionality that occurred, at the same time, we recognised that working and learning practices may sometimes only tangentially reflect our theoretical framing and even introduce new issues for us to consider. Consequently, much professional practice is likely to be taken for granted by professionals and may not be identified by them in interviews and we

wanted to remain open to new ideas and concepts that emerged from our observations and interviews.

For these reasons, we present in the next section of the paper an ethnographic vignette that sets the scene for readers, to demonstrate the ways in which C-fIPPTs work. Our vignette illustrates how the members of the C-fIPPT team are fractionally engaged in immaterial activity through developing an economy of attention to discuss options, stabilise discussion and resolve an issue that emerged by making a situated judgement, before passing the baton on to other team members to address the next aspect of the scope. We supplement the vignette with extracts from the team's deliberations, including references to socio-material artefacts, and interview data for team members' reflections on their working practices and further selected descriptions of team meetings.

Fractional working and learning in client-facing interprofessional project teams

Design team meeting – September 2017 central London offices of high-arch architecture firm

The vignette starts halfway through a two-hour discussion between a number of members of the C-FIPPT about the Student Central building project. Up to that point, most of the meeting had focused on the issues Fabrizzio and Ben, the structural engineers from SFE are dealing with, in discussion with Rowan and Xia, the architects from High-Arch, and three services engineers from Jackson Hughes – Catherine, James and Alberto – are also in attendance – their main concern being the building's services such as water, heating and electricity. For this reason, no one is in attendance from *Dachell*. Decisions therefore are therefore being made by other members of the project team that will impact on the work their fire and acoustic engineers will engage with when they pick up the baton, at a later date. At this point in the meeting, Rowan

and Xia are raising issues, and all the engineers are making suggestions, asking for clarifications and promising further work. As the discussion shifts to them, the structural and service engineers swap seats along the long oval table, so that the latter are in a more central position and able to focus their attention, together with the architects, on the huge pile of drawings representing the stage of the scope the team is working on. These are printed on large A3 sheets and have been drawn based on data – designs with technical specifications and associated costs – by a computer programme rather than pen and ink.

Xia, one of the architects, spends a little time organising her papers, making sure they are in the right order. When ready, she stands up over the desk to point out things on the drawings to Catherine, James and Alberto who sit opposite her. The sheets are ordered to enable the discussion to travel up through the floors of the building, showing the flow of the services (water and heating pipes and electricity cables) from the basement to the roof. At the point the participants start to discuss the top of the building, they begin to focus on the location of the chiller, a large white block unit currently located on the roof. Aesthetically, Rowan, the lead architect, is not happy with where it is because it has become apparent that the chiller and its flues are visible from the street. The member of the C-fIPPT present discuss a few options, but nothing emerges as a likely solution. Rowan suggests they switch from looking at the drawings to a virtual 3D model on the TV screen on the back wall.

It takes Xia some time to log in to her account and to find the file – but when she does, it is clear why Rowan requested this. The 3D model is in full colour, and Xia can move the perspective around, up and down the outside of the building, so that the project team can 'see' it from different sight lines. One part of the façade of the building that they are renovating is listed, so it is important that this is not adversely affected. The team concurs with Rowan that the chiller and flues are too visible and, as such, spoils the building's aesthetic effect.

They return to the drawings on the table, Catherine, James and Alberto get to their feet to gain a better view. Rowan shows them a hand-drawn pen sketch in his notebook that he has done previously to illustrate his point. James draws an image on the plans to explain the chiller dimensions and the implications of its weight for its structural position on the roof. Thinking

aloud about how to minimise the spoiling effect the flues are having, Rowan asks 'Could we group the flues?'. Without really waiting for an answer, he asks Xia to show them a different perspective. Xia pulls up another 3D image on the screen that shows a different view of the building to check how obvious the flues jutting out the top of the building look to a pedestrian in front of the listed façade. Rowan asks Xia to show the team what you can see from the street – Xia checks the angles, and Rowan's speculation is correct, provided they can put the chiller in this new position you can more or less no longer see it from the street. 'Only just see the top of them from here . . . The chiller that you can see from this angle won't be there'. Rotating the images, the team checks several other views, and to support this process, Xia gets photos of the current façade from her file so that they can have another way to check what the chiller looks like from the street, at the moment.

James then suggests that he could seek clarification about options for positioning the chiller from the manufacturer. He speculates that they'll 'say that because you've got your chiller here, you've got the airflow upwards (i.e. through the building), so I think the dimension [authors; health and safety] they ask for from this area will be 2 metres'. James is speculating therefore that if the new position of the chiller encroaches on the airflow the aesthetic issue may be reduced, but that arrangement may generate a health and safety issue. At this point, Catherine suggests they could consider using a 'smaller chiller'; however, James counters by pointing out that the chiller was 'the smallest size anyway', before Alberto reminds everyone that the team had 'measured the acoustics last week' and that *Dachell* (who are not represented in the meeting) 'are OK with current arrangement', but they could check with them about the proposed new position for the chiller in relation to 'the noise level' in the upper part of the building.

The team then returns to discussing the tricky problem of finding a new position for the chiller which eliminates the aesthetic concern Rowan has expressed, addresses the technical concerns about the structure to hold the chiller as well as the health and safety concerns that James has raised and also keeps in mind Alberto's observations that whatever decision they make is likely to have a knock-on effect for the acoustic engineers. Following a further round of discussion and deliberation about how to overcome the chiller and flues being visible from the

street, Alberto suggests that they might think about a 'decorative' solution. This prompts Rowan to suggest that:

> Well we can just have a frame, have quite a simple frame. Because here you can only just see the top from there. And if there was a 2 metre-high frame holding them up then you're not going to see that.

Responding to Rowan's solution to his original suggestion, Alberto then comments reflexively:

> So I guess that is where this frame sits and what we do then is fix the frame on to the roof like this' so it masks the flues and the chiller is positioned behind it.

The team agrees that Alberto and Rowan have between them generated a workable solution however at that point James points out that before they can finally agree to do so and present the new design feature they will 'just need to check if that is enough for the services to pass through', in other words, will there be sufficient room for the 'services' i.e. the water, electricity and heating cables and pipework.

The members of the C-fIPPT participating in the discussion are fractionally engaged in immaterial activity thinking through the aforementioned issues out loud together about what changing one thing would mean in terms of the impacts elsewhere, and the chosen course of action emerges from within that process. For this to happen, different conceptions of value will have to be commingled together. The aesthetic cost of placing the chiller in a particular site must be balanced by technical concerns regarding the building's structure and where it is strong enough to safety hold the weight of the chiller. The solution to this conundrum arises when the team seizes on (i.e. capture) Alberto's externality when he floats the idea that they look for a decorative solution. This suggestion allows them to 'reposition' (Guile, 2010) themselves and think differently about the aspect of the overall object of activity on which they are working by seeing 'building' as mutable, even though it already exists. The vignette allows us to appreciate that almost everything associated with the refurbishment and updating can shift and move about so long as the outcomes defined in the scope are achieved, the space is

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not set. Even with the continued references to computer drawings, hand drawings and photos and 3D models – all very material elements that focus on the fixities of material space, they are at the same time immaterial because they are still fluid, movable, changeable and renegotiable.

The members of the C-fIPPT therefore work on the object of their activity by drawing things – ideas and materials – together creatively, but without centring them in the sense that the solution they have produced may be subject to further revision by other team members. For this reason, the design team meeting includes both service and structural engineers, if the team moves a wall, or a ceiling, the pipework and cabling will also be affected. It becomes necessary therefore for all the team members present to sustain an economy of attention, even if they are not actively involved in the discussion because a course of action that some members of the C-fIPPT make will have implications for the work of other members who are present as well as members who are not present. In the vignette, Rowan, Xia, Catherine, James and Alberto's contributions led to a resolution of the problem-in-hand; however, Fabrizio and Ben's had to follow the discussion in case the proposed solution generated a structural problem, and all of them had to bear in mind the implication of the proposed solution would still require input from Dachell's acoustic engineers. Sustaining economy of attention in an interprofessional project team therefore assists the formation of a workable situated judgement, rather than one that is flawed because it has not taken account of other members' expertise. It also assists them to, as Alberto acknowledges, keep their eye on the implications of their decisions for when they have to pass the baton onto or back to other team members who are not present but whose future work will be impacted by their decisions.

This form of interprofessional working and learning is a complex performance and requires more continuous forms of input, even with the addition of new tools and digital technology. In an interview with the authors, Rowan reflected on how new technologies had been changing the way of working.

Rowan: . . . previously from my point of view I would be able to mark up a plan
and give it to the person who was drawing that plan for
them to fix, and now I can mark up the plan but that might

> have to go to five different people because they've all
>
> been doing different bits of it. So that's a kind of workflow
>
> thing that we're trying to work out.

Author: Oh, that's interesting, because you would have thought it all being

together would make it simpler.

Rowan: It does but it means that anyone can do anything, whereas before

people might be assigned to produce particular assets.

Which is still the case I think, it's just a kind of . . . it's a

slight change in that . . . you're not just drawing one thing

anymore, you're drawing something which . . . well you're

modelling something which will become a space, and that

space has a hoard of things associated with it.

Author: It's more layered.

Rowan: Yeah, and the division between different elements of work is less clear.

The aforementioned vignette, and Rowan's interview comments, shed light on the way in which C-fIPPTs create forms of social cooperation to enable them to externalise emerging ideas by 'thinking aloud' to engage with, and take forward, issues that emerge from their discussions, debates and speculations. The creation of contexts for social cooperation is never stipulated in the POW or scope. It is an emergent and contingent phenomenon that characterises C-fIPPTs' working and learning dynamics. Each change results in an impact elsewhere. Thus, as decisions are being made, members of a C-fIPPT engage in a conjoined working and learning process by thinking through the implications of their deliberations and judgements. The challenge for the members of the project team is to develop the expertise to oscillate, as they work with one another, between thinking aloud and then focusing on a specific suggestion, to ascertain whether it might constitute a better solution to the issue they were exploring. To do so, it is necessary for members of a C-fIPPT to develop a working sense of other members' forms of knowing so they can envisage their contribution to the building as a

whole. In the process, face-to-face interactions, some of which are mediated by digital artefacts, co-exist because they inform and penetrate each other. During the aforementioned team meeting, the engineers and architects saw the 2D line drawings, which had been produced outside of their meeting, as a 3D object from both their own specialist perspective and from the perspectives of other team members' specialist perspective, as well as having to anticipate how other absent, but nonetheless members of their project team, will see it. The project team is contending therefore with a new digitally mediated manifestation of, what Goodwin and Goodwin (1996) refer to as, the embeddedness of knowledge and knowing as well as a new notion of co-presence: team members in and beyond the situation. They are 'seeing' objects and issues mediated by a range of socially constituted tools, so that even actions and judgements that they appear to take are situated within a web of collective work and technology.

Fractional working and learning in client-facing interprofessional project teams: implications for workplace learning

This chapter has addressed the implications of, a particular but nonetheless extremely well-established, manifestation of the projectification trend – client-facing interprofessional project teams – for working and learning. To do so, the chapter has drawn on a conceptual framework that has integrated extant concepts from social theory (immaterial activity), cultural-historical activity theory (object of activity) and socio-cultural theory (situatedness), along with more recent concepts from our own work (situated judgement) and work undertaken separately (fractionality). Taken in combination, this conceptual framework has enabled us to highlight that although C-fIPPTs may have an overarching object of activity – in *Dachell*'s case to remodel historic buildings and their immediate environment – the members of the project team assembled to work on this project/object do so fractionally. We have seen that this is because the scope, which emerges post the contracting process, positions members of C-fIPPTs to firstly

have, simultaneously, intermittent engagement with the overarching goal and emergent opportunities to negotiate or even re-negotiate aspects of that goal, for example, the decorative issue described earlier. This requires members of C-fIPPTs who are working on a particular phase of the scope to develop through their participation in the contingent and discontinuous work practices described earlier the following modes of interprofessional expertise. The expertise to first, comingle different conceptions of worth – aesthetic, technical, financial and so on – to form situated judgements about the best way either to implement or to exercise their professional creativity to redesign that phase of work. Second, to sustain an economy of attention throughout discussions and deliberations because the output of their work is always 'towards the production of the execution conditions of someone *else's* activity' (Redding, 2012, p. 61), since members are aware that they will pass the baton onto other members of their team to implement the next stage of the scope as well as for their client to approve the stage of work they have just completed. The successful completion of these dimensions of project work assists C-fIPPts to consolidate their own (and by extension their firms') reputation and in the process secure 'repeat contracts' (Maister, 1993.

The account of client-commissioned and therefore-facing project work and learning presented in the chapter has revealed ontological issues associated with interprofessional working and learning that have not, up to now, been discussed in the field of workplace learning (Malloch et al., 2021). C-fIPPTs are an assemblage of experts held together by a time-bound contract who disperse at the project's end. Consequently, they are a contingent, unstable set of actors with divergent motives and measures of professional success, learning enough about one another's motives, conceptions of worth and modes of justification to make the joint effort relatively coherent and stable. In such cases, members of C-fIPPTs' ontological engagement with the object of their activity and one another are fractional. It is accomplished as members learn first to mediate between the known practices associated with a construction project, such as those stipulated in the scope, for example, to install new flues. Second, they learn to be alert to not-yet-known practices which emerge, for example, in the deliberations that led to the 'decorative' solution, as they resolve competing conceptions of worth to agree on how to locate the flues. Third, they learn how to sustain an economy of attention through

discussions and deliberations which may or may not have implications for their domain of expertise, before passing the baton on to other members of the C-fIPPT to contribute to the further accomplishment of the overarching goal of the project.

To understand members of C-fIPPTs fractional participation and enactment of their roles and commitments it is helpful to recontextualise Law's (2002, p. 148) concept of 'ontological performance'. This concept refers to the way in which the discursively immaterial and socio-material 'conditions of possibility' (Law, *ibid.*) C-fIPPTs generate enables them to frame and enact their decision-making. It is nevertheless important to recognise that a C-fIPPTs' object of activity may provide a unified purpose or 'sensemaker' (Kaptelinin, 2005) for other actors. For example, university staff and students will continue their teaching and learning in the new environment once the Student Central project has been completed. In contrast, the members of the C-fIPPT working on Student Central have, however, learnt to accept they will disperse to deploy their expertise in new ways on other projects and with new combinations of colleagues. The above observation about ontological performance adds additional conceptual and empirical dimensions to, what Hager and Beckett (2019; Beckett and Hager, this volume) refer to as, the 'complexity' of all forms of collective learning. This is because we conceptualise the working and learning dynamics associated with C-fIPPTs as they engage immaterially with the object of their activity as a process of drawing things together without centring them, whereas they exemplify their argument by conceptualising group learning in well-established and stable groups, such as jazz groups, in a more naturalistic way (Guile & Wilde, 2022).

References

Becket, D and Hager, P. (2023) Complexity theory: a key to understanding emergent learning and judgements in workplaces. In Bound, H., Edwards, A., Evans, K. and Chia, A. (eds) *Workplace Learning for Changing Social and Economic Circumstances* Routledge: Abingdon.

Beckett, D., & Hager, P. (2019). *Complexity Theory and Education*. Springer.

Commented [3]: The in-text callout does not have a corresponding Reference. Please correct the in-text callout or add the missing Reference.

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Commented [GD6R5]: Please delete

Blomquist, T., & Packendorff, J. (1998). Learning from renewal projects: content, context and embeddedness. In R. Lundin & C. Midler (Eds.). *Projects as arenas for renewal and learning processes* (pp. 37–46). Springer.

Boltanski, L., & Thévenot, L. (2006). *On Justification: Economies of Worth*. Princeton University Press.

Burawoy, M. (2000). *Global Ethnography: Forces, Connections and Imaginations in a Postmodern World*. University of California Press.

Edwards, A. (2010). *Being an Expert Professional Practitioner: The Relational Turn in Expertise*, Springer.

Edwards, A. (2016). A cultural-historical approach to practice: working within and across practices. In J. Lynch (Eds.). *Practice Theory: Diffractive Readings in Professional Practice and Education* (pp. 127–140). Routledge, 2016.

Empson., M. D., Broschak, J., & Hinings, B. (Eds.). (2015). *The Oxford Handbook of Professional Service Firms*, Oxford University Press.

Engeström, Y. (2008). *From Teams to Knots: Activity-Theoretical Studies of Collaboration and Learning at Work*. Cambridge University Press.

Fenwick, T. (2016). *Professional Responsibility and Professionalism: A Sociomaterial Examination*. Routledge.

Fenwick, T., & Nerland, M. (2014). *Reconceptualising Professional Learning*. Routledge.

Foot, K. (2002). Pursuing an evolving object: Object formation and identification in a conflict monitoring network. *Mind Culture and Activity*, 1(9), 132–149. https://doi.org/10.1207/S15327884MCA0902_04.

Fough, A. J., Theusen, C., & Geraldi. J. (2016). The projectification of everything: projects as a human condition. *Project Management Journal, 47*(3), 21–34.10.1177/875697281604700303.

Commented [7]: Please indicate where the in-text callout for this Reference should appear in the text.

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Commented [GD10R9]: Reference appears in second sentence

Garsten, C., & *Nyqvist*, A. (Eds). (2014). *Organisational Anthropology: Doing Ethnography in and among Complex Organisations*. London: Pluto Press.

Goodwin, C., & Goodwin, M.(1996). Seeing as situated activity: formulating planes. In Y. Engeström & D. Middleton (Eds.). *Cognition and Communication at Work* (pp: 61–95). Cambridge University Press. http://doi.org/10.1017/CBO9781139174077.004.

Grabher, G., & Ibert, O. (2012). Project ecologies: a contextual view on temporary organizations. In P. Morris, J. Pinto & J. Soderlund (Eds.). *The Oxford Handbook of Project Management* (pp. 154–175). Oxford University Press.

Grabher, G. (2004). Learning in projects, remembering in networks?: communality, sociality, and connectivity in project ecologies. *European Urban and Regional Studies*, 11(2), 103–123. https://doi.org/10.1177/0969776404041417.

Guile, D., & Spinuzzi, C. (forthcoming) "Fractional" working and learning in project teams: From the "activity system" to "project assemblage" as the unit of analysis.

Guile, D., & Wilde, R. J. (2018). Articulating value for clients: An 'immaterial' practice-based perspective on working and learning in a global engineering consultancy firm. *Journal of Education and Work*, 31(5&6), 519–532. http://doi.org/10.1080/13639080.2018.1535699.

Guile, D., & Wilde, R. J. (2022) Complexity theory and learning: Less Radical than it Seems? In P. Hager & D. Beckett (2022) (Eds.). *Special Edition of Educational Philosophy and Theory Refurbishing Learning via Complexity Theory*. https://doi.org/10.1080/00131857.2022.2132934

Guile, D. (2019). The concept of "recontextualization": implications for professional, vocational and workplace Learning. *Learning, Culture and Social Interaction*, 23. https://doi.org/10.1016/j.lcsi.2019.100343

Guile, D. (2010) *The Learning Challenge of the Knowledge Economy*. Rotterdam: Sense Publishers.

Commented [11]: Please indicate where the in-text callout for this Reference should appear in the text.

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Commented [GD16R15]: Reference above changed to 2012

Hager, P. and Beckett, D. (2019) *The Emergence of Complexity: Rethinking education as a social science*. Cham, Switzerland: Springer.

Kaptelinin, V. (2005). The object of activity: making sense of the sense-maker. *Mind, Culture, and Activity*, *12*(1), 4–18. https://doi.org/10.1207/s15327884mca1201_2.

Knorr Cetina, K. (2010). The epistemics of information. *Journal of Consumer Culture 10* (2), 171–201. https://doi.org/10.1177/1469540510366641.

Latour, B. (1987). *Science in Action: How to Follow Scientists and Engineers Through Society*. Harvard University Press.

Lave, J., & Wenger, E. (1991). *Situated Learning: Legitimate Peripheral Participation*. Cambridge University Press.

Law, J. (2002). *Aircraft Stories*: *Decentering the Object in Technoscience*. Duke University Press.

Lundin, R. A., & Söderholm, A. (1995). A theory of the temporary organization. *Scandinavian Journal of Management*, *11*(4), 437–455.

Maister, D. (1993). *Managing the Professional Service Firm*. Simon & Schuster.

Malloch, M., Cairns, L., Evans, K., & O'Connor, B. (Eds.) (2021). *The SAGE Handbook of Working and Learning*, Sage.

Moulier Boutang, Y. (2012). *Cognitive Capitalism*. Polity Press.

Nieto-Rodrigues, A., & Evard, D. (2004). *Boosting Business Performance Through Programme and Project Performance.* www.mosaicprojects.com.au/PDF/PwC_PM_Survey_210604.pdf

Redding, P. (2012). The role of work within the processes of recognition in Hegel's idealism. In H. Smith & J. Deranty (Eds.). *New Philosophies of Labour: Work and the Social Bond* (pp: 39–62). Brill.

Schwartz, O. (2021). *Sociological Theory and Digital Society*. Polity Press.

Commented [17]: Please indicate where the in-text callout for this Reference should appear in the text.

Commented [GD18R17]: I have changed the date of the reference in the text

Spinuzzi, C. (2012). Working alone, together: coworking as emergent collaborative activity. *Journal of Business and Technical Communication*, *26*(4), 399–441. https://doi.org/10.1177/1050651912444070.

Sydow, J., & Staber, U. (2002). The institutional embeddedness of project networks: the case of content production in German Television. *Regional Studies*, *36*(3), 215–227. https://doi.org/10.1080/00343400220122034.

Thévenot, L., Moody, M., & Lafaye, C. (2002). Forms of valuing nature: arguments and modes of justification in French and American environmental disputes. In M. Lamont & L. Thévenot (Eds.). *Rethinking Comparative Cultural Sociology* (pp. 229–273). Cambridge University Press.

Van Nordenflycht, A. (2010). Is a professional service firm? Towards a theory and taxonomy of knowledge-intensive firms. *The Academy of Management Review*, *35*(1), 155–174.

Wilde, R.J., & Guile, D. (2021). Client-facing interprofessional project teams: the role of engineers' 'situated judgment'. *Engineering Studies*, *13*(3), 185–204. doi.org/10.1080/19378629.2021.2005073.

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