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**Social interactions in construction design
team meetings**

H F Ponton

PhD

2021

**Social interactions in construction design
team meetings**

Hazel F Ponton

A thesis submitted in partial fulfilment
of the requirements of the
University of Northumbria at Newcastle
for the degree of
Doctor of Philosophy

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Abstract

The design process for construction projects is widely recognised as being challenging to manage. This is partly due to the fragmented nature of the design and construction. How designers and constructors interact at this interface merits investigation. This study examines how the designers and constructors interact with one another during design team meetings and how these social interactions affect group decision-making. An ethnographic, non-participatory observer approach was adopted to gather qualitative data from seventeen consecutive design team meetings across three live case study projects. The primary data is 360° panoramic audio and visual video-camera footage. The nature of the data allowed for observation and analysis of all the meeting participants' simultaneous verbal and non-verbal actions and reactions. An ethnographic account of the social interactions during the design meetings is presented as a thick description to present a detailed narrative of the group behaviour. The social cohesion and intragroup conflict events, which are identified as the dominant forms of interactions, were collated into packets of rich data. These packets were organised and structured using NVivo computer-assisted qualitative data analysis software. Conversation extracts are presented to provide a deep level of analysis of typical social events. The results of the analysis show that instances of social cohesion and intragroup conflict perform distinct functions that impact the design coordination and decision-making process. The results also indicate that social cohesion is created and fostered through humour, familiar behaviour patterns and demonstrations of solidarity, praise and support. The presence of social cohesion allows potentially dysfunctional task and process-related conflict to be mitigated successfully. The study contributes to knowledge and practice through a greater understanding of theories of organisational behaviour when applied to interdisciplinary project teams and group decision-making. It also makes a methodological contribution in terms of the novel (in this context) use of a 360° panoramic camera to gather verbal and non-verbal audio and visual, simultaneous data from a “central” position.

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Ponton, H., Osborne, A., Greenwood, D. and Thompson, N. (2019) 'Exploring the designer-constructor teamwork interface to improve collaboration: a review of current literature', in *Proceedings of the 35th Annual ARCOM Conference, 2-4 September*. Leeds: ARCOM, pp. 324–333.

Ponton, H., Osborne, A., Thompson, N., and Greenwood, D. (2020) 'The power of humour to unite and divide: a case study of design coordination meetings in construction', *Construction Management and Economics*, 38(1), pp. 32–54.

List of acronyms

2D	-	2 Dimensional
3D	-	3 Dimensional
Arc	-	Architect
ARCOM	-	Association of Researchers in Construction Management
BIM	-	Building Information Modelling
BREEAM	-	Building Research Establishment's Environmental Assessment Method
C	-	Constructor (for example, CCM = Constructor Construction Manager)
CCTV	-	Closed Circuit Television
CIOB	-	Chartered Institute of Building
CIDM	-	Contractor-led Design Meeting
Clr	-	Client representative
CM	-	Construction Manager
D	-	Designer (for example, DArc = Designer Architect)
DM	-	Design Manager
Eng	-	Engineer
IPA	-	Interaction Process Analysis
MEP	-	Mechanical, Electrical and Plumbing
PM	-	Project Manager
QS	-	Quantity Surveyor
RIBA	-	Royal Institute of British Architects

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Many people have helped shape the research and provided support over the last six years. I would like to take this opportunity to express my sincere gratitude and appreciation to the following people. Thank you to my supervisor Dr Allan Osborne for all his advice and encouragement, and for giving me the freedom and confidence to pursue a very different type of research project compared to most research in my field. Thank you to my supervisor Professor David Greenwood for his wisdom, particularly during the writing up phase. David has been a role model to me for 25 years. I am glad that he was with me on this journey. Thank you to Neill Thompson for agreeing to be my supervisor. Without his expert knowledge, this PhD would not have been possible. I am particularly grateful for all his time, feedback and enthusiasm during the data analysis process.

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A huge thank you to my parents for supporting me in everything I do. Thank you to my family and friends for your ongoing support and interest in the research. And lastly, a huge thank you to my husband, Jonny. Thank you for always believing in me and having patience during all the (very) early mornings I spent working in my study.

Dedicated to Joe and Tom
– *dream big, work hard, stay focused,*
and surround yourself with good people.

Declaration

I declare that the work contained in this thesis has not been submitted for any other award and that it is all my own work. I also confirm that this work fully acknowledges opinions, ideas and contributions from the work of others.

Any ethical clearance for the research presented in this thesis has been approved. Approval has been sought and granted by the Faculty Ethics Committee on 10th November 2017 (submission Ref: 2451).

I declare that the Word Count of this Thesis is 80,909 words

Name: Hazel Ponton

Signature:

Date: 10th December 2021

Reflexivity statement

A reflexive statement will be provided that includes specific details about the researcher's experience and how this knowledge has shaped the current study. The “I” refers to the researcher of the current study.

I would like to start by disclosing my experience and background, which shapes my social gaze (Bourdieu and Wacquant, 1992; Löwstedt, 2015) and reflexivity (Hammersley and Atkinson, 2007; Schweber, 2015). Reflexivity refers to the explicit reflection of the observers personal and theoretical biases, which need to be taken into account when examining assumptions and drawing conclusions. After completing a BSc (Hons) Building Management degree in 2000, I gained 10-years of experience working on construction projects for two of the largest main contractors in the UK. My roles evolved from a site engineer to a construction manager. I regularly attended contractor-led design meetings during this period. Since 2011 I have been employed as a Senior Lecturer in Construction Management. I have taught a wide variety of subjects, including Design Management. This wealth of knowledge and experience cannot be ignored while carrying out ethnographic research. I found my experience beneficial because I could follow the meeting discussions, which regularly became highly technical. Ethnographic research that requires a deep understanding of the design coordination conversations would be challenging for a researcher without the necessary knowledge and experience.

Having spent ten years working on construction projects, my preconceptions of the meetings matched reality. I expected (to name a few things) the meetings to take longer than the participants wanted them to, at least some of the design information would be late, and the general atmosphere of the meetings would be informal, with occurrences of humour, banter and expletives. Although ethnographic studies do not aim to test a hypothesis, according to Hammersley and Atkinson (2007), these preconceptions could affect my sociological gaze when examining practice. For example, my education and background have firmly placed me in the “tribe of construct” (Eynon, 2013). This bias became apparent during the third meeting I observed. The below quote is taken directly from my field notes:

For the first time, I have become aware of my bias in favour of the construction team, i.e., I am on the construction team's side. This realisation occurred during a discussion about an internal manhole. My industry experience tells me that internal manholes are a bad idea to build, to maintain and to live with.

The quotation demonstrates the importance of reflexivity by the researcher to acknowledge personal bias. However, the quotation also illustrates the advantage of my insight and knowledge of the setting and the conversations taking place. A researcher without prior industry experience

would not necessarily be aware of the long-term and broader impact of design discussions and decisions. Identifying and recognising bias can allow greater subjectivity during the ethnographic process while still accepting and embracing that the ethnographic experience is intrinsically personal (Van Maanen, 2011). *Who* the ethnographer is influences *what* is observed and *how* regarding the case study setting (Jarzabkowski, Bednarek and Cabantous, 2015).

Chapter 1 Introduction

1.1 Background and rationale of the study

The construction industry has long since been criticised for low productivity and poor performance; a view supported by Andersen and Langlo (2016) and Emmitt and Ruikar (2013). As early as the Philips Report (1950) and the Emmerson Report (1962), the construction industry has been told that it requires a change in attitude and culture to improve collaboration, coordination, and communication. The more recent Farmer Review supports the need to improve project communication (Farmer, 2016). The review highlights fragmentation and adversarial behaviour problems, including negative working practices in construction project teams. One of the outcomes of this drive for change through government reports is the increase in popularity of contractor-led procurement routes that have led primary or main contractors to take more responsibility for the design subprocess. According to Alaqad *et al.* (2020), the move to contractor-led procurement routes should improve client satisfaction through improved quality and productivity, and reduce cost and time. However, given the long history of systemic problems present in the construction industry, changing how the industry operates will be a challenge.

Mitchell *et al.* (2011) highlight that the effect of new procurement routes means main contractors are often contractually responsible for and thus need to manage the entire design process. Kelly, Morledge and Wilkinson (2002) suggest that although the design process accounts for a relatively small proportion of the overall project cost, the decisions made significantly impact projects' characteristics, construction, and whole-life cycle. Tjell and Bosch-Sijtsema (2015) and Emmitt (2016) state how vitally important the effective management of the design process is to a construction project. El Reifi *et al.* (2013) and Emmitt (2016) agree that this management process is vital, particularly during the early design development phase, due to its propensity to create uncertainty from uncertainty through an iterative process. Therefore, the design decisions by the main contractor are of particular importance to the overall project during the early stages of design development.

Emmitt and Ruikar (2013) argue that due to the uncertainty and complexity of construction projects, the most critical inter-relationship within a site-specific, project-based organisational structure is the dynamic relationship between design and construction subprocesses. Mehrbod *et al.* (2018) highlight the extensive knowledge of building systems required by the disciplines involved with the design coordination process. Dewlaney and Hallowell (2012) support the notion that designers and constructors from different disciplines need to share their knowledge and make good decisions about the design to create a design that fulfils the client's brief and allows a safe, sustainable and cost-effective construction process. Atkinson and Westall (2010) emphasise how effective relations between designers and constructors are vital when striving for high levels of

integration and coordination. Knotten *et al.* (2015) supports this view and stress the importance of effective communication, decision-making, and team management. In other words, managing the relationships and social interactions between designers and constructors are key success factors to good design management and successful project outcomes.

Çıdık and Boyd (2020) and Gorse and Emmitt (2007) emphasise the lack of construction-specific applied research that explicitly examines social interactions during a construction project's design coordination and management process. Gorse and Emmitt state that there is a need to better understand the forms and functions of communication before advice on how to improve communication can be offered to construction teams. Çıdık and Boyd suggest that most construction management research that looks at the coordination of construction design tends to focus on the integration or fragmented discipline-specific design-related tasks and their associated outputs rather than examining the social interactions between team members in different disciplines. Mehrbod *et al.* (2018) emphasise the importance of *how* designers and constructors communicate during design coordination meetings, including the use of 2D and 3D artefacts. They also acknowledge that scant attention is being paid to behavioural approaches in understanding this critical relationship; instead, research predominantly focuses on operational improvements and technological advancement. Ershadi *et al.* (2021) extend the debate of *how* project teams collaborate to *where* they collaborate, specifically the variables of construction project offices. Overall, existing literature agrees that a current gap in knowledge exists regarding the social interactions during the design coordination process of construction projects. Of particular need for inquiry is the social interactions between different disciplines involved in the design process. This gap includes an understanding of *how* the disciplines communicate and the functions of this dialogue. The gap in knowledge includes verbal conversations while extending to the broader non-verbal and material aspects and the physicality of the setting. This research project will aim to contribute to this gap in knowledge.

The research field of organisational behaviour will be used as a lens to understand better the social interaction behaviour of construction project teams involved in the design process. Organisational behaviour provides insight and advice to organisations on making teams work effectively in an organisational setting. Organisational behaviour has been defined as “... *the study of the structure and management of organisations, their environments and the actions and interactions of their individual members and groups*” (Huczynski and Buchanan, 2017, p. 6). Figure 1.1 summarises the field of organisational behaviour, according to Walker (2011, p. 4).

Figure 1.1: The disciplines constituting the field of organisational behaviour with examples of their contributions. Source Walker (2011)

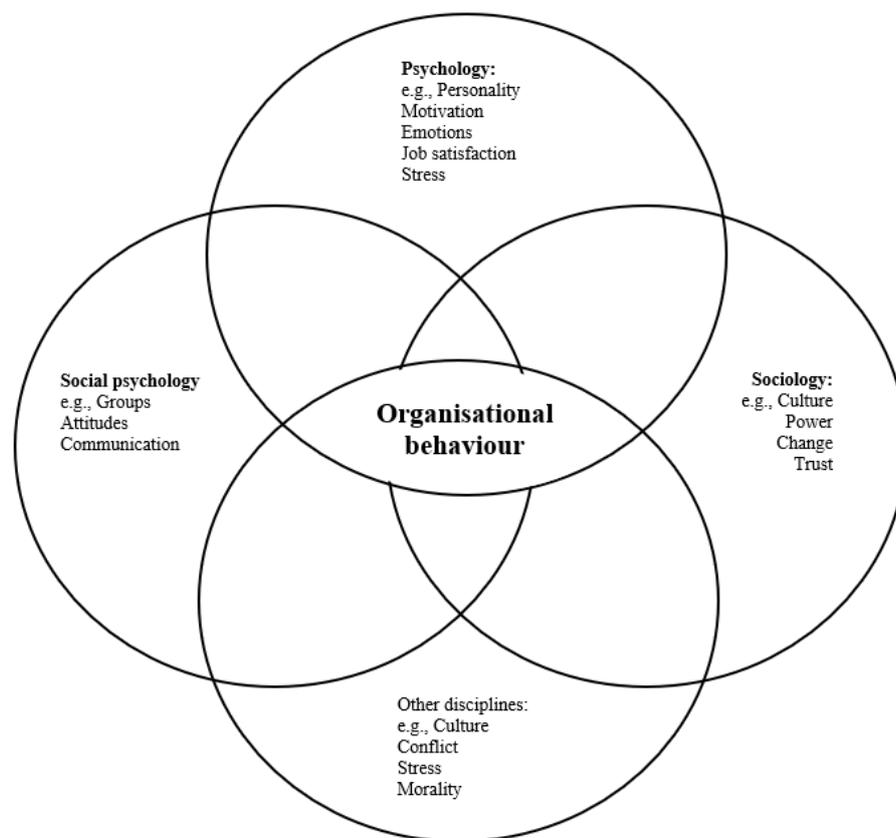


Figure 1.1 illustrates how organisational behaviour draws from the research disciplines of psychology, social psychology and sociology. According to Walker (2011), psychology focuses on the individual and their behaviour and interactions with their environment. Social psychology is concerned with social groups and the group's influence on the individuals, and sociology is the study of social systems such as organisational groups. Group and individual behaviour will need to be examined to understand the social interactions of the disciplines involved in the design process. Therefore, organisational behaviour is the appropriate research field for the current study.

The aim, objectives and intended contribution to knowledge will next be presented to provide an overall scope to the study. An overview of the methodology will present the gap in construction research for alternative approaches to research, beyond the traditional positivist and quantitative strategies, to tackle the current construction industry challenges. This section of the chapter will also include a discussion about ethnography, specifically video ethnography, which is the chosen method for collecting the data. A summary of the data collection process will be provided as an overview of how the research was conducted. Finally, a summary of the thesis chapters is given to provide the overall structure of the chapters.

1.2 Aim, objectives, and intended contribution to knowledge

1.2.1 Aim

The aim of the research is to investigate the impact of social interaction on decision-making in construction project design meetings. The following objectives represent the steps to be taken to achieve the aim.

1.2.2 Objectives

The objectives are as follows:

- 1. To review the relevant literature on project work teams, specifically in the construction industry, to provide a theoretical background of knowledge and theory pertinent to examining its social interactions.*
- 2. Having identified contractor-led design meetings as the most appropriate setting to observe such social interactions, to identify the dominant and recurring themes and patterns of social interaction behaviour during these meetings.*
- 3. To review relevant literature about the themes of social interaction behaviour and team decision-making, from theories found within the field of organisational behaviour.*
- 4. To extract from the meeting observations typical examples of social interaction events and to analyse these from the standpoint of theories of organisational behaviour.*
- 5. To reconsider how episodes of social interaction are understood (by academics and practitioners) and the impact that they might have on group interaction during meetings while confined to those data and phenomena observed.*

1.2.3 Intended contribution to knowledge

By observing the social interactions during ‘live’ CIDMs of design and build procured projects, team decision-making can be better understood through the lens of social interaction theories found within organisational behaviour.

It is intended that the proposed research will make a contribution to:

- A greater understanding of organisational behaviour theory relating to team social interactions and decision-making.

- A greater understanding of the method of collecting, analysing and understanding data gathered from ‘live’ team meetings.

A summary of the methodology will next be provided.

1.3 Research methodology: video ethnography

Seymour and Rooke (1995) highlight the dominance of positivist and quantitative methodologies in construction management research. Dainty (2008) concludes that little had changed a decade later, with only 8.4% of research surveyed using exclusively qualitative methods. Dainty suggest the historical dominance of quantitative strategy has fostered a convention of applying a natural science strategy to understand social phenomena in construction research, even though this approach is not always appropriate. More recent research by Agyekum-Mensah, Reid and Temitope (2020) discovered that various novel approaches are being adopted to conduct construction research and urge the use of more diverse approaches to aid industry performance. Overall, the literature encourages the execution of construction research using a methodology and method appropriate to the individual research project to generate or develop theory without being constrained by construction domain traditions.

The current study adopts an ethnographic approach, which aligns with the call for alternative strategies to traditional positivist and quantitative construction research. Reeves, Kuper and Hodges (2008, p. 337) define ethnography as *“the study of social interactions, behaviours, and perceptions that occur within groups, teams, organisations, and communities”*. According to Tutt and Pink (2019), ethnography has a vital role to play in construction research because it is sensitive to the local context by observing the practice of work as it is experienced and played out, which includes the cultural context of organisational and project life. Tutt and Pink report that the volume of construction research that adopts an ethnographic lens is increasing and that future ethnographic research in construction should focus on global issues that can be observed at a local level. This form of analysis where a micro view is adopted for macro problems can offer new questions, insights and understanding of human actions, feelings, tensions and relationships, including interpersonal attributes such as group needs, frustrations, hopes and anxieties. By further understanding these social phenomena, Tutt and Pink suggest the industry can tackle its enduring challenges. The current study investigates these human behaviours at a team level to provide a more generalizable view that can be transferred more widely to benefit project teams during decision-making meetings beyond the construction industry setting. Figure 1.2 provides an overview of the research project.

Figure 1.2: Research project overview

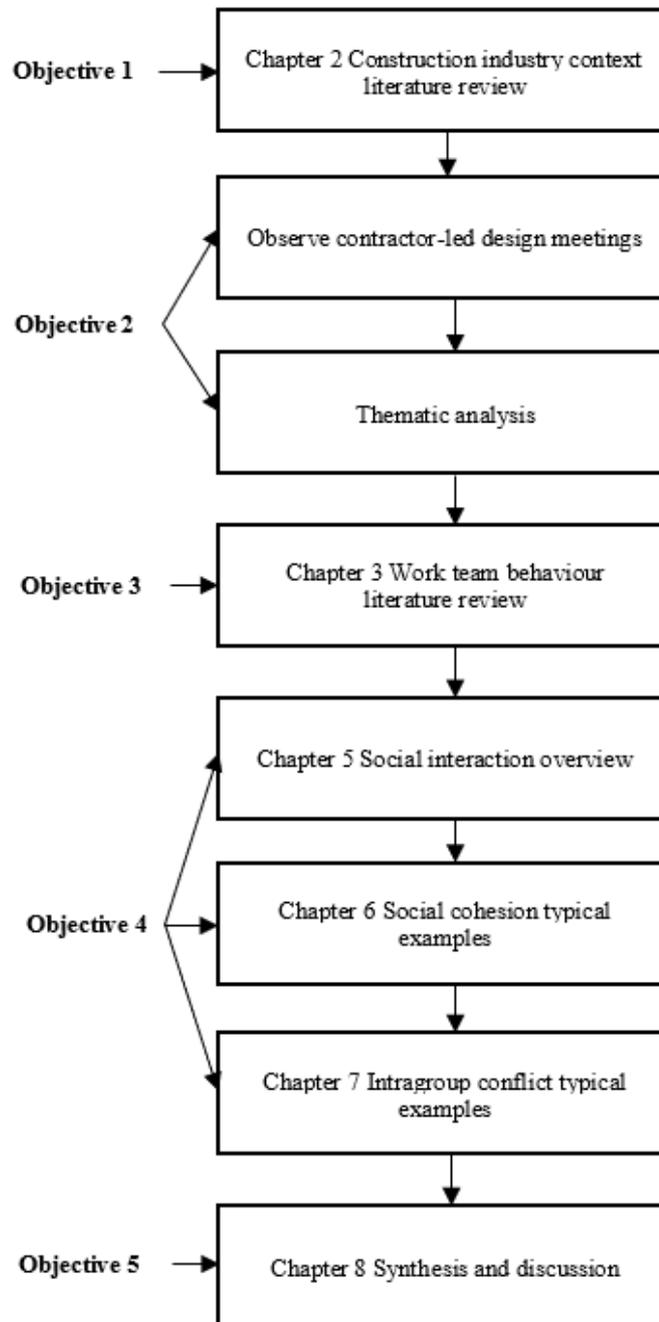


Figure 1.2 demonstrates the inductive nature of the study and how the objectives are linked to the chapters. Full details about the methodological design and the method of collecting, structuring and analysing the data are given in Chapter 4.

1.4 Conducting the research

The first stage of conducting the research involved a review of the relevant literature about project work teams, specifically in the construction industry. The review provides a theoretical background of knowledge and theory pertinent to examining social interactions in this setting. (For full details,

see Chapter 2). As a result, and considering the nature of the subject and the available data collection methods, a longitudinal, video ethnography observational approach was adopted. This approach allows the data collection to capture the dynamic social relationships across time and in a natural, 'live', work environment to provide an authentic construct of the team social interactions themes. The observations focused on the social interaction behaviour, including verbal and non-verbal exchanges and reactions between the meeting participants. The social interactions included behaviour that reflects the relationships in the group.

The observations of the contractor-led design meetings (CIDMs) took place over ten months in 2018. Seventeen meetings were observed across three case study projects, creating thirty-four hours of video footage. CIDMs of construction design and build procured projects were video captured and observed during the early design phase. The meetings were observed to consider the social dynamics during the *forming* stage of team development (Tuckman and Jensen, 1977), such as establishing group norms, socialisation, creating social cohesion, and managing intragroup conflict. The current research project is based on the data from these four projects (the Pilot Study and Case Studies A, B and C). To provide a similar context to the case study observations, the criteria for selected projects included the same main contracting organisation. The projects were all privately funded and procured using a design and build form of contract. The projects were also all located in the same region to limit the influence of possible regional subcultures influencing the data. All the projects were 'live' during 2018 (when the observations took place), and finally, the whole project team provided consent for the meetings to be observed and video recorded.

During similar studies that have observed construction and design team meetings (for example, see Gorse and Emmitt, 2007; Mehrbod *et al.*, 2018; Kiernan, Ledwith and Lynch, 2019), an issue has been how to capture the maximum amount of data, while still gaining consent to access the setting. A particular novelty of this study is the use of a 360° panoramic video camera. Earlier studies relied on the use of field notes only (see Gorse *et al.*, 2006), audio recordings (see Kiernan, Ledwith and Lynch, 2019) or video recordings (see Mehrbod *et al.*, 2018). The video recordings method used by Mehrbod *et al.* captured the most information during the meetings, compared to field notes and audio recordings. However, their video footage only captured one perspective of the room, with a number of the participants sitting with their backs to the camera. For the current study, 360° panoramic video recordings form the primary data for the research project. During all the meetings, the video was positioned in the centre of the meeting room table. The current research project offers a new "central" perspective, where the activities occur around the video while the video captures the action from all directions. The 360° panoramic camera simultaneously captured the visual, verbal and non-verbal information during the meetings. Plus, repeated observations of the data allowed for a rich understanding of the setting. The use of a 360°

panoramic video is a new approach in team, organisational and construction-specific research. The current study will provide a contribution to knowledge of this method of data collection.

The researcher attended all the meetings as a non-participating observer. The participants of the meetings included representatives from the main contractor construction team and sub-contracted design disciplines, such as the architect, structural engineer and mechanical, electrical and plumbing (MEP) engineer. The field notes of the participant's social interaction behaviour supplement the primary data source of the video recordings and provide a perspective of the social interactions in the room, such as emotions and feelings of cohesion and tension. In addition, the meeting minutes recorded and distributed by the design managers also supplement the primary data source to verify conversations and decisions made during the meetings.

The first step in structuring the data was to reflect on the field notes, which noted trends and patterns in behaviour during the meetings. From these trends and patterns, preliminary themes were identified. These themes included social cohesion, intragroup conflict, group norms, decision-making, interdisciplinary working, and the physicality of the meeting room. These themes became the starting point of structuring the thirty-four hours of video footage. Next, the video data was repeatedly observed to identify specific social interaction events. When the participants displayed any behaviour that either matched one of the social interaction themes or was a new theme, the time on the video was noted, and a code name was created. This iterative process continued until the researcher identified no other new patterns of behaviour or sub-themes. Thus, a total of 329 social interaction events were identified across the three case study projects.

Next, NVivo software was utilised to create a thematic analysis by organising and structuring the 329 social interaction events. The researcher watched the video recording of each social interaction again and thematically coded each one. Inductively coding the events allow themes to emerge. Themes were identified by observing repetition or patterns in the group behaviour. The two dominant parent nodes or themes of social cohesion and intragroup conflict emerged from the data. These themes became the primary themes of the study. It should be noted that the thematic analysis in the current study is a tool to identify trends and patterns in behaviour. It is not a tool to carry out a quantitative analysis of the primary data. Instead, a detailed conversation analysis took place of typical conversation extracts initially identified as social interaction events through a thematically structured process.

The next step of structuring the social interaction events captured was selecting the events to analyse in detail. To ensure rigour was achieved, the principal researcher and two peers watched the video recordings of a range of typical social interaction events per theme as part of a workshop. They discussed each event and the interpretation the researcher had drawn from it. This process

represents the “critical friend” approach (Smith and McGannon, 2018), whereby the interpretation and consideration behind the coding and thematic classification of the events were discussed. Then critical feedback was provided. A total of twenty-two typical events were selected across the dominant themes of social cohesion and intragroup conflict. A thematic analysis was also created using the field notes and the meeting minutes. These supplementary documents were also inductively structured using the NVivo software. The themes of this process included the communication milieu, functions of the meeting, group norms, cohesion, conflict and the physical setting. This thematic analysis forms the basis for the thick description included in Chapter 5 – Social interaction overview.

Once the primary data of the video recording social interaction events were structured and the typical events selected, the next step was to analyse the events in detail. This process required a multi-faceted approach. Firstly, the conversation extracts were transcribed using the Jeffersonian Lite (Jefferson, 2004) system of transcription notation. Secondly, the typical conversation extracts were deconstructed by applying discursive devices to specific words and phrases. The discursive devices (taken from social psychology) were adopted to consider the role and function of individual words and phrases to examine the conversations contribution to the group dynamics. The discursive devices help locate clues in the conversation that the researcher can examine further to help interpret what is going on. Finally, the conversations were analysed. The analysis process utilised the theoretical background of knowledge and theory presented in Chapters 2 and 3 as a lens to interpret the team behaviour. In addition, the considerable knowledge and experience of the researcher were also utilised. A “member reflection” meeting took place to ensure rigour to the research findings. The meeting engaged original participants to the CIDMs. The participants were asked to reflect on and provide feedback on the research findings. An “audit” of research documentation has also been executed to ensure the researcher can defend the process and decisions made during the study.

Finally, it should be noted that the ability to fully understand the highly technical conversations that occurred during the CIDMs, which include specialist terminology and inferred (not explicitly stated) information, relies on the extensive industry experience of the researcher. Without this wealth of knowledge, it would be challenging for another researcher to replicate the level of structuring and analysis carried out during the current study.

1.5 Structure of the thesis

The following is a summary of each chapter of the thesis.

Chapter 1 Introduction - The chapter provides an overview of the research project. Background of the importance of effective construction design coordination is discussed to provide the scope of the research. The aim and objectives are presented, including the initial intentions for the contribution to knowledge. A summary of the methodology and method is provided.

Chapter 2 Construction industry context – A review of the relevant literature about project work teams, specifically in the construction industry is presented, to provide a theoretical background of knowledge and theory pertinent to examining social interactions in this setting. A review of existing literature about works teams is provided. Then consideration is given to the UK construction industry as a project-based industry. Characteristics of construction project teams are presented. The review of relevant literature identifies the social interactions during ‘live’ CIDMs of design and build procured projects as an appropriate unit of analysis for the current study.

Chapter 3 Work team behaviour - A review of relevant literature about social interaction behaviour identified during the observations of the CIDMs is presented. The theories found within the field of organisational behaviour include; the stages of team development, group norms, team socialisation, social cohesion, communication climate, and intragroup conflict. Team decision-making theory and knowledge relevant to the study are also reviewed.

Chapter 4 Methodology – The application of the social sciences to examine construction practice is first considered. Next, the philosophical stance and the methodological design for the current study are justified. A description of the data collection method and ethical considerations is next provided. And finally, a justification for a Future Research Agenda is included as a contribution to knowledge.

Chapter 5 Social interaction overview and discussion – An ethnographic account of the social interactions is presented to provide a detailed narrative of the team behaviour. The thick description focuses on social interaction behaviour, including verbal and non-verbal exchanges and reactions between participants, reflecting the group's relationships during task-orientated and non-task discussions.

Chapter 6 Social cohesion findings and discussion - During this chapter, typical examples of social interaction events are presented as conversation extracts and discussed in detail. The discussion includes typical examples of social interaction behaviour relating to familiar behaviour, humour, banter, and solidarity, praise and support.

Chapter 7 Intragroup conflict findings and discussion – The chapter content focuses on the intragroup conflict behaviour observed during the CIDMs. Typical examples of conversation

extracts are presented and discussed in detail. The examples of intragroup conflict behaviour include conflict due to; late design information; a designer not attending the meeting; conflict during collaborative working, and conflict due to a design change request.

Chapter 8 – Synthesis and discussion - Impact of social interactions on team decision-making

discussion – The chapter draws together the three previous data chapters (5, 6 and 7) to consider the impact of the social interactions observed on team decision-making practice. The impact of social interactions on team decision-making is discussed from the following perspectives: the impact of process gain; of process loss; of social cohesion; of intragroup conflict; and finally, of the physicality of the meetings.

Chapter 9 – Conclusion – The research study aim and objectives are addressed during the final chapter of the thesis. The overall research contribution to knowledge is presented regarding the contribution to theory and method. Recommendations for future research and a summary of the limitations of the study is also included.

The next chapter will review the relevant literature about construction project teams, including the challenges of managing the design-construction interface.

Chapter 2 Construction industry context

2.1 Introduction

The aim of the research is to investigate the impact of social interaction on decision-making in construction project design meetings. This chapter will address the first objective - *To review the relevant literature on project work teams, specifically in the construction industry, to provide a theoretical background of knowledge and theory pertinent to examining its social interactions.*

The review of relevant knowledge and theory will allow the unit of analysis for the current study to be identified.

In this chapter, the traditional approach to work teams will be examined. Consideration will be given to why this approach has changed in recent decades. Next, the background of the construction industry as a project-based industry will be provided. The focus of the chapter will then move to the construction industry's unique characteristics regarding the designer-constructor interface, team membership and current understanding of social interaction behaviour.

2.2 Project work teams

2.2.1 Traditional work teams

Management's role in designing systems and controlling their operations became known as *scientific management*. This area of research originates from Taylor (1923). Whereas classic *scientific management* was concerned with work processes, a later participative approach with its origins in McGregor's work (McGregor and Cutcher-Gershenfeld, 1960), adopted two sets of assumptions about workers, known as *Theory X* and *Theory Y*. *Theory X* managers assume workers are inherently lazy and need to be controlled. In contrast, *Theory Y* managers assume that workers naturally want to work and take responsibility. In turn, the trust will motivate workers to commit to the task. Both *scientific management* and *Theory X* and *Y* as a managerial assumption are rather simplistic. Later work by Ouchi introduced *Theory Z* (Azumi and Ouchi, 1981). This Japanese management style became popular during the Asian economic boom of the 1980s. The theory focuses on increasing employee loyalty to the organisation by focusing on employee well-being and the reassurance of a "job for life". Management theory has significantly developed since the early *scientific management* approach. *Theory Z* reflects a greater emphasis on providing for employees' needs rather than on how to control employees actions and behaviour.

2.2.2 Contemporary work teams

According to a number of authors, including Kozlowski and Bell (2012), Mathieu *et al.* (2008) and Sundstrom *et al.* (2000), work teams are ingrained in the contemporary workplace. Salas,

Reyes and McDaniel (2018) emphasise how worker characteristics, job roles, and organisational structure changes have increased the interest in team dynamics rapidly over the last few decades. Bertolotti *et al.* (2015) discuss how organisations have shifted to using work teams to respond to fast-paced and dynamic business environments. According to Larson, McLarnon and O'Neill (2020), the characteristics of people, jobs, and organisations have changed. Workers are increasingly required to; carry out non-routine tasks, continually improve products or services, deal with complex tasks (beyond the knowledge and expertise of a single person) and take into account customer needs and tight deadlines. Greater demand for higher quality products and services and a need to rapidly react to changing markets and business environments are also growing requirements of a successful organisation. One of the core notions of work teams is that organisations require teams to create a commitment-based structure based on worker responsibility, autonomy, and empowerment.

Caruso and Woolley (2008) stress the benefits of a work team containing a diversity of knowledge rather than highly skilled individuals. Organisations need work teams because few individuals possess the necessary knowledge, skills, and expertise to complete a complex or intricate task or independently solve difficult problems. Add to these issues, the changes in workplace technology requiring increasing innovation and flexibility and organisations' need to create teams, rather than depend on individuals, are evident. Bertolotti *et al.* (2015) discuss how working in teams can also benefit the organisation in the long term as team members can learn from the group interactions, transfer knowledge, and benefit from best practices. Summers, Humphrey and Ferris (2012) also contribute to the team membership debate by suggesting that a positive working environment can help generate new perspectives when analysing problems and creating alternative solutions.

The world of work is becoming more varied and increasingly complex through its processes and technology use, a view supported by Levi and Askay (2021), who identify that organisations need to continually reduce costs, improve quality, improve customer services, and their ability to react to changing markets to remain competitive in an increasingly competitive global market place. These reactive drivers create an organisational requirement to deliver a wide range of demands. By creating an environment where work teams, rather than individuals, are the solution in many workplaces, these demands can be met and exceeded. The chapter will next consider UK construction as a project-based industry.

2.3 UK construction – a project-based industry

It is generally agreed that the construction industry is a site-specific, project-based industry. This view is supported by Vrijhoef and Koskela (2005, p.13), who state that “*Construction is dominated by project-based production organisations [who] are constructed from relatively independent*

participants joining in constantly changing one-off coalitions of firms". However, a small number of authors have considered if this is the case. For example, Groak (1994) argued that construction is not an industry, rather an agglomeration of projects. He concluded that the description of construction as an industry is limited and misconceived. A different perspective is provided by Dubois and Gadde (2002), who question whether construction is an industry, as most writers would suggest, or a loosely coupled system of projects. However, neither of these perspectives have gained considerable support. Construction is generally recognised as a project-based industry in most academic and industry literature and will be categorised as such for the purposes of this study.

The dominant one-off, project-based nature of construction influences its organisational structure, which has evolved through historical and economic forces, into a highly fragmented form, with many different types and sizes of organisations operating within it (see, for example, Vrijhoef and Koskela, 2005). According to Andersen and Langlo (2016), this high level of fragmentation increases complexity and reduces efficiency. Where relatively independent participants are involved in continually changing and temporary coalitions. Vrijhoef and Koskela (2005) highlight a clear link between industry characteristics (for example, unique-product production), project culture (such as non-homogeneous, informal and distinct to each project) and industry problems. In summary, the project-based industry characteristics and project culture are at the root of the industry's fragmentation and a one-off, temporary approach to production. These characteristics and project culture make the construction industry an interesting yet challenging setting for this research study.

2.4 Construction project teams

The background to project teams in the context of the UK construction industry will next be considered. An examination of the designer – constructor interface will be reviewed, including a review of the idea of "tribes" of designers and constructors.

2.4.1 UK construction project team background

The construction industry has long since been criticised for low productivity and poor performance, a view supported by Andersen and Langlo (2016) and Emmitt and Ruikar (2013). As early as the Philips Report (1950) and the Emmerson Report (1962), the construction industry is viewed as requiring a change in attitude and culture to improve collaboration, coordination and communication. These failings, Knotten *et al.* (2015) argues, are partly due to deficiencies in construction design management. The Latham (1994) and Egan (1998, 2002) reports that target the UK construction industry call for greater collaboration and innovation. The Latham (1994) review cites the lack of sufficient money and trust as factors that choked the industry through chronic

conflict. The Latham Report portrays the conflict as an undesirable phenomenon that requires removal from the construction process to secure a better future for the industry's clients. To attain his goal, Latham recommends the industry develop a system for effective project coordination and communication with the intention being to minimise the incidence of claims and disputes. The need to improve project communication has recently been supported by the Farmer Review (Farmer, 2016). The review addresses the ongoing problems of fragmentation and adversarial behaviour, including negative working practices in project teams. One of the outcomes of this drive for change is the increase in popularity of contractor-led procurement routes that have led to primary or main contractors taking more responsibility for the design subprocess. According to Alaqaq *et al.* (2020), the move to contractor-led procurement routes should improve client satisfaction, through improved quality and productivity, and reduce cost and time. Male, Bower and Aritua (2007), supported by Greenwood *et al.* (2008), discuss how this development has resulted in those who traditionally directed the design subprocess finding themselves as subcontractors participating in interdisciplinary teams. The change in roles creates uncertainty that needs to be understood and managed.

The effect of new procurement routes, according to Mitchell *et al.* (2011), means main contractors are often contractually responsible for and thus need to manage the entire design process. Kelly, Morledge and Wilkinson (2002) raise the salient point that although the design process accounts for a relatively small proportion of the overall project cost, it significantly impacts the characteristics, construction, and whole-life cycle of projects. Tjell and Bosch-Sijtsema (2015) and Emmitt (2016) state how vitally important the effective management of the design process is to a construction project. Since the increase in popularity of contractor-led procurement routes (such as design and build), the need for effective management of the design process is widely acknowledged by authors such as Knotten, Lædre and Hansen (2017). El Reifi *et al.* (2013) and Emmitt (2016) agree this management process is especially important during the early design development phase due to its propensity for creating certainty from uncertainty through an iterative process. Knotten, Lædre and Hansen (2017), supported by El Reifi, Emmitt and Ruikar (2013) and Emmitt (2016), acknowledge a lack of research in managing the construction design process from the perspective of the processes but also the actors involved. The current research project aims to contribute to knowledge in this area relating to the actor's behaviour during the collaboration and coordination of the early project design phase.

Inherent complexity in project processes (which includes the design) is influenced by what Dubois and Gadde (2002) refer to as decentralised decision-making and financial control. In other words, project design is influenced by both the tight coupling in an individual project team and the loose coupling within the project's organisational dynamics. These two layers of interdependency leave the financial responsibility and authority with the project team rather than executive-level

management. The combined effect of unique and possibly uncertain site conditions and decentralised decision-making heightens the need for effective project management. Emmitt and Ruikar (2013) argue that due to the uncertainty and complexity of construction projects, the most critical inter-relationship within a site-specific, project-based organisational structure is the dynamic relationship between design and construction subprocesses. Accordingly, this research will involve an examination of designers and constructors as members of a construction project team involved with the design. The social interactions between these team members will be the subject of the study.

The individual disciplines of designers and constructors will next be reviewed in more detail. The crucial inter-relationship between the roles will also be considered to provide a theoretical background of knowledge and theory to examine this specific context.

2.4.2 The designer-constructor interface

Mehrbod *et al.* (2018) highlight the extensive knowledge of building systems required by the disciplines involved with the design coordination process. Project team members involved with design creation and coordination are predominantly individuals who are either professional designers or constructors. Within these two categories are a wide range of specific discipline specialisms such as the civil and structural aspects and the mechanical and electrical components. In addition, within these disciplines are highly specialised design areas, such as acoustics, landscaping and interiors, to name a few. For the purpose of this study, the term 'designer' will be used when referring to project team members with specialist design knowledge of building or infrastructure elements. The term 'constructor' will identify a construction project team member whose discipline and focus are constructing the project. Constructors include the project manager, construction manager, quantity surveyor, site engineer, and planner.

Dewlaney and Hallowell (2012) support the notion that designers and constructors from different disciplines need to share their knowledge about the design to create a design that fulfils the client's brief and allows a safe, sustainable and cost-effective construction process. Based on the work of Andreasen, Hansen and Cash (2015), Pikas *et al.* (2016) suggest the term *collaboration in design* be used to describe this complex phenomenon. Luck (2013) and, more recently, Deep, Gajendran and Jefferies (2019) support the widely recognised view of the importance of collaborative working between disciplines. Atkinson and Westall (2010) emphasise how effective relations between designers and constructors are vital when striving for high levels of integration. Knotten *et al.* (2015) supports this view and stress the importance of effective communication, interface management and team management; in other words, managing the relationships and interactions between designers and constructors are key success factors to good design management. Authors such as Barrett *et al.* (2013) and Emmitt and Ruikar (2013) acknowledge the challenges that

collaboration between designer and constructor creates, and they highlight the high dependency of effective management of the social process within the project team environment. Mehrbod *et al.* (2018) emphasise the importance of *how* designers and constructors communicate with each other during design coordination meetings, including the use of 2D and 3D artefacts. They also acknowledge that scant attention is being paid to behavioural approaches in understanding this critical relationship; instead, research predominantly focuses on operational improvements and technological advancement. Ershadi *et al.* (2021) extend the debate of *how* project teams collaborate to *where* they collaborate, specifically the success variables of construction project offices. Again, the researchers acknowledge the scant understanding in this area and call for future research. This research project will respond to these gaps in knowledge by investigating how and where designers and constructors interact, including the use of 2D and 3D artefacts.

Loosemore and Tan (2000) identify a potentially problematic environment that exists between professional construction disciplines due to deep-rooted stereotypes, which can result in intragroup conflict between team members. Vaux and Dority (2020) carried out a literature review that focuses specifically on relationship conflict in the construction industry. Vaux and Dority identified the top sources of relationship conflict as attitudes and personality traits, a lack of communication and withholding information. Malik *et al.* (2021) support the view that communication and conflict are linked in relation to project success. Their research suggests that relationship and process conflict harm communication through miscommunication. Qualitative research by Vaux and Kirk (2018) suggest that relationship conflict in construction teams is partly sourced from an “old-school” attitude that still exists in the construction industry. Particularly between project management and subcontractors. Old-school being an attitude of “*fist-pounding, yelling and screaming*” and “*my way or the highway*” (p. 043018032-5). Intragroup conflict is generally agreed in construction industry literature as problematic and something that requires further investigation.

Based on the presence of intragroup conflict in the construction industry, it is clear to see the challenge of establishing a working environment of trust and psychological safety, which Sun *et al.* (2015) identify is essential for successful collaborative team working, especially to create an innovative design. Edmondson and Nembhard (2009) express that both designers and constructors need to trust each other and feel safe to offer diverse viewpoints, share knowledge and learn from each other. Further issues regarding different cultural perceptions and perspectives within construction organisations and teams are investigated by Ankrah *et al.* (2009). In the wider literature (summarised by Watts, 2007), it is considered that the predominant construction culture is one of antagonism, mistrust, finger-pointing, sexism, machismo, poor communication, and conflict, and that a work team's culture is a significant driver towards the team members' behaviour and social interactions. A gap in knowledge exists to understand further if positive working

environments exist in a construction project setting, given the many negative cultural aspects the industry suffers.

Lawson (1997) and Gray and Hughes (2001) suggest that a specific cause of conflict between designers and constructors may be the clash of culture that stems from divergent personal aptitudes and differences in their educational expertise. Reinerstein (1997) supports this view and goes on to say a further issue when managing the design is the potentially conflicting priorities between designers and constructors. For example, a designer may prioritise environmental considerations, a desire to elevate the public's taste and influence culture or bring about social and political changes. While a constructor may empathise with these priorities, their focus is usually designed for profit. This clash of cultures may lead to conflict and strained intragroup relationships. Knotten, Lædre and Hansen (2017) suggest key success factors need to be addressed relating to the design-construct interface to manage design successfully. These factors include effective communication, decision-making and team management.

A holistic view of the intragroup dynamics will next be reviewed to consider if the differences between designers and constructors may create problematic conflict during the design process of a construction project.

2.4.3 The “tribes” of design and construct

Interesting work by Eynon (2013) explores the interdependent relations between designers and constructors from a holistic perspective to understand the professional disciplines, i.e., designers and constructors, concerning their views, backgrounds, and preferred working practices. He introduces the notion of “tribes” to distinguish between the two disciplines, surmising that silos or positions of “tribe of design” and “tribe of construct” are different in several ways, ways that can create conflict. See Table 2.1.

Table 2.1: Tribes of design and construct. Source Eynon (2013)

Tribe of design	Tribe of construct
Iterative	Linear
Possibilities	Cost-driven
Ambiguous	Deadlines
Options	Schedule
Visual	Practical
Creative	Certainty
Intuitive	Factual

Not only are the relations between designers and constructors based on contractual boundaries, which may result in adversarial behaviour, but they are also influenced by the differences identified in Enyon's analysis and by differing values, culture, education, and history. These opposing perspectives and differing cultures and group norms will inevitably lead to intragroup conflict while working under pressure to complete a bespoke construction project on time and to a budget.

Loosemore and Tan (2000) gathered data from surveys to establish occupational stereotypes in the construction industry. They support the notion that the "tribes" of design and construct are potentially harmful cultural attributes requiring further study. The term stereotype refers to people's tendency to categorise and generalise others by distinct, over-simplistic, extreme and negative traits based on their social group. The findings by Loosemore and Tan (2000) specifically support further investigation into the deep-rooted problematic cultural relations in construction project teams. In particular, the stereotypical relationship between constructors and architects was found to be negative and relatively strong, which may create the potential for conflict when these disciplines are required to work together. Loosemore and Tan (2000) also suggest more research is needed that considers if perceived stereotypes influence actual behavioural patterns. For example, if constructors are perceived to be aggressive and blunt, will their relationships with others be confrontational and defensive? Consideration will be given during this study to examine the presence of stereotypical behaviour by designers and constructors and posit if this behaviour may impact the group's ability to make decisions.

In summary, the disciplines of design and construct reflect problematic silos or positions in the construction industry, which in turn reflects the industry's fragmented nature. The differences between the disciplines may create conflict, which may be further compounded by the deep-rooted, negative stereotypes in project teams. A knowledge gap exists about; the nature and impact of behaviour between designers and constructors; if a positive working environment can exist between these two disciplines given the deep-rooted negative issues identified; and the impact of the stereotype culture that exists for each discipline. An aim of this research project will be to contribute to these gaps in knowledge.

The relevant literature about construction project team characteristics will next be reviewed, specifically team membership and social interactions.

2.5 Characteristics of construction project teams

So far, relevant literature has been reviewed regarding traditional and contemporary organisational work teams, construction project team background and literature specific to the design-construct interface. The knowledge and understanding specifically relevant to team membership

characteristics created by the unique nature of the construction industry structure and dynamics will next be reviewed, namely interdisciplinary team composition and multi-team membership. A review of social interaction literature will follow to provide a theoretical background for this research project.

2.5.1 Team membership

Team membership in the construction industry includes several dimensions that create challenges, such as the temporary nature of the team composition due to the changing demands of the project, and the interdisciplinary knowledge required from temporary team members to design and construct a product. Gorse and Emmitt (2003) discuss the complication created by the temporary nature of a construction project team, which means that team members enter and leave the team as the demands of the project change. They surmise that these temporary states mean that teams do not mature enough to allow social-emotional behaviour to occur at the same level as more permanent teams. According to Koutsikouri, Austin and Dainty (2008), construction projects are highly complex and require an interdisciplinary approach to team member composition. MacMillan (2001) defines interdisciplinary working as teams comprising members with different specialisms that work together and solve design solutions as a whole. In addition, MacMillan suggests that members should be willing and encouraged to contribute outside their specific profession. The impacts of temporary membership and interdisciplinary team membership will be examined further in this study to consider the effect these challenges have on team behaviour.

The need for interdisciplinary knowledge sharing for both the design and the construction aspects of a project creates project teams that bring together designers and constructors. Within these broad categories (i.e., Enyon's "tribes"), many disciplines and roles exist which focus on different areas of a construction project (e.g., commercial and contractual elements). Ensuring a project team includes the appropriate roles during a specific phase, and the team includes individuals with sufficient knowledge and experience is a considerable challenge. Interesting research by Gorse *et al.* (2006) focuses on the group interactions and the attempts made by more vocal members to encourage other, quieter members to participate in discussions during live construction meetings. The research identifies that few attempts were made to actively encourage reluctant members of the meeting to participate in the debate during construction meetings. This is a concern when construction projects, particularly during the design phase, depend on the integration of specialist knowledge. As in most work settings, some individuals are more socially gifted than others, and some may be reluctant to interact in a group or public environment. Gorse and Emmitt (2009) develop this knowledge further and question if interdisciplinary working is taking place during construction meetings, as one or two individuals often dominate the discussion. Further research is required to understand if the team are making essential project decisions based on specialist knowledge or the opinion of the team members with the dominant social skills.

It has already been noted that the construction industry is highly fragmented, with many relatively small organisations involved in a single project (Pryke, 2004). Male, Bower and Aritua (2007) discuss the arrangements of how relatively small design practices are sub-contracted to the main contractor during contractor-led procurement projects. Designers are often subcontracted to more than one project at the same time. This contractual arrangement is generally known as multiple-team membership (or multi-team membership MTM). See Figure 2.1 for an example of this arrangement:

Figure 2.1: Multi-team membership in the construction industry

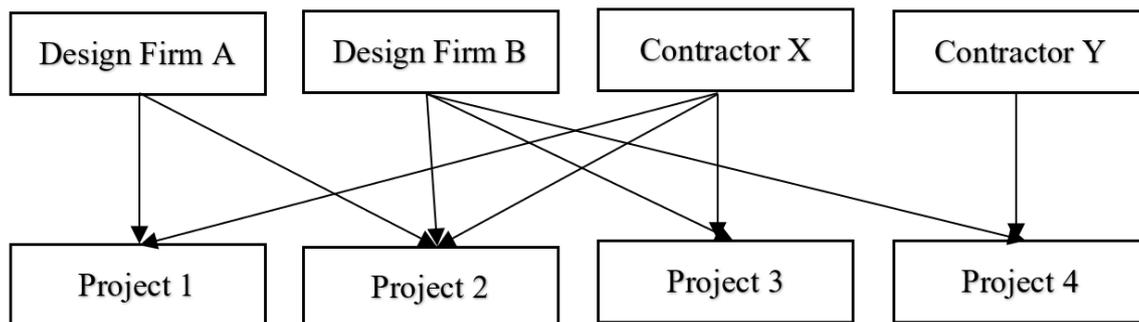


Figure 2.1. illustrates how a design firm is commonly employed to create the design for more than one project at a time. This means that individual designers are simultaneously members of multiple project teams. These projects may involve different; clients, main contractors, and project types in each case. No existing knowledge and theory about the social implications of multi-team membership's, specific to the construction industry, currently exist, even though this is a common scenario during contractor-led design procured construction projects. A substantial and recent literature review by Margolis (2020), set outside the context of the construction industry, suggest possible directions for future research, including the unique benefits and challenges of MTM to employees, teams and organisations.

Next, existing literature will be reviewed specific to the social interactions between designers and constructors. The impact of these relationships and interpersonal dynamics on construction project teams will be presented to create a theoretical background for this study.

2.5.2 Social interaction literature

Çıdık and Boyd (2020) and Gorse and Emmitt (2007) emphasise the lack of construction-specific applied research that explicitly examines social interactions during a construction project's design coordination and management process. Gorse and Emmitt state that there is a need to better understand the forms and functions of communication before advice on how to improve

communication can be offered to construction teams. Most of the construction management research that looks at the coordination of construction design tends to focus on the integration or fragmented discipline-specific design-related tasks and their associated outputs rather than examining the social interactions between team members of different disciplines. Çıdık and Boyd (2020, p. 20) advocate the need for studies that try to understand the practice of coordinating design in construction that adopts a practice-based ontology, which they explain to mean studies that explore “*the importance of the continuously developing aspects of the task in relation to the evolving social situations within which the task is taking place*”. By using such an approach, Çıdık and Boyd suggest that design develops as a result of the “*path-dependent*” actions of the individual members of the team and the interdisciplinary social interactions between them. They postulate the concept of a “*shared sense of purposefulness*”, which they explain refers to the “*temporary and precarious organisational state of a design team in which each of the interacting team members has achieved a state of purposefulness to resume individual action*” (2020, p.18). The research suggests that design coordination is as much a social process of “*becoming*” as it is a technical control process. Research is needed that examines or observes how these social processes manifest themselves through an authentic view of reality.

Similarly, a small number of empirical studies have attempted to investigate the synchronous group dynamics and behaviour that arise during ‘live’, face to face, construction project meetings. Foley and Macmillan (2005) observed ‘live’, face to face project team meetings to establish different meeting functions, e.g., problem-solving, progress, and technical meetings, and demonstrate how interactions between project participants impact interdisciplinary team working. Unfortunately, the team being monitored refused to permit video or tape recordings of the meetings. Therefore, the data is limited to field notes, which creates a lack of depth of investigation and no opportunity to observe the meetings more than once. Gorse and Emmitt (2007) apply the established quantitative Bales interaction process analysis (IPA) to a project team's task and social interactions during the construction phase of live construction and design meetings. Despite making a meaningful contribution to the current knowledge gap, by adopting the Bales IPA approach, Gorse and Emmitt record task-based and socio-emotional interactions separately. This separation means any connection between these two theoretical concepts, or the impact of socio-emotional behaviour on the task-based activities is not included in the analysis. The study also relied solely on the observations during the live meetings. There was no opportunity to revisit the observations of the fast-paced and highly technical communications to ensure the categorising was accurate. Finally, the 12 categories identified in the Bales IPA analysis provide a limited range of interpretations. For example, “*Shows tension release*” includes the definition of “*– jokes, laughs, ...*” (Gorse and Emmitt, 2007, p. 1201). However, Ponton *et al.* (2019) demonstrate various functions of humour and laughter during CIDMs that is not connected to tension release, i.e., to create solidarity or ridicule. The current research project will recognise these limitations and examine how a team's

social interactions impact task-based and non-task based activities, advancing understanding in this research area.

A surprising finding by Gorse and Emmitt (2007) is the low levels of negative emotions and critical discussions observed during the design meetings. This is a surprising finding given the Farmer Review (Farmer, 2016) that appealed for improved project communication to resolve the industry-wide ongoing problems of adversarial behaviour, including negative working practices in project teams. Thus, it would appear that the discovery of low levels of conflict occurring between designers and constructors during design meetings is a paradox worthy of further investigation. This is particularly noteworthy, Gambatese and Hallowell (2011) suggest, as a certain amount of conflict and critical discussion is necessary to create an innovative design by integrating the design and construction disciplines' ideas. Within the construction industry, high levels of conflict have often been reported as hindering productivity (Latham, 1994; Egan, 1998). Badke-Schaub *et al.* (2009) identify dysfunctional conflict behaviour as a characteristic of interdisciplinary design teams due to different approaches to solving design problems. However, Gambatese and Hallowell (2011) stress that conflict can also be regarded as an essential element of innovative design and the creative processes through challenging and generating alternative solutions, critical to project performance. Kiernan, Ledwith and Lynch (2019) observed live design meetings (though not specific to construction projects). They discover that interdisciplinary communication collaboration does not *always* require conflict to reach a consensus when solving a design problem. The question, therefore, is what kind of conflict and what level of conflict is the most productive to result in creative and innovative design? A greater understanding is required of the presence and potential impact of conflict during construction meetings to postulate the impact this may have on the team's ability to collaborate.

Ponton *et al.* (2019) also observed 'live', face-to-face design team meetings to observe humour and joint laughter' positive and negative functions. The article supports Morton *et al.* (2006) and Sinclair (2011) regarding the importance of productive team social cohesion as an ingredient of successful collaborative working by promoting a positive working environment through psychological safety and trust. Ponton *et al.* (2019) state that the social phenomena of humour were present throughout all the construction design team meetings observed. Functions of humour are suggested as moderating conflict escalation and increasing the presence of social cohesion. It is suggested that humour may contribute to how teams can constructively respond to errors or problems and create collective solutions when team members effectively utilise it. Other than Rooke's (2001) observation that humour is an important cultural feature of the construction industry, there is a lack of research investigating the role of humour in the industry; and particularly when contextualised within Cidik and Boyd's work, the role of humour in enabling

each of the interacting design team members to possibly achieve their "*shared sense of purposefulness*".

In summary, a lack of construction-specific literature that explicitly examines social interactions during a construction project's design coordination and management processes currently exists. A small number of empirical studies have attempted to investigate the synchronous group dynamics and behaviour that arise during live, face to face, construction design meetings. Of particular interest to this research project are the low levels of negative emotions and critical discussions observed, which is a contradictory finding to the generally agreed perception of the construction industry as including high project team adversarial and aggressive behaviour. Research is needed that examines how the social processes that occur during design meetings manifest themselves through an authentic view of reality.

2.6 Summary

A review of the relevant literature about project work teams, specifically in the construction industry, has been provided to address the first objective of the current study. The review forms a theoretical background of knowledge and theory pertinent to examining social interactions in this setting. Firstly, the traditional approach to work teams has been examined. Consideration has been given to why this approach has changed in recent decades. Secondly, the background of the construction industry as a project-based industry has been reviewed. Finally, the construction industry's unique characteristics regarding the designer-constructor interface, team membership and current understanding of social interaction behaviour have been discussed.

Gaps in existing knowledge have been identified regarding; the construction design process from the perspective of the processes and the actors involved; the relationship between design and construction subprocesses; behavioural approaches in understanding how and where designers and constructors communicate, including the use of 2D and 3D artefacts; intragroup conflict created by deep-rooted cultural aspects, connected explicitly to stereotypes and the "tribes" of design and construct; the impacts of temporary and interdisciplinary team membership; whether teams are making essential project decisions based on specialist knowledge or the opinions of the team members with the dominant social skills; the social implications of multi-team membership; the social interactions during design coordination and management process, the forms and functions of communication during CIDMs; how a team's social interactions impact task-based and non-task based discussions; the surprisingly low levels of task conflict between designers and constructors during CIDMs; the presence and potential impact of conflict during construction meetings to postulate the impact on collaboration and team decision-making; and finally, the role of humour in construction teams.

The current study will aim to address the gaps in existing knowledge by identifying, observing and analysing the social interactions during contract-led design team meetings (CIDMs). The CIDMs will form the research unit of analysis. They provide an opportunity to observe constructors and designers coordinating and collaborating on the project design. The data for the research will be observations of the designers and constructors authentic social interactions and behaviour during the 'live' face to face meetings. Case study projects will be selected of construction projects procured using a design and build form of contract where the main contractor is responsible for the design. The early project design phase will be targeted as this phase represents the most complex phase when certainty is required from uncertainty.

The next chapter will review literature found within the field of organisational behaviour, which is relevant to the social interactions observed during the 'live' CIDMs.

Chapter 3 Work team behaviour

3.1 Introduction

The aim of the research is to investigate the impact of social interaction on decision-making in construction project design meetings. Following a review of relevant literature about project work teams, specifically in the construction industry, to provide a theoretical background of knowledge and theory pertinent to examining social interactions in this setting, the unit of analysis has been identified as contractor-led design meetings (CIDMs). The meetings of construction design and build procured projects during the early design phase have been observed. The meetings provide an opportunity to observe constructors and designers coordinating and collaborating on the project design. Seventeen meetings, over ten months and across three case study projects, equating to thirty-four hours of observations, have taken place. This chapter will address the third research objective – *To review relevant literature about the themes of social interaction behaviour and team decision-making, from theories found within the field of organisational behaviour*. The contents of the chapter will focus on work team characteristics and work team social interaction dimensions pertinent to the research project scope.

The chapter is divided into three themes identified as the predominant themes that encapsulate both the psychology and social science perspectives, and the management and applied social science view of a work team relevant to social interactions. The themes are; characteristics of teams, work team social interaction dimensions, and work team decision-making issues relevant to social interactions.

3.2. Characteristics of work teams

The literature about the characteristics of teams and work teams will firstly be reviewed. A definition of work teams will be provided, which will be applied to the research study. Next, a chronological overview of the key theory and literature of team academic research will be reviewed to illustrate where team research originates and where it needs to develop in the future. Why organisations use groups will be considered, and a summary will be presented that identifies the type of work teams currently operating in organisations today.

3.2.1 Defining teams, groups and work teams

Most definitions of work teams generally agree that a team is a particular type of group comprising a collection of people working independently to accomplish a common goal or purpose. All members of the work team share a common goal, and the goal connects the members. According to Levi and Askay (2021), this connection binds the team members together to collectively share the impact of things that happen to a fellow group member. Sundstrom, De Meuse and Futrell (1990 p.

120) suggest, a definition of work teams is the “*interdependent collections of individuals who share responsibility for specific outcomes for their organisations*”. Looking beyond a work team, and instead, at a successful work team, the following definition is the definition this study will adopt because it goes further than including outcomes and includes the need for social relations:

[A group of people that] “completes its task, maintain good social relationships, and promotes its members' personal and professional development”. (Levi and Askay, 2021. p. 25)

This description emphasises the three primary facets of a work team; the task, social relations, and the individual. For this research project, the terms team, group and work team will be used interchangeably. The study will primarily focus on work teams in an organisational setting. The research will focus on the social-relational aspects of work teams to examine social interactions.

3.2.2. Defining organisational behaviour

The function of organisational behaviour literature is to provide insight and advice to organisations on making teams work effectively in an organisational setting. From the 1920s to the 2000s, Levine and Moreland (2012) observe that work team research generally appeared in social psychology outlets. By the 2000s, much of the work team research is generated from the three academic fields of applied psychology, management, and social psychology (or journals that span all three fields, such as *Organizational Behaviour* and *Human Decision Processes*). Driven by the growing popularity of work teams rapidly expanding in the workplace during the last few decades, much of the literature being produced today regarding work teams are from the field of organisational behaviour – namely, “*the study of the structure and management of organisations, their environments and the actions and interactions of their individual members and groups*” (Huczynski and Buchanan, 2017, p. 6). Existing organisational behaviour theory and knowledge is the appropriate field of research to situate this project in to examine work team social interactions and team decision-making because the research is interested in examining the actions and interactions of team members in a workplace setting.

A review of key theory and literature relevant to the scope of the research project from the field of organisational behaviour will be considered next.

3.2.3 A chronological history of work team research since the Hawthorne studies

Substantial development of the theoretical understanding of work teams has taken place over the last 100 years. The following section is a chronological review of the academic literature during this time. This review aims to demonstrate that the current study acknowledges the complex nature of examining group behaviour by acknowledging that theories used to explain events reflect their

time. The current study embraces the contemporary view of work team behaviour as complex and multi-faceted while appreciating theory development over the last century.

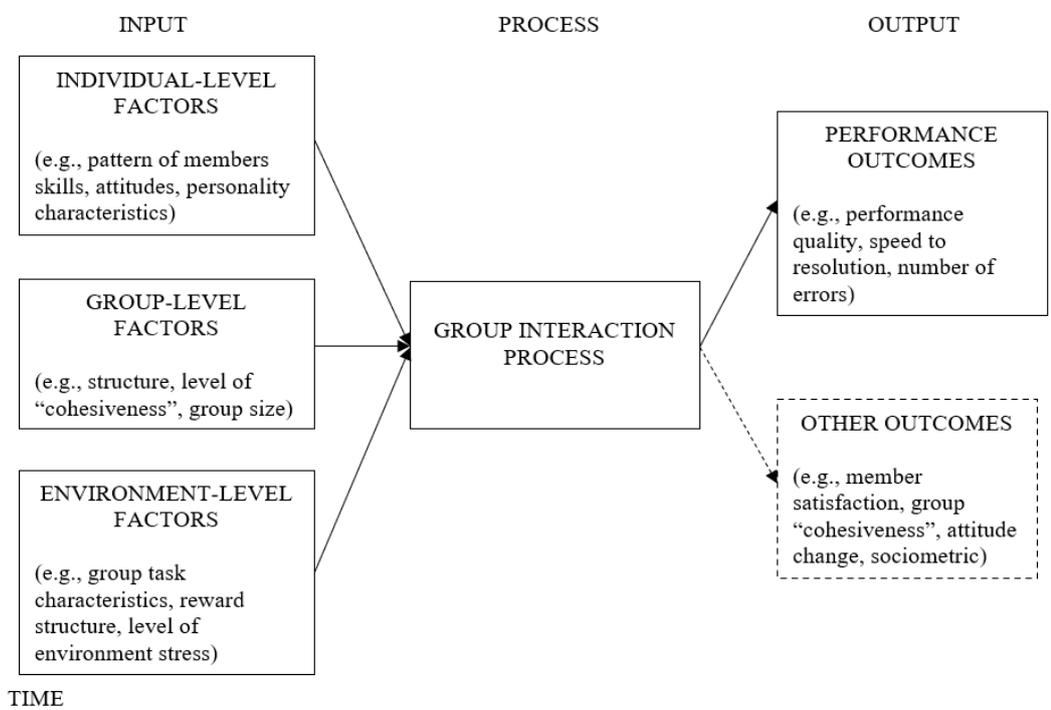
Mathieu, Wolfson and Park (2018) state that literature that focuses on teams and teamwork originates around the 1920s and 1930s based on the Hawthorne studies conducted at the Chicago Western Electric plant. The studies, designed and conducted by Mayo (1933) as experiments in scientific management, explore if social relations mattered in the workplace. The studies include a series of experiments to see if environmental factors and social relations affected work performance. For example, ideal workspace lighting levels and scheduled comfort breaks were observed. The research revealed that not only did the environment and social ties matter significantly, but they also influence productivity and performance (Sonnenfeld, 1985; Mathieu, Wolfson and Park, 2018). The original study by Mayo contributed to the creation of the *human relations* movement, which focuses on the social aspects of work, particularly the idea that treating employees with respect and valuing team relations are necessary for achieving work team performance and success. Of particular relevance to the current research was a specific aspect of the research project that investigated workers' behaviour when a small group was separated from the main workforce into a room known as the bank wiring assembly room, and further divided into two teams. The study investigated the creation and impact of sub-cultures in sub-groups that impact the worker's overall performance (Friedkin, 2001). These early findings demonstrate that a new culture is created when teams are isolated from the wider organisational group and divided into separate, smaller groups. The methods and findings from the Hawthorne studies are still relevant today to examine twenty-first century work teams and sub-teams.

Until the 1940s, organisational behaviour research had primarily come from the field of psychology and had examined how groups affected individual performance or attributes. Although the research was about groups, the focus was on the individuals. Pivotal work by Kurt Lewin (and his followers) changed this perspective, making the group the unit of study. Lewin, considered to be the founding father of social psychology, according to Mathieu, Wolfson and Park (2018), created the term *group dynamics* to provide the emphasis of his investigations. Lewin established the Research Center for Group Dynamics (RCGD) at the Massachusetts Institute of Technology (MIT) to combine scientific and practical research (Lewin, 1945). Lewin (and his team) were the first psychologists to try and understand a group as an entity. Previous work had studied the effects of a group on individuals. Seminal research at this time focused on studying the process that influences individual behaviour in a group setting. For example, intergroup relations (Lippitt and Radke, 1946). Lippitt and French (1948) published research on leadership and improving the functions of groups by demonstrating an ongoing focus on the group, not just as a vehicle to accomplish a task but also, as Mathieu, Wolfson and Park (2018) describe, as a social entity.

During the 1950s and 1960s, the study of *group dynamics* expanded rapidly from a field confined to psychology, with knowledge associated with group relation theory tending to arise from experimental, psycho-analytic studies (for further information, see French and Simpson, 2010). It grew to be interdisciplinary, with research from sociology, anthropology, business, management, and education, among others, contributing to the body of knowledge, using *group dynamics* and *human relations* theory to study a range of team processes. For example, Thibaut (1950) published work about group cohesion in the journal *Human Relations*.

From the 1970s, research about work teams had moved towards examining groups from a task and social perspective and in an organisational context. A significant development at this time is the Hackman and Morris (1975) Input-Process-Output Framework (IPO). See Figure 3.1:

Figure 3.1: Input-Process-Output Framework. Source Hackman and Morris (1975)

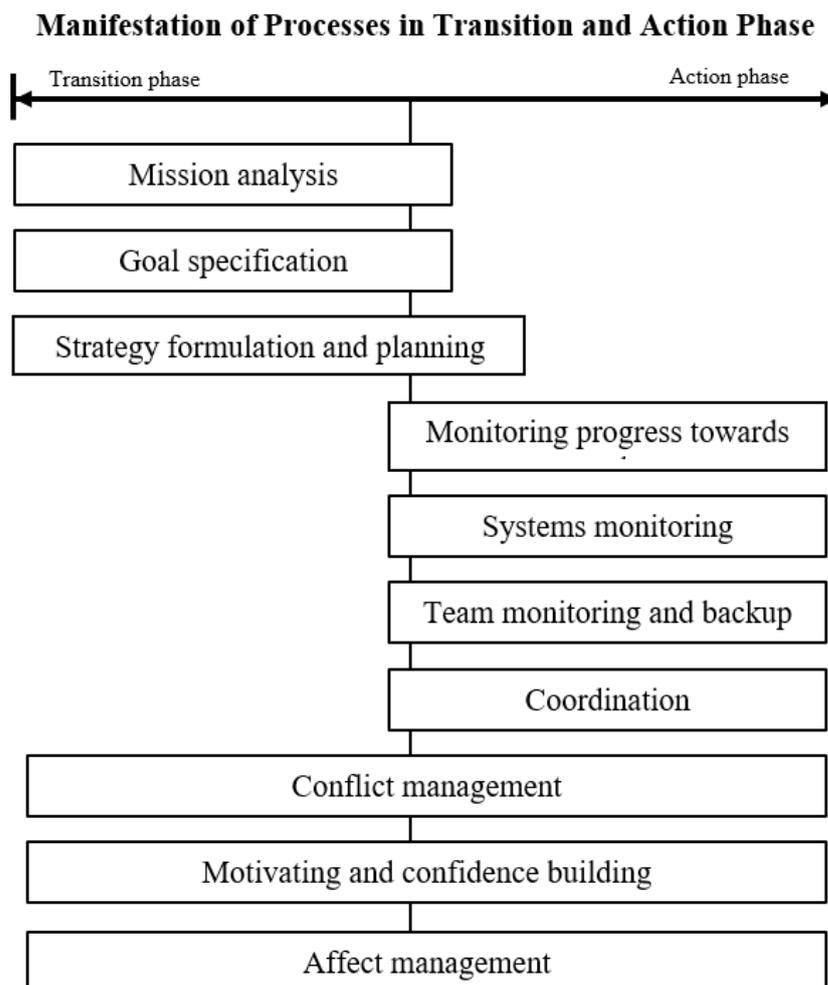


The IPO framework combines the previously independent inputs of group analysis, namely individual, group and environmental factors, as combined influences to the group input. The group process then, in turn, influences the group output (performance outcomes). The performance outcomes include performance quality, as well as social outcomes such as member satisfaction and group cohesiveness. The model also interestingly comprises the input, process, output analysis over time. The IPO framework, therefore, adds a further, longitudinal dimension to work team theoretical understanding, compared to earlier models.

Although the IPO framework has been widely adopted, for example, Salas *et al.* (2007), it has also been criticised. Ilgen *et al.* (2005) are critical of the framework for making the assumption of a single linear pathway from inputs to outputs, which, they consider, does not reflect the dynamic nature of teams. For example, the iterative process of outputs generating feedback on performance which then influence input and processes. More contemporary adoptions of this model have incorporated this critique and are termed Input-mediator-output-input (IMOI) models, whereby the extra “I” enables cyclical feedback loops (Ilgen *et al.*, 2005; Mathieu *et al.*, 2008).

Later work has been influenced by the IPO framework, such as the McGrath (1991) Time, Interaction, Performance theory (TIP), which emphasises that teams are social systems brought together to carry out processes while exhibiting dynamic intragroup interactions and behaviour. The McGrath (1991) TIP theory itself influenced later work on the theory of team processes, such as the Marks, Mathieu and Zaccaro, (2001), Temporal based framework of team processes. See Figure 3.2.

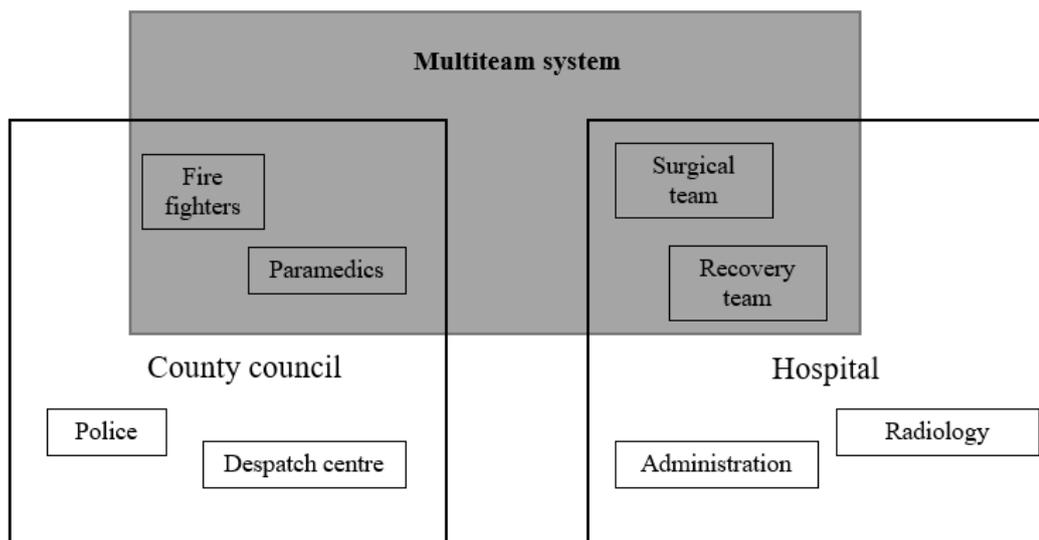
Figure 3.2: Temporal based framework of team processes. Source Marks, Mathieu and Zaccaro, (2001)



This framework describes how teams exhibit different behaviours at different times, depending on the requirements of the task—overall, taking work team theory a step closer to an integrated view of groups as complex systems.

Marks, Mathieu and Zaccaro (2001) also advance the notion of multi-team systems (MTS). MTS are recognised as multiple specialised teams that focus on delivering a specific task of a larger goal, for example, the handling of severely injured accident victims, see Figure 3.3 as an example of this scenario:

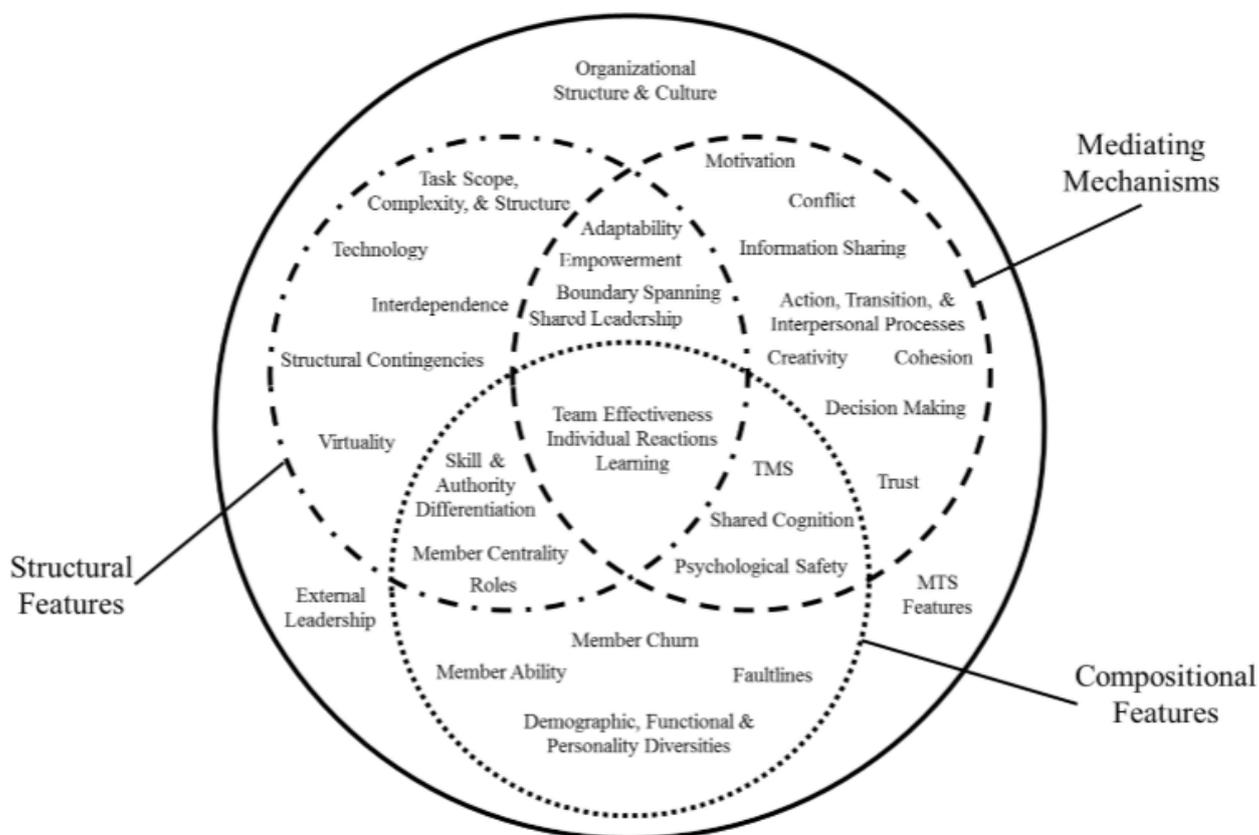
Figure 3.3: Multi-team system for handling severely injured accident victims. Source Marks, Mathieu and Zaccaro (2001)



This kind of team has organically existed in organisations before being identified and examined in detail. Shuffler and Carter (2018) synthesise existing knowledge of this challenging facet of work teams. Their research highlights the importance of this kind of multi-team organisational structure in industries where a goal or task is highly complex. The overall task would benefit from being broken down into more manageable pieces. The research also warns that coordination of the individual teams is critical to ensure the MTSs create a component team. Marks, Mathieu and Zaccaro (2001) suggest that academic literature should progressively reflect the reality of team structures and operations that already exist in the workplace.

According to Kozlowski and Ilgen (2006), over the last quarter of a century, there has been a growing dissatisfaction with the Hackman and Morris (1975) IPO framework, (see Figure 3.1), due to advancing knowledge and insight into work team understanding. Indeed, during the later stages of his career, Hackman moved away from the IPO model. This dissatisfaction has produced calls for more dynamic and multi-level frameworks. An example of a response to this call and an example of current thinking towards team research can be found from the Mathieu *et al.* (2017) overlapping facets of the team effectiveness domain model. See Figure 3.4.

Figure 3.4: The overlapping facets of team effectiveness domain model. Source Mathieu *et al.* (2017)



The model “illustrates the simultaneous and interrelated relationships among factors associated with teams and individual outcomes” Mathieu *et al.* (2017, p. 455). The model is structured across three primary domains; mediating mechanisms, structural features, and compositional features. These three categories are presented as independent and overlapping subject areas. Research from the last 100 years is mapped within the primary domains and the overlaps. The mediating mechanisms domain is particularly relevant to this research project through the research themes of conflict, cohesion, trust, psychological safety, information sharing, and decision-making. Mathieu *et al.* (2017) state the need for a far more complex and wide-ranging faceted view of work teams as researchable entities than the relatively simplistic IPO framework. They highlight some gaps in work team research knowledge, such as research that examines dynamic relationships of a work teams' complex social system.

An example of the research that has attempted to address this gap is Mathieu, Wolfson and Park, (2018, p. 318), who describe work team research as requiring an appreciation of teams as multi-level organisational entities, “individuals are nested in work teams, which are in turn nested in larger subunits (e.g., strategic business units), which are in turn nested in organisations, which

operate in industry sectors”. An example of this nesting arrangement can be taken from the construction industry. A construction site team is nested in a broader project team (including designer and other supply chain disciplines), which is nested in a construction organisation, which is nested in the wider construction industry. The current research project aims to contribute to this gap in knowledge by examining the dynamic social relationships of work teams that are nested in larger work teams that operate in a larger organisation and industry to examine the impact of this arrangement on the social relationships of the group.

Mathieu *et al.* (2017) discuss how the gap in knowledge should be addresses. They suggest a possible (and desired) move away from survey data collection methods. Instead, the increased adoption of observational field investigations to capture the in context and over time elements of work team social relationships. Data collection methods, ironically, harks back to the original Hawthorne studies data collection technique. Supporting this view, Nyein *et al.* (2020) suggest that team research moves in a new “*real*” direction, moving away from heavy reliance on positivist paradigms and quantitative methodologies. Instead, the authors indicate that research about teams should take a qualitative approach to expand knowledge regarding “*real*” teams in-situ. For example, through the use of narrative research, ethnographic research, or case study research. These approaches would complement the existing quantitative findings and in particular, the popular meta-analysis approach. This research project will respond to this call by adopting a longitudinal, observational approach to data collection, to capture the dynamic social relationships across time and in-situ to provide a more authentic construct of the team social relations, than a quantitative cross-sectional snapshot approach.

3.2.4 Summary

Work team theory and knowledge have developed a great deal since the Hawthorne studies. This development is demonstrated through the increasingly complex theoretical representations of work team understanding regarding the number of facets and scope included (i.e. structure and composition). As well as the possible approaches research might adopt to understand work teams across multiple levels and over time. This research project aims to contribute to several gaps in knowledge identified by researchers in the field, such as research that examines dynamic relationships of a work teams' complex social system. By adopting an approach that emphasises real teams in action, this project will adopt a similar approach to the Hawthorne studies that has been critical to our understanding of how work teams function.

The social interaction literature and theories found within organisational behaviour will next be reviewed to establish a picture of the current body of knowledge and identify gaps relevant to this research project.

3.3 Work team social interaction dimensions

Levi and Askay (2021) suggest that a work team will often focus on a task rather than social behaviour. However, social interactions, behaviour and relationship aspects of teamwork are also vital dimensions that Hüffmeier and Hertel (2011) suggest significantly influence the team's ability to perform well. A theoretical background of the team social interaction dimension found in the field of organisational behaviour will next be provided. The following predominant and relevant areas to this research project will be reviewed, focusing on the context of organisational teams. These areas include; team development; group norms; team socialisation; social cohesion; communication climate and intragroup conflict.

Before reviewing the team social interaction dimensions, consideration will be given to the theoretical background of social interactions as a social construct.

3.3.1 Defining social interactions

Social interactions are broadly recognised as an exchange, communication or reaction between two or more people. According to De Jaegher, Di Paolo, and Gallagher (2010, p. 442), “*Social interactions are complex phenomena involving different dimensions of verbal and nonverbal behaviour, varying contexts, [and] numbers of participants*”. Seminal work by the Canadian sociologist Erving Goffman in the 1950s (known as *impression management*¹) introduced the idea that face-to-face social interactions could be viewed as performances by the individual. Goffman suggests that social interactions are carefully constructed to elicit the desired result “*when an individual appears before others, he knowingly and unwittingly projects a definition of the situation of which a conception of himself is an important part*” (Goffman, 1959, p. 235). Goffman distinguishes between *front-stage* and *back-stage* performances of social interactions (Goffman, 1959; Innes, 2003). Front-stage behaviour occurs in public, e.g., in a work team meeting setting, and it incorporates behaviour the actor feels is appropriate and makes them look good. Back-stage behaviour occurs in a more private setting and lacks the element of performance, and is therefore considered by Hogg and Vaughan (2018) as closer behaviour to an authentic self. According to Innes (2003), Goffman's theory of human behaviour in the public domain draws attention to shared norms, conventions, and rituals in a particular public setting. Norms and conventions allow individuals to anticipate the actions of others, making behaviour predictable. Although the original work by Goffman refers to face-to-face encounters in which people are physically present with one another, contemporary understanding by Little, McGivern and Kerins (2016) offers that the theory also includes social encounters that are technologically mediated such as texting, virtual meetings, and email.

¹ *Impression management* is defined as “*people’s use of various strategies to get other people to view them in a positive light*” (Hogg and Vaughan, 2018, p. 145).

According to Bales (1970) and more recently supported by McLeod and Kettner-Polley (2004), work team interactions are generally divided into two broad dimensions; task-orientated interactions and social interactions. Task-orientated interactions focus on the group task. For example, task-orientated interactions are used to clarify understanding and seek, develop and explore information about the task. On the other hand, social interactions have an emotional element reflected in either positive or harmful behaviour. For example, positive behaviour might build relationships by encouraging commitment, showing support and resolving differences. However, social interactions can also include negative behaviour, such as threatening relationships by creating harmful conflict or abusing social influence. The two dimensions are often categorised in literature as separate phenomena (see Bales Interaction process analysis (IPA) categorisation). However, McLeod and Kettner-Polley (2004) recognise that the two dimensions are intertwined in practice and that the group's socio-emotional interactions occur during the task-orientated interactions. This simultaneous behaviour is particularly evident during collaborative working environments, which are inherently social events between stakeholders (Çıdık and Boyd, 2020). Task-orientated interactions and social interactions (and a combination of the two) affect the relationships between group members, ultimately impacting the group's ability to perform a task.

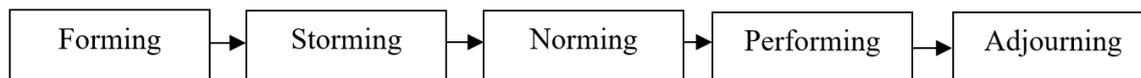
The current research project will focus on the social interaction behaviour of the group, including verbal and non-verbal exchanges, communications and reactions of the participants, in the work setting. The social interactions will include behaviour that reflects the relationships in the group. In addition, interactions during task-orientated and non-task communications will be included.

A variety of work team social interaction dimensions theory and literature will next be explored, starting with reviewing the relevant literature about team development. The predominant and relevant dimensions of a work team setting include the stages of development, group norms, team socialisation, social cohesion, communication climate, and intragroup conflict.

3.3.2 Stages of team development

It is broadly accepted that teams develop and mature through a series of stages. These stages reflect both the demands of the task and the group's social relations. Levi and Askay (2021) suggest that early activities of the group can include low levels of productivity and possible conflict due to the unfamiliar relations between the team members. According to Miller (2003), the most predominant and referred to stages of team development model is by Tuckman (1965), which is later developed by Tuckman and Jensen (1977). The model identifies five stages of group development; *forming*; *storming*; *norming*; *performing*, and *adjourning*. See Figure 3.5.

Figure 3.5: Tuckman's stages of group development, adapted from Tuckman and Jensen (1977)



According to Tuckman and Jensen (1977), internal team relations develop over time. Goncalo, Polman and Maslach, (2010) suggest that when examining social interactions during the *forming* stage, group members get to know each other (socialisation) and establish group rules and norms. This early stage, and the *storming* stage, may include low productivity and a degree of social conflict as the groups move towards the *norming* stage when the group norms and relations have been established. Research by Mathieu and Rapp (2009) suggest that effective team performance is increased over time if the foundations of teamwork and taskwork during the early *forming* stage is invested. The research emphasises the benefits of fostering good social relations during the early stage of a work team's life, which can aid the team later when dealing with conflict. This has implications for carrying out research on teams by recognising that the stage a group is operating needs to be identified to understand the team dynamics. Therefore the observable behaviours from one group might be different from another group because of the different stage they are at in terms of their development. This issue needs to be acknowledged and factored in while observing team behaviour.

Despite its popularity, limitations to the Tuckman and Jensen (1977) model have been identified. For example, Rickards and Moger (2000) note that the model lacks an explanation of how groups change over time and the effects of group development on creativity in problem-solving. They also ask the question – what if the *storming* stage never ends? Miller (2003) also raise a concern with the model being too simplistic, and it is not possible to represent a ‘one size fits all’ approach to team development theory in such as linear fashion. This might be relevant for specific, non-standard project teams, for example, teams that include interdisciplinary members and teams that are fully expected and required to not just *form* but *perform* during the very early stage of the team’s life. The specific time or stage to examine the social interactions of a work team needs to be given carefully considered to fully appreciate the presence and potential impact of conflict and the broader impact of conflict on the team performance. The criticisms may stem from the fact that the original model was created based on data in a laboratory setting rather than real-life observations. The current study will consider this difference in data collection during the analysis process to consider if the criticisms discussed above have merit and suggest weakness in the model.

The Tuckman and Jensen model identifies that the initial period after the group is created includes a period of low productivity which is normal and to be expected. However, the early *forming* stage

of team development is essential and relevant to many organisational project teams because, according to Curşeu and Schruijer (2010) it is critical in creating the social environment for the remaining time the team is working on the task. Therefore more research is required which focuses on the social interactions that occur during this critical early stage of a team.

Team norms, often established during the early stages of team development, are an essential benchmark of a work team in terms of their social interactions and behaviour. This key area relating to this research project will next be examined.

3.3.3 Group norms

To create an environment where all team members can interact in an agreed way, a team needs to develop group norms and rules to operate and behave. According to Hogg and Reid (2006), team communication, interactions, and behaviour are all influenced by formal and informal norms and rules. The group norms differentiate the group from other social groups. As individuals and as a group, the behaviour and social interactions of team members are considered significant by Levi and Askay (2021) because these interactions influence the group's performance through its ability to complete a task and foster and maintain social relations. This unified behaviour effectively controls and limits the behaviour of the whole group. By observing group norms, the ability of a team to function as a united group of individuals can be examined.

Feldman (1984) and, later, Innes (2003) suggest that group norms provide the framework for predictable and acceptable behaviour between team members, avoiding embarrassing interpersonal situations. An example of this might be the use of expletives or banter during informal interactions. The group norms also aid the completion of tasks by supporting coordination through established ground rules. A further function of the group norms is to highlight deviant behaviour within the group. Deviant, unpredictable and unacceptable behaviour can have a detrimental impact on the task. For example, incivility, which encompasses behaviour such as breaches of etiquette and professional misconduct, according to Cortina, Sandy Herscovis and Clancy (2021), can negatively impact both the social and biological aspects of an individual. Baruch *et al.* (2017) discuss how the traditional view of expletives, for example, is unacceptable for professionals in a work setting where there is a need to be civil. However, Baruch *et al.* found that swearing, although formally unacceptable, has become an established and accepted group norm and does occur at most levels within different organisational contexts and professions. The researchers found male and female business executives (lawyers and doctors) use expletives in the workplace to positive effect at individual, interpersonal and group levels, including improved stress-relief, communication enrichment and socialisation-enhancement. Overall, group norms serve the purpose of creating an agreed framework of acceptable behaviour, specific to team setting and context, that allows a team to function with limited conflict due to unpredictable or unaccepted behaviour.

According to Tuckman and Jensen's (1977) widely accepted work on team development, groups establish the agreeing of norms during the early *forming* stage to allow the team to perform well. Teams do not develop group norms overnight. Wheelan (2005) suggest that they incorporate cultural norms and values from their organisation and society. Group norms are established and developed over time and often, according to Hogg and Reid (2006), during the early *forming* and *storming* stages of group development. According to Lapinski and Rimal (2005), group norms can be categorised as; collective (e.g. a form of code of conduct) and perceived (peoples' understanding of the code of conduct). Explicit norms may be discussed by the work team or imposed on the work team by the organisation. The authors also discuss informal, unexpressed and unconscious norms that grow gradually over time and originate from historic behaviour the group has repeated and therefore has become acceptable. For example, multitasking on a laptop during meetings, or the lack of a formal meeting agenda. If team members do not address this behaviour as unacceptable early on, then the behaviour becomes acceptable to the group. Interesting research by Dannals, Reit and Miller (2020) suggest that group members tend to perceive the group norms by copying the behaviour of low ranking group members. The assumption is that low-ranking members are more attentive to and aware of group norms. However groups norms are established, their presence has a fundamental impact on the social interactions of the work team, as well as the ability of the group to perform the task.

According to Levi and Askay (2021), the power of a group norm may be measured by the level of conformity in the group. If the majority of the members conform, then the other members are more likely also to comply. In addition, the authors state that the level of team social cohesion also influences the degree of conformity. The more cohesion present in the team, the more likely the team accepts and conforms to the group norms. Research by Schein (1969) noted that a groups' level of tolerance of deviant behaviour could be influenced by the value of a person completing the task. For example, technical experts required to provide valuable information that the task relies on might be allowed to ignore or violate certain group norms, such as dress code. In general, group conformity research suggests that group norms do not apply consistently to all group members, all of the time, highlighting the complexity of this form of team dynamic.

Work team norms are an essential aspect of group dynamics that are rarely formally managed and are often left to develop from cultural norms, the organisation and society. Group norms are a mechanism to control and limit behaviour to avoid unpredictable and unacceptable actions which may foster conflict and hinder the completion of the task. The establishment of agreed norms is vital during the early *forming* stage of team development when group members get to know each other. However, norms are also revised and created over time. Therefore, an in-depth

understanding of the group norms is vital to understand the overall behaviour of the group to examine if the presence of social interactions impacts a team's ability to make decisions.

The socialisation of new team members and the loss of existing members is another relevant aspect of team social dimensions, which will be discussed next.

3.3.4 Team socialisation

Summers, Humphrey and Ferris, (2012) suggest that team socialisation refers to the change in team membership. Teams that function over time will often experience a change of membership. The team may grow in size, or members may leave and be replaced (or not replaced) by new members. New members need to be orientated into the group if the revised group are to be successful. Members leaving the group may also create a gap that needs to be addressed. Work teams have long since been recognised as having two essential functions. Firstly, a work team needs to accomplish a task. The task will involve the use of processes and outputs. Secondly, teams are dynamic social entities. Therefore team socialisation needs to consider familiarising new team members with the task and social relations in the groups, such as the group rules and norms.

Original research by O'leary, Mortensen and Woolley (2011) explores the research area of multiple team membership (MTM), where team members are members of various groups simultaneously. The research looks at when an employee is concurrently a member of several teams at the same time and how the multiple membership impacts productivity. This team structure is a further complication of group socialisation that commonly exists in the workplace. According to O'Leary, Woolley, and Mortensen (2012), more than 80% of knowledge workers experience MTM, especially in the field of new product development. Bertolotti *et al.* (2015) state that little is known about if and how multiple commitments of professionals with MTM influence the team dynamics and performance of the single teams involved. The authors suggest that positive consequences may include transferring knowledge and better working practice, e.g. time management. Adverse effects may consist of issues with belongingness, possibly driven by the percentage of time allocated to a team by a team member. In addition, the level of commitment and awareness of the group norms may vary across the teams involved. As a result, MTM presents a current gap in knowledge. This research project will explore some of the social relationship aspects created by the membership to multiple teams in a work team setting to understand group dynamics in this specific context further.

In sum, team socialisation highlights the needs of an existing team to familiarise new team members with the task and social relations in the groups, such as the group norms. The team also needs to consider how best to replace existing members and accommodate new members to gain the most for the new task and social dynamics. This research project will explore some of the social

relationship aspects created by the change of team members and contribute to the relatively new research area of multiple team membership (MTM) in an organisational setting.

3.3.5 Social cohesion

The characteristics of work teams have already been discussed as including three facets; the task, social relations and the individual. Successful teams are teams that complete the task and perform better during the next task. In addition, a successful work team requires consideration of the social relationships in the group (and a degree of group maintenance) to allow it to perform successfully in the future. A team, therefore, needs to develop and maintain good social relations. A way to do this is through effective social cohesion.

According to LePine *et al.* (2008) social cohesion is one of the most widely studied constructs in group dynamics literature. Casey-Campbell and Martens (2009) suggest that social cohesion is generally recognised as the team members' inclinations to forge social bonds which create interpersonal connections that hold a group together. A similar understanding is offered by von Treuer *et al.* (2018), who state that social cohesion is an individual's desire to develop and maintain friendships with work team colleagues. They extend the scope to include relationships that stem from a commitment to the task. However, von Treuer *et al.* (2018) state the precise constitution of social cohesion remains unclear. Braun *et al.* (2020) agree the definition of the construct is still unclear, particularly over time. According to Kidwell, Mossholder and Bennett, (1997) and Carron, Widmeyer and Brawley (2016), social cohesion is generally recognised as a multi-dimensional concept that often distinguishes between task and social aspects. Studies such as Beal *et al.* (2003) and Yang and Tang (2004) confirm the positive relationship between workplace cohesion and group performance. Dimas *et al.* (2020) consider increased team learning as a result of increased cohesion in a work team. In sum, cohesion is recognised through a wide breadth of study as a central feature of workgroups that can positively improve performance, learning, and outcomes. It is an important area of research when examining the presence and impact of work team social interactions.

Holmes (2000) describe how social cohesion in the workplace often takes the observable form of shared humour. According to Butler (2015), the prevalence of humour research has increased in recent years as its influence in the workplace has become increasingly recognised. Previous lack of interest can be attributed to the historical perspective that humour was considered concerning emotion; consequently, this was the antithesis of rationality and, therefore, less critical in organisational settings. A change in this perspective (see Ashforth and Humphrey, 1995) accepts that emotion is best considered as intertwined with rationality and, therefore, worthy of investigation. Romero and Cruthirds (2006) outline an organisational humour model whereby a range of potentially desirable organisational outcomes may be generated, such as cohesiveness,

creativity, culture and leadership. However, moderators such as the style of humour, e.g., affiliative, aggressive, self-enhancing, and the presence of sensitive topics, (e.g., gender or ethnicity), determine whether the humour is evaluated as positive or negative. Humour can also be viewed as a management resource, to motivate and stimulate creativity (Pundt, 2015), and boost productivity (Avolio, Howell and Sosik, 1999; Lyttle, 2007; Romero and Pescosolido, 2008). Romero and Pescosolido (2008) describe how the presence of shared humour enables the establishment of a team as an identifiable entity. In addition, it is associated with higher organisational commitment (Sasa, 2002) and higher levels of trust and inclusion (Terrion and Ashforth, 2002). Gockel and Kerr (2015) found that humour directed at out-group members increases perceived cohesion in groups. Based on the discussed literature, shared humour generally creates a positive impact on group dynamics, specifically regarding social cohesion and the working environment of a team.

Trouvain and Truong (2017) suggest that laughter and humour are frequently used synonymously. However, Rogerson-Revell (2007) observe that this is not necessarily the case that humour and laughter are inextricably linked. They pose that not every act of humour is marked with laughter by the recipients or speaker. Aside from humour, laughter can be evoked through nervousness, surprise, affiliation, maliciousness, face-saving, or as a form of threatening action (O'Donnell-Trujillo and Adams, 1983). According to Robert and Yan (2007), it is generally agreed that humour can be viewed as verbal or non-verbal events, which are initiated with the intent to amuse onlookers or which unintentionally become perceived as amusing. The laughter associated with humour can offer multi-functionality in its usage that, according to Keyton and Beck (2010), offers positive, negative, and ambiguous emotional display. To understand social interactions, the presence and function of laughter requires understanding.

Greatbatch and Clark (2003) suggest that while widely viewed positively, humour can also be a means to manipulate relationships between groups and individuals. For example, Janes and Olson (2000) discuss observations of implied threats and ridicule, where it is employed, according to Holmes and Marra (2002) and Keyton and Beck (2010), in a dysfunctional competitive manner through questioning, controlling, and regulating relationships, procedures, and information in a group. Janes and Olson (2000) and Holmes and Marra (2002) also suggest that humour can imply threats and ridicule and create a dysfunctional competitive atmosphere. Martin *et al.* (2003) support the negative findings contributing to the debate by adding that humour can also be aggressive and self-defeating. Evans and Steptoe-Warren (2018) found that negative humour is more likely to damage teams when used without positive humour styles. For example, where a manager uses primarily aggressive humour styles, subordinates often report them as weaker leaders and that their working environment is poor. By considering the potentially harmful aspects of shared humour, it

can be argued that not only can humour foster team social cohesion, but it can also damage cohesion and potentially foster social conflict in a group.

Greatbatch and Clark (2003) reveal that shared humour and laughter serves five primary positive and negative functions; collegiality: to create and maintain social cohesion and group solidarity (Meyer, 1997, 2000), superiority: to attack others in a socially acceptable way and enhance self-esteem at the expense of others (Rodrigues and Collinson, 1995), support: to gain the approval of others (Meyer, 1997, 2000), relief: to manage embarrassment fear or stress in threatening situations (Vinton, 1989), and conflict: to express opposition, resistance, and dissent (Rodrigues and Collinson, 1995; Mulkay, 1988). However, Greatbatch and Clark (2003) criticise many of these studies, pointing out that they do not observe humour and laughter occurring during natural and authentic interactions. Studies of humour and laughter during 'live' and authentic organisational settings are rare. Exceptions being Holmes (2000), Kangasharju and Nikko (2009) and Lehmann-Willenbrock and Allen (2014), who stress the need for further understanding of team interactions and particularly the role of humour in an organisational setting. By observing social cohesion and humour in a natural organisational setting, greater understanding can be established of the impact humour may have relating to other contextual phenomena such as group norms, social cohesion, and intragroup conflict.

According to Norrick (1993), a specific type of humour linked to social interactions is banter, which is recognised as playful and friendly remarks such as teasing or winding someone up. Banter is a form of teasing that is often responded to with counter-teasing that is jocular in nature. Plester and Sayers (2007) suggest that this specific form of humour can be related to inclusion and acceptance in a work team. Research by Raiden (2016) demonstrates how banter can help create inclusion and acceptance in a relatively extreme real-life setting through a female construction project manager successfully undertaking her role in a traditionally male-dominated environment, partly by the use of banter and horseplay. However, early research in this area by Traylor (1973) postulates that banter has often been viewed as disruptive due to those taking part vying for influence or competing. Plester and Sayers (2007) further develop this debate by suggesting that banter is symptomatic of a familiar, close-knit group and, therefore, worthy of a more in-depth investigation while examining natural social interactions relating to team social cohesion.

Overall, the impact of social cohesion on interpersonal relationships is positive. Research by von Treuer *et al.* (2018) supports the idea that highly cohesive teams perform better than groups that lack cohesion. They suggest that people who are part of a cohesive team are generally more satisfied than members of a non-cohesive team. However, the impact of team social cohesion on performance is mixed. Jong, Curseu and Leenders (2014) suggest negative social relations can damage social cohesion, which can negatively impact performance. When a team experiences

failure, if the team lacks cohesion, they can blame the failure on an individual rather than the lack of social relations in the group. Social cohesion is particularly crucial to performance when the team's task requires high levels of interaction, coordination, and interdependence (Beal *et al.*, 2003). According to O'Neill, Allen and Hastings (2013), groups with good social relations and cohesion are better equipped to manage conflicts constructively than groups with poor social relationships. However, excessive cohesion may be detrimental. High levels of team cohesiveness can impair decision making. For example, *groupthink* can arise when team members agree to a decision, not because they believe it is the best outcome but because they do not want to upset the team's relationships (Janis, 1972a, 1982). *Groupthink* highlights the need to identify and manage the potentially damaging impact team cohesion may create, to then allow the many positive impacts a healthy, cohesive team bring to provide a positive working culture. While enduring as a concept, *groupthink* has been challenged as limited (see Longley and Pruitt, 1980). Notably, Moorhead and Montanari (1986) found only partial support for the theory in one of the most comprehensive studies. This controversy has led Fuller and Aldag (1998) to suggest that studies require a longitudinal focus that allow the examination of decision making over time. An appropriate balance of social cohesion is required in a team to provide an effective working environment.

A facet of team social cohesion is the connection to a group, or perception of oneness within a group which, according to Ashforth and Mael (1989) and Hogg and Reid (2006), is created by a psychological process known as *social identity*. This process refers to the idea that the team is separate from other teams, creating a belief of “us versus them”, which can foster task and social cohesion. According to Hogg and Reid (2006), membership or self-categorisation to the team becomes personally valuable to the members so that they define themselves as members of the group. Haslam *et al.* (2006) carried out a controlled experiment to compare the response of teams and individuals to measure their commitment to a failing project. The teams demonstrated more significant commitment compared to the individuals due to the group's desire to make the project a success for the team's benefit. The authors refer to this phenomenon as “we-ness”. A further impact of social identity is identified by Hüffmeier and Hertel (2011). They highlight how a sense of social identity allows the group to manage stress and conflict between the members because people are more supportive of each other. This social support, in turn, can provide process gains in teams. An example of how social cohesion can foster social identity is through the use of humour. For example, using humour alongside discussions about an error relating to the task may, according to Carmeli, Reiter-Palmon and Ziv (2010), allow for a resolution without problematic conflict escalation. The presence of social identity can also be observed through humour, such as humour at the expense of someone outside the group – further emphasising the belief of “us versus them”. The presence and impact of social identity will be considered during this research project.

The importance of team social cohesion is clear from the literature discussed. Highly cohesive teams perform better and manage conflict more constructively than teams with lower levels of social cohesion. A common, observable form of social cohesion is shared humour, which generally impacts group dynamics positively. Although potentially harmful aspects of shared humour do exist and need to be managed a gap exists in observing social cohesion and, specifically humour, in a natural, organisational setting. This research project will aim to establish the impact social cohesion may have on other contextual phenomena such as group norms and social conflict to contribute to this gap in knowledge.

3.3.6 Communication climate

According to Marlow *et al.* (2018), communication is consistently identified in organisational behaviour literature as a critical component of team performance. Communication climate is generally defined by Putnam and Cheney (1985) as the atmosphere in an organisation regarding accepted communication behaviour. Salas, Reyes and McDaniel, (2018) argue that even if a work team comprises a group of experts, the team can still fail the task through a lack of effective communication. Given that team members need to work together to complete a task while also fostering social relations, communication is a fundamental consideration, given that it is the mechanism of the group. Existing knowledge and theory about communication and, specifically, communication climate will next be reviewed. The review will be specific to knowledge and literature about communication behaviour relevant to work teams' social interactions and group dynamics.

According to Barnlund (1970), communication has long since been recognised as a transactional phenomenon, meaning that people are both simultaneously senders and recipients of the information. Cheshin, Rafaeli and Bos (2011) discuss how communication takes the form of verbal and non-verbal information as well as synchronous and asynchronous events (den Otter and Emmitt, 2007). The significance of communication is about what is communicated and equal relevance in *how* information is shared. Marlow *et al.* (2018) suggest that teams with high levels of familiarity, such as the level of knowledge team members hold about one another, as well as the duration of time spent in face-to-face communication, exhibit a higher correlation between communication and performance. Therefore, a link exists between the social relationships of team members, the format of communication, and the task. This important link between the social relations of team members and how communication takes place makes the communication climate relevant to this study.

Early research by Gibb (1961) highlights positive and negative patterns of group communication behaviour. The study demonstrates how a communication climate can be created as either *supportive* or *defensive*. See Table 3.1.

Table 3.1: Communication behaviour, adapted from Lumsden and Lumsden (1997)

Supportive	versus	Defensive
Description		Evaluation
Problem orientation		Control
Spontaneity		Neutrality
Equality		Superiority
Provisionalism		Certainty

Table 3.1 provides examples of team communication behaviour that create *supportive* or *defensive* dynamics in a group. *Defensive* behaviour is significant when examining social interactions because *how* a message is communicated can influence whether the team members focus on the content (i.e., *what* is said) or the structure (i.e., *how* it is said). When team members feel defensive due to perceived threat, mental attention is taken away from focusing on the task and instead moved to defend oneself. Wu *et al.* (2017) and de Wit, Greer and Jehn (2012) agree that an adverse or negative communication climate can reduce productivity, lower social cohesion and increase conflict. Recent research by Feitosa *et al.* (2020) includes a more positive view by postulating that a *supportive* or encouraging communication climate can increase feelings of trust, which can lead to an environment of psychological safety, which can aid performance benefits for both teams and organisations. By examining patterns of group communication behaviour, a greater understanding of the wider issues of social relations can be understood, such as social cohesion and intragroup conflict. Feitosa *et al.* (2020) carried out a meta-analysis of 118 studies and found that existing research in this area lacked a longitudinal view which they acknowledge is required to understand the trust development trajectory within a team’s life span. They call for future research to consider the multilevel or nesting effect, as discussed previously, which acknowledges teams are entities nested in organisations, which nest within an industry (for an explanation about nesting, see Mathieu, Wolfson and Park, 2018). They also call for future research to consider data collection methods that are “novel and less obtrusive” (p. 490) to allow trust to be observed more naturally and authentically than most studies included in the meta-analysis self-reporting strategies. This research project will adopt a longitudinal, novel and unobtrusive data collection method to study the positive and negative aspects of communication climate behaviour.

Schein and Bennis (1965) first introduced the concept of psychological safety. They define it as part of the unfreezing process required for organisational learning and change. They propose that psychological safety reduces perceived threats, removes barriers to change, and creates a context which “*encourages provisional tries and which tolerates failure without retaliation, renunciation, or guilt*” (Schein and Bennis, 1965, p. 45). Psychological safety is recognised by Ilgen *et al.* (2005) and Edmondson and Lei (2014) as a facet of communication climate. It describes people's

perceptions of the consequences of taking interpersonal risks in a group setting. Although introduced a half-century ago, empirical work by Frazier *et al.* (2017) on the construct has continued to confirm its significance in recent years. The authors highlight the links between psychological safety and other similar constructs such as empowerment and trust. They also describe the benefits of creating an environment of psychological safety which means that members of the group can share feelings and opinions, provide feedback, and admit mistakes without fear of negative consequences. Research by Hirak *et al.* (2012) identify that psychological safety can create an environment that allows for learning from failure, which can improve the team's performance over time. According to Salas, Reyes and McDaniel, (2018), work teams need to create an environment where psychological safety can flourish and be used as a mechanism for resolving conflict and continual learning without fear. They also stress a current gap in knowledge in this area with a need for greater understanding, particularly from a practical, workplace-context perspective. This research project will aim to contribute to this gap by examining if social interactions and relations foster or hinder the presence of an emotionally safe environment in a workplace setting.

According to Edmondson and Nembhard (2009), psychological safety is particularly beneficial when a work team is cross-functional, may include temporary members and is working on a complex task. In other words, the work team is created from different professions and includes members from various organisations—for example, multi-team membership (see Luciano, DeChurch and Mathieu, 2018). The purpose of the group, in this context, is to bring together highly technical and diverse perspectives to solve problems and complete a task. The diversity of viewpoints is critical and needs to be exploited without team members feeling anxious about negative retribution. In this situation, psychological safety is vital to generate the optimal environment for efficient collaboration and the coordination of different perspectives.

As previously mentioned in this chapter, trust is identified by Frazier *et al.* (2017) as a similar construct to psychological safety, where trust is defined by Mayer, Davis and Schoorman, (1995) and Feitosa *et al.* (2020) as a willingness to be vulnerable to the actions of another party. Trust is a further ingredient required to create a positive communication climate in a work team. Research by Uusitalo *et al.* (2021) has shown the construct to be generally positively associated with effective problem solving, conflict management (Curşeu and Schreijer, 2010), and higher-level team performance (De Jong and Dirks, 2012). According to Curşeu and Schreijer (2010), teams that establish trust early in the *forming* group development stage experience higher levels of functional task and relationship conflict later on. De Jong and Elfring (2010) suggest that a lack of trust from a few members can break down the whole group's ability to work together and negatively impact team performance. Literature generally agrees that trust is built over time, and it is generally recognised that trust benefits the team by improving performance. Controversially, Langfred

(2004) disagree with this perspective. He suggests that a high level of trust can reduce the level of surveillance and awareness of other team members' activities, and this reduction may impede team performance. The delicate balance of sufficient trust, without too much, makes this social construct an aspect of communication climate relevant to the understanding of work team social behaviour.

In summary, a positive communication climate is generally linked to good team performance. Patterns of group communication behaviour can provide a greater understanding of the broader issues of social relations, such as cohesion and conflict. Psychological safety is an essential facet of communication climate. Psychological safety is critical to generate the optimal environment for the collaboration of different perspectives in a group setting. Trust is closely linked to psychological safety and is also an essential ingredient of team social behaviour. These facets of communication climate need to be appreciated when examining the social interactions of a work team. This research project will aim to consider communication climate in a natural workplace setting over time to appreciate the broader impact of communication climate on the ability of the team to make decisions.

3.3.7 Intragroup conflict

According to de Dreu and Gelfand (2008), intragroup conflict is generally defined as the process emerging from perceived incompatibilities or differences among group members. Bradford, Stringfellow and Weitz (2004) describe conflict as when two or more individuals interact to attain their individual or mutual objectives. It is accepted that their relations may well become incongruous or inconsistent. Tjosvold, Wong and Feng Chen (2014) discuss how incompatibility may occur due to competition, scarce resources, or having divergent attitudes, values, beliefs, skills, and abilities. Intragroup conflict is a natural and inevitable part of team processes and is an inherent attribute of social interactions and behaviour.

Past research (see, Guetzkow and Gyr, 1954; Amason, 1996) initially identified two forms of intragroup conflict; task conflict and relationship conflict. Jehn, Northcraft and Neale (1999) later identified a third type of conflict called process conflict. Task conflict involves disagreements about the task, such as outcomes. Relationship conflict involves disputes about personal relations, for example, personality or beliefs. In contrast, process conflict is disagreements about *how* the task is completed, such as the responsibilities of team members. de Dreu and Weingart (2003) and De Wit, Greer and Jehn, (2012) discuss the pros and cons of these three types of team conflict. Generally speaking, process and relationship conflict hinders team outcomes, but task conflict is necessary for achieving creative and innovative solutions. However, according to Jehn *et al.* (2008), the negative effect of process conflict on trust and cohesion can be reduced when team members effectively resolve their issues. Choi and Cho (2011) state that task conflict and relationship conflict are intertwined in reality, depending on the communication climate and level

of psychological safety. For example, if a member of the group states, "*I do not like your idea*", an emotional interpretation of this may be "*I do not like you. I think you are stupid*". For the current study, all three forms of intragroup conflict are worthy of examination to understand the impact of all three conflict forms on social relations and the group process of decision-making.

According to de Dreu and Weingart (2003), dysfunctional or unhealthy intragroup conflict behaviour will have a detrimental impact on group outcomes and relationships. Unhealthy conflict can be observed in members using emotionally undermining language, intimidation tactics, or ad hominem. Simons and Peterson (2000) suggest that arguments may leave recipients feeling bruised, humiliated, and offended. Dysfunctional conflict in a work team is problematic, according to Farh, Lee and Farh (2010), if it is avoided or used as an opportunity to dominate the views of a team member. Therefore unhealthy conflict can cause strong negative emotions and stress, negatively impacting the team's ability to perform a task.

Argyris (1962) and Pondy (1967) identify that, contrary to popular belief, conflict does not always produce negative or dysfunctional outcomes. Conflict can be both functional and dysfunctional at both the individual and organisational level. According to O'Neill and McLarnon (2018), functional or healthy intragroup conflict is a positive sign of multiple perspectives effectively shared in a work team setting. O'Neill, Allen and Hastings (2013) suggest that teams with diverse viewpoints should consider alternative solutions and effectively solve problems by encouraging new ideas. Conflict may produce constructive or functional outcomes, according to Farh, Lee and Farh (2010), such as creative and innovative ideas, through higher levels of discussion and decision-making. By spending an increased amount of time discussing alternative solutions, Tjosvold, Wong and Feng Chen (2014) state that a group prevents premature consensus and stimulates critical thinking. However, the research reviews existing literature, much of which is based on retrospective data rather than observations of conflict in the real world. The research needs to appreciate further the time needed to consider alternative solutions and that some decisions can be made successfully without considering an alternative. This is particularly relevant in organisational team settings. The research discussed suggests intragroup conflict to be a necessary and healthy aspect of working in a team required to solve problems and make decisions. The current study will examine the reality of considering alternative solutions in a live meeting to deepen understanding in this area.

During an extensive meta-analysis of 116 empirical studies of intragroup conflict and its relationship with group outcomes, de Wit, Greer and Jehn (2012) identified a stable negative connection between relationship and process conflict and group outcomes. The study also disagreed with the previously suggested findings by de Dreu and Weingart (2003) that a strong and negative association exists between task conflict and group performance. Considering this, they discuss whether a task conflict event may produce positive task outcomes while simultaneously

damaging proximal relationship outcomes, such as trust within a group. Thus, intragroup task conflict behaviour should not be viewed as simply positive or negative but needs to be examined in a more detailed manner to consider the effect of the conflict event on all three forms.

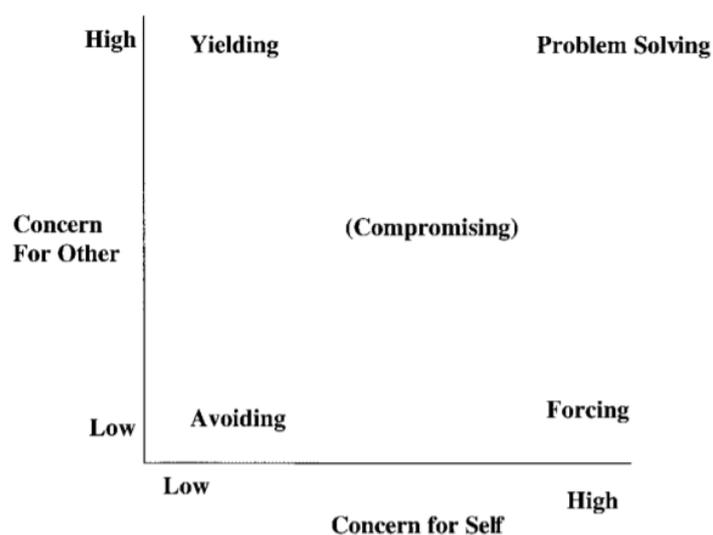
de Wit, Jehn and Scheepers (2013) have carried out an extensive meta-analysis of 2012 studies, which have included an investigation of whether team members are less likely to adopt the viewpoint of others during team decision-making if relationship conflict and task conflict are present. The authors identify that the presence of perceived relationship conflict during task conflict increases group members rigidity in holding onto suboptimal initial solutions during team decision-making which thus led to poor decisions. This finding is significant when considering multidisciplinary and interdisciplinary teams. The individual with the expertise to offer alternative solutions may not be the individual who has the authority to make the final decisions. This might be the scenario for project-based teams, where the project manager's role might include the final say on decision-making, even though they do not have the expertise of the other team members, specific to the decision being made. An important limitation of the study by de Wit, Jehn and Scheepers (2013) is that the participants took part in a controlled exercise rather than a real-world situation. Therefore the consequences of reaching a poor decision were not the same in the controlled exercise as a real situation, such as an authentic work situation. More research is required to understand the complexities of relationship, task and process conflicts in the real-world and how the three forms of conflict impact each other and the team outcomes.

According to Salas, Kozlowski and Chen (2017), teams are dynamic, complex, social entities that change with time and react differently to different inputs and events depending on how long the group has been formed. The way the work team reacts to and deals with intragroup conflict will therefore vary over time. For example, Jehn and Bendersky (2003) suggest that a conflict event that occurs while a team is in its early stages of group development (see Tuckman and Jensen, 1977) is more likely to be detrimental than in a more experienced work team. Seminal work by Glasl (1982) presents a nine-stage model of conflict escalation that emphasises the situational pressures acting on people involved in a conflict event. The nine stages are; (1) hardening; (2) debates and polemics; (3) actions not words; (4) images and coalitions; (5) loss of face; (6) strategies of threats; (7) limited destructive blows; (8) fragmentation of the enemy, and (9) together into the abyss. O'Neill and McLarnon's (2018) continue the debate in this field by suggesting that when a group has fostered a high level of trust and psychological safety, a conflict event is less likely to escalate and is easier to moderate. A range of interactional moderators may influence a conflict event. For example, Norrick and Spitz (2008) demonstrate that various types of humour can shape and moderate conflict episodes. Interesting research by Kiernan, Ledwith and Lynch (2019) suggests that conversational activities such as knowledge sharing, arguing and constructing scenarios are associated with high levels of communication, collaboration, and social skills. These skills create

an environment where the team could manage task conflict, rather than the task conflict inevitably escalating to relationship conflict, as suggested by de Dreu and Weingart (2003). A longitudinal approach to data collection is required to examine the intragroup conflict in a work team, to appreciate and observe the impact time and the different stages of group development have on the broader reaction to and impact of conflict events.

According to De Dreu *et al.* (2001), conflict management is defined as what people who experience conflict intend to do, as well as what they actually do. It is argued that conflict management is a function of either low or high concern for self, in conjunction with low or high concern for others. Figure 3.6 illustrates how the different levels of concern result in a preference for either yielding, problem-solving, compromising, avoiding or forcing, as conflict management strategies. See Figure 3.6.

Figure 3.6: Theoretical representation of the five conflict management strategies as a function of concern for self and concern for others. Source De Dreu *et al.* (2001)



De Dreu *et al.* (2001) argue that even though conflict management is a product of personality and the situation, this does not necessarily mean that behaviour in work teams is not predictable based on the five conflict management strategies as a function of concern for self and concern for others. They pose that work settings tend to remain relatively stable over time. Teams tend to do similar work and face similar recurring problems, which results in individuals tending to preference particular behaviour when dealing with conflict events. The current study will consider the preference for and appropriateness of the conflict management strategies in the context of a construction project setting to provide insight and consider best practice.

Overall, intragroup conflict is a natural part of team processes. It is generally categorised as taking the form of task, relationship, or process conflict. Relationship conflict is widely accepted as harming group performance. Task and process conflict are more complicated, and the emotional reaction of team members to a conflict event may depend on the communication climate and level of psychological safety present in the group. Literature suggests that task conflict is necessary to generate discussion, which can lead to creative and innovative thinking. However, task conflict may need to be moderated to reduce the risk of a negative impact on relationships. Conflict management is an important consideration for team dynamics. It can reflect concern for self and others based on personality and situational context. The literature suggests that conflict management strategy preferences are fairly stable and predictable in a work team setting. This study will employ a longitudinal method to capture the complex nature of intragroup conflict behaviour and management, explicitly concerning the various stages of team development, to examine the reaction to and impact of conflict events over time.

3.3.8 Summary

In summary, a theoretical background of team social interaction dimension research from the field of organisational behaviour has been reviewed. The current research project will focus on social interactions that include behaviour that reflects the relationships in the group. The predominant and relevant dimensions of a work team setting include the stages of development, group norms, team socialisation, social cohesion, communication climate, and intragroup conflict. This research project will contribute to existing gaps in knowledge by examining the positive and harmful social interactions of work teams during the early stages of the team's development. The social environment is critically important for effective group norms, social cohesion and intragroup conflict. The research will include longitudinal, verbal and non-verbal observations of work team behaviour, including observations of behaviour specific to multi-team membership social identity, psychological safety, task complexities, process and relationship conflict, to further understand these fields. A greater understanding of these dimensions will focus the research on examining the impact of social interactions on the project team's ability to make decisions.

Relevant knowledge and theory relating to the influence of social interactions on decision-making will next be considered.

3.4 Work team decision-making issues relevant to social interactions

Decision-making is a crucial function for a work team. Kerr and Tindale (2004) highlight that one of the main drivers for an organisation to use a team to complete a task is the ability of a team to make informed decisions based on a variety of perspectives and pooled knowledge, compared to an

individual. The ability to make effective decisions impacts the team's dynamics in completing the task and the social relations in the group. These dynamics will be evident in the social interactions and behaviour between the team members. Research by Beal *et al.* (2003) identifies that teams that make effective decisions experience higher performance levels. This elevated performance is linked to higher levels of social cohesion. Conversely, groups that make poor decisions are more likely to suffer from intragroup conflict, dissatisfaction and low levels of cohesion. The next section of the chapter will review theory and knowledge about work team decision-making issues relevant to social interactions in the field of organisational behaviour.

An advantage of team decision-making is *process gain*, which is generally recognised as the ability of a team to pool knowledge and generate new ideas through group discussions, more than an individual could. Rajaram (2011) elaborates on this point and suggests that collaboration can also allow a team to remember facts from previous work and filter this information more effectively than an individual could, allowing the team to learn from their mistakes. The proof of the success of team decision-making can be witnessed through organisations extensive use of groups in the workplace.

However, early research by Steiner (1972) states a disadvantage of team decision-making is *process loss*. A term which refers to the loss or wasted time a team may spend discussing issues such as team coordination or social problems which would not need to be addressed by an individual working alone. Another example of process loss, according to Wu and Seidmann (2015), is when a team spend more time than is necessary discussing a problem. This waste of time can become a frustration for team members and result in increased intragroup conflict.

Although social cohesion has already been discussed early in the chapter as predominantly a favourable and desired phenomenon, too much cohesion can negatively impact a team's ability to make effective decisions. *Groupthink* is the term created by Janis (1972). The first *groupthink* example is the Bay of Pigs fiasco. Janis describes *groupthink* as a psychological drive for consensus at any cost that suppresses dissent and the appraisal of alternatives in cohesive decision-making groups. Specifically relevant to the influence of social interactions on team decision-making, Janis identifies flaws in a team suffering from *groupthink*. For example, too much cohesiveness in the group. According to Jaeger (2020), the *groupthink* model also highlights one of the conditions as too much stress put on the group to make decisions. This stress can result in premature closure of decision-making, which is making a decision too quickly and failing to consider alternative solutions just to avoid a disagreement. *Groupthink* illustrates the intrinsic link between the social relations of a work team and the process of decision-making. The relationship between social interactions and decision-making is crucial and needs to be understood to allow a team to perform effectively.

Emotions can positively and negatively impact group decision-making. Emich (2014) studied intragroup positive emotion patterns. He discovered that positive emotions, as part of a group setting, increase the amount of unique information shared and knowledge sought by group members, which improves the team's overall decision-making ability. The research also highlights the increase in confidence felt by team members experiencing positive emotions. The increase in confidence leads to an increase in the level of interactions the team members had in group discussions. Overall, unique knowledge being shared and more team members interacting in group discussions lead to higher quality decisions being made. On the other hand, negative emotions can impact negatively on decision-making. Kerr and Tindale (2004) raise the issue that teams under pressure and stress tend to seek uniformity of opinion. For example, work teams that are under too much pressure tend to become risk-averse and overly reliant on quick, safe, generic solutions that have been sufficient in the past—reducing the potential for creativity and innovation that would exist otherwise. By making a quick decision, the team may settle on the first solution that will satisfy the scenario rather than spending time considering alternative solutions. By observing positive and negative emotional behaviour, a greater understanding can be achieved of the wider impact emotions have on the dynamics of a work team.

An essential influencer of effective decision-making is the team's ability to manage disruptive behaviour through an effective communication climate. For example, a dominant team member talking too much during a meeting, stopping the team members with the relevant knowledge and experience to discuss the issue. Research by Lu, Yuan and McLeod (2012) suggests that team discussion tends to focus on information the team is familiar with (known as the bike-shed effect) rather than information that the minority of members are aware of. Meaning, teams can lack the process of knowledge sharing and fail to discuss all the information required to make an informed decision. Instead, they may focus on knowledge that is common to the group and limit the number of possible solutions that may be available to solve a problem. This lack of thorough problem solving becomes a barrier to effective decision-making and creativity. Therefore, managing effective behaviour to support a productive communication climate is necessary to create an environment for a team to perform a task and make considered decisions effectively.

Other barriers to making effective decisions come from intragroup conflict. Tjosvold, Wong and Feng Chen (2014) consider team processes, such as previously discussed defective group norms, can create inappropriate behaviour and conflict, which can cause social pressure in which team members feel they have to agree with each other. This social pressure can lead to errors in the decision-making process. For example, Sunstein and Hastie (2014) highlight misinformation not corrected, which can cause problems later on. de Wit, Greer and Jehn (2012) suggest that instead of focusing on the task, if discussions become overly emotional, or clashes between team members

occur because of high levels of relationship conflict, perhaps generated from lack of trust, decision-making will be negatively affected. On the other hand, too little conflict can also cause problems. de Wit, Greer and Jehn (2012) highlight that disagreements and constructive task conflict can help stimulate thinking and can lead to a richer generation of ideas by the team. Balance is required to facilitate an adequate level of task conflict without reducing the relationship conflict and the members' satisfaction. These kinds of scenarios will negatively impact the team's ability to exchange and discuss information and make good decisions. This study will examine the presence or lack of intragroup conflict and its impact on decision-making in a work setting.

Finally, one of the more contemporary and evolving research movements in organisational behaviour is team demographic diversity (e.g. race, sex, age, and educational), linked explicitly to team performance. According to Shin *et al.* (2012), this research field looks at collaboration, innovation and creativity. Jackson, May and Whitney (1995) state that creating teams that represent a diverse range of members is becoming increasingly pertinent following social policy concerns surrounding diversity issues and the changing nature of the workforce. Research by Caruso and Woolley (2008) demonstrate the positive potential diversity has on team performance, particularly the ability of a diverse team to generate a broader range of possible solutions. Caruso and Woolley (2008) identify the crucial role of psychological safety to provide the necessary communication climate for a diverse team to thrive. Bell *et al.* (2011) suggest that general statements about “good” or “bad” effects of diversity do not consider the complex view of diversity itself. The meta-analysis carried out by Bell *et al.* (2011) found a slightly negative relationship between race and sex diversity and team performance. The research suggests that teams of different races and or sex perform less well than teams of a single race and sex. A reason for this is suggested to be unconscious bias. The authors urge that more research be carried out to examine this complex field. Consideration of the demographic diversity of work teams will be observed to understand if the mix of individuals impacts a work team's social interactions and general behaviour.

In summary, decision-making is an essential function for a work team. Careful management is required to ensure a balance of social cohesion exists in a work team. Too much cohesion can create *groupthink*, which negatively impacts a teams ability to make informed decisions. A lack of social cohesion can foster negative emotions, which also creates barriers for decision-making, such as risk-aversion and a reluctance to provide creative solutions. A balance is also required to allow information and expertise, rather than unethical persuasion styles, to drive group decision-making. Finally, the demographic diversity of work teams is an evolving research field that reflects contemporary team dynamics. This research project will aim to include these complex and varied dimensions when examining the impact of social interactions.

3.5 Summary

The aim of the research is to investigate the impact of social interaction on decision-making in construction project design meetings. Following a review of relevant literature about project work teams, specifically in the construction industry, to provide a theoretical background of knowledge and theory pertinent to examining social interactions in this setting, the unit of analysis has been identified as contractor-led design meetings (CIDMs). The meetings of construction design and build procured projects during the early design phase have been observed. The meetings provide an opportunity to observe constructors and designers coordinating and collaborating on the project design. Seventeen meetings, over ten months and across three case study projects, equating to thirty-four hours of video footage, have been captured. This chapter has addressed the third research objective – *To review relevant literature about the themes of social interaction behaviour and team decision-making, from theories found within the field of organisational behaviour.* The contents of the chapter have focused on work team characteristics and work team social interaction dimensions pertinent to the research project scope following the repeated observations of the video footage. Organisational behaviour literature has been reviewed in the following areas; work team characteristics; work team dimensions, and decision-making.

The review of relevant literature has identified gaps in knowledge that require further research, for example, an investigation of; the dynamic relationships of work team' complex social systems, including the relationships of work teams that are nested in larger work teams (multi-team membership - MTM); the behaviour of "real" teams in-situ, for example, by applying an ethnographic approach; interdisciplinary teams that are expected to *perform* during the early stages of the team's life; the role of humour in a natural organisational setting, including the presence of banter; the presence and impact of team social identity; the longitudinal understanding of team psychological safety and trust based on a novel and less intrusive approach than previous research; the impact of task, process and relationship intragroup conflict on team decision-making based on an authentic, longitudinal view of behaviour and the influence of conflict management strategies on team behaviour, and final, the impact of team diversity on decision-making.

This research project will contribute to existing gaps in knowledge about the dynamic relationships of a work teams' complex social system. A longitudinal, observational approach to the data collection has been adopted to capture the dynamic social relationships across time and in-situ to provide a more authentic construct of the team social relations than a quantitative cross-sectional snapshot approach. Teams that include MTM will be examined to contribute to knowledge in this area. The observations of the video footage will focus on social interactions, including verbal and non-verbal exchanges and reactions between actors. The social interactions will include behaviour that reflects the relationships in the group during task-orientated and non-task communications.

Chapter 4 Methodology

4.1 Introduction

The theoretical background of the current research project has been provided in Chapters 2 and 3. The theoretical background provides a review of the relevant knowledge and theory regarding the study. A review of the existing literature has indicated gaps in existing knowledge regarding the impact of social interactions during the design coordination process of construction design and build procured projects. The current study will address these gaps by investigating how team decision-making can be better understood through the lens of theories of social interaction found within the field of organisational behaviour. The current research project adopts a longitudinal, observational approach to collecting data. This approach captures the dynamic social relationships across time and in-situ to provide a more authentic and therefore superior construct of the team social relations than a cross-sectional snapshot approach. The observations focus on social interactions, including verbal and non-verbal exchanges and reactions between actors. The social interactions include behaviour that reflects the relationships in the group during task-orientated and non-task communications. The behaviour during contractor-led design meetings (CIDMs) of construction design and build procured projects forms the focus of the current study. CIDMs meetings during the early design phase have been observed to consider the social dynamics that occur during the *forming* stage of team development.

The chapter will commence with a discussion of the application of the social sciences to examine construction practice. Next, the philosophical stance and the methodological design for the current study is justified. This justification includes the epistemological orientation, the ontological basis, the generation of theory, and the research strategy. The discussion of the data collection method includes an overview of the existing construction research, which has applied an ethnographical approach. The use of video ethnography is also debated. Following this, the research methods of the current study are presented, including how access was gained to the CIDMs, information about the pilot study and the main study (Case studies A, B and C), how the observations were carried out, and how the data is structured, analysed, and presented. The final section of the chapter presents the ethical considerations undertaken during the study.

4.2 Applying the social science research methods to examine construction practice

The problems the UK construction industry are currently facing regarding people, processes, products, and technologies, resulting in low productivity, are well publicised (see most recently, Farmer, 2016). Many practitioners and researchers have responded to this call for change through an increased understanding of innovations such as new contractual arrangements, increased

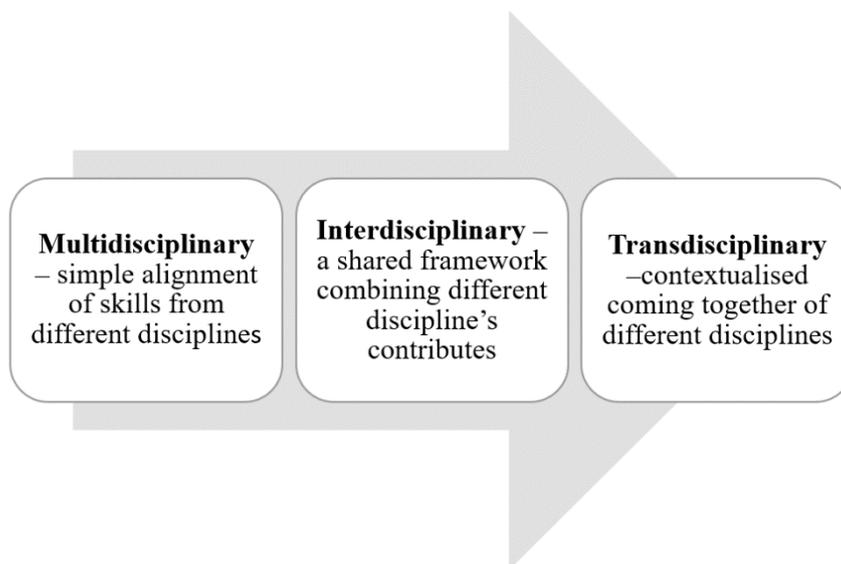
collaboration, and digital technologies (see Dainty, Moore and Murray, 2006). However, researchers such as Dainty, Moore and Murray (2006), Gorse (2009), and Love, Edwards and Wood (2010) have noted the dominance of research that focuses on operational improvements or technological advancement, with scant attention paid to behavioural approaches.

Koch, Paavola and Buhl (2019) ask how research can help understand the changing ways of construction management working. The authors argue that if the aim is to better understand change, there is an argument for research that includes a more holistic and integrated approach. They suggest a holistic approach of change requires interdisciplinary working but that this creates two challenges. Firstly, given that, according to Agyekum-Mensah, Reid and Temitope (2020), most existing construction research relies on a scientific approach, moving towards an increase in alternative methodologies and interdisciplinary thinking would require a change in the mindset of researchers, “*it is not easy to change one’s way of doing research*”, (Koch, Paavola and Buhl, 2019 p. 320). Secondly, moving towards more practically relevant research. However, this change in approach presents the challenge of ensuring a balance of rigour and relevance (see Bresnen, 2017; Schweber, 2015; Volker, 2019). In other words, when access to practice is relatively easy and certainly more straightforward than creating rigorous and fertile results produced from it. The issue is how to balance a requirement between theory development and the practicality of application. A way forward towards more holistic, interdisciplinary research while acknowledging the challenges of new ways of thinking and ensuring rigour and relevance, may be found in the field of social science.

Winch (1990) provides an overview of the broad number of disciplines included in the social sciences relevant to construction management research. They include psychology, sociology, economics, education and geography. Similar to the construction industry, Pryke (2004) and Bresnen (2017) discuss how social science is fragmented and constantly changing. This fragmentation brings challenges such as the wide variety of approaches and terminology available to the construction management researcher. However, what variety and diversity can offer is the opportunity to take a fresh view of construction practice.

While questioning how to meet the social sciences while doing construction research, Koch, Paavola and Buhl (2019) provide three approaches. Figure 4.1 provides a summary of the alternative ways of carrying out research. See Figure 4.1.

Figure 4.1: How to do it?, adapted from Koch, Paavola and Buhl (2019, p. 312) and Strathern (2007)



According to Strathern (2007), multidisciplinary, interdisciplinary and transdisciplinary collaborations can be viewed as a spectrum or continuum of different degrees and types of interactions. The author suggests that transdisciplinary research brings disciplines together in the context of the subject matter. This contextualization creates the environment for new approaches, and a heightened degree of research can arise. Collins, Evans and Gorman (2007) suggest that research questions need to be joined and shaped in a common language of concepts to achieve transdisciplinary working. The title of Volker's (2019) research argues that the social sciences should be “looking out to look in” to allow for the embrace of the richness of adjacent fields of study to develop construction research and address the plethora of contemporary societal issues the construction industry currently faces. The debate of whether construction research can benefit from the social sciences is supported by existing literature. The degree to which construction researchers and other research disciplines or domains intersect or fully collaborate is a future challenge for researchers. Volker (2019, p. 13) provides a positive direction to follow when stating that construction researchers should not “*deny our origins, ... rather embrace the richness of our rich professional roots in order to dynamically develop our field ... [through] multidisciplinary, integrative and creative research*”.

Regarding the current research project that aims to examine social interactions during team meetings, Phua (2013) argues that individual-level constructs are seldom considered during construction research relating to project performance. Instead, research tends to be operationalized at the project or organisational level of analysis. The authors observe a knowledge gap when

examining existing literature examining the psychological and social aspects of trust, culture and identity. Phua argues that individuals' perceptions, values, and behaviour need to be understood at the individual unit of analysis to add new insights and perspectives to construction research. The individual-level analysis would inevitably require theories from organisational behaviour and psychology to be integrated into the inquiry. To bridge the methodological gap, Phua suggests one approach is the application of organisational behaviour and management literature that adopts a sociologically informed approach and takes a discursive and interpretive epistemological stance. The author also suggests appropriate methods for collecting data, which include in-depth case studies and ethnographic approaches.

Barrett, Goulding and Qualter (2013) provide a theoretical framework within the social psychology field relating to innovative performance in construction design teams. The framework includes themes relevant to the current research study, such as cohesion, groupthink, psychological safety, conflict, and group norms, all represented in the framework as part of a team's social climate. Furthermore, the framework identifies that group norms are the only theme lacking interdisciplinary research between construction and social psychology theory. Overall, Barrett, Goulding and Qualter (2013) support the notion that psychology, particularly social psychology, provides a viable and beneficial framework and background to explore behavioural facets of construction design management. The authors suggest that social psychology can strengthen understanding of how teams are designed and managed to capitalise on individual strengths to reach a more collaborative team environment. The current study will use the field of organisational behaviour and specifically social psychology to provide a theoretical background to investigate how team decision-making and its implications can be better understood.

4.3 Philosophical stance, methodological design and method of data collection

This section of the chapter introduces the theoretical concepts relevant to the current study. Following a review of relevant literature, the current study involves a longitudinal, observational approach to the data collection to capture the dynamic social relationships across time and in-situ to provide a more authentic construct of the team social relations than a cross-sectional snapshot approach. Firstly, a background of the methodological applications in construction research is discussed.

4.3.1 Construction research domain – background

Seymour and Rooke (1995) initially highlighted the problem of the monopoly of positivist and quantitative research in the construction domain during the 1990s. The authors encouraged

different approaches, such as interpretivist and qualitative research strategies, to combat the imbalance. Dainty (2008) conducted a follow-up study and established that little had changed, with only 8.4% of research surveyed exclusively using qualitative methods. Schweber (2015) contribute to the debate by supporting construction research that combines the strengths of the two opposing epistemological approaches through a combined or mixed research methodology. Agyekum-Mensah, Reid and Temitope (2020) explore the situation more recently. They discovered that alternative approaches are being adopted to conduct construction research. These approaches include more interpretivist epistemologies and qualitative research strategies, as well as mixed-method approaches. The authors suggest that using a more diverse approach (when applied appropriately) can increase the industry's competitive advantage through improving performance. Dainty (2008) poses the thought that the historical dominance of a quantitative strategy has fostered a convention of applying a natural science strategy to understand social phenomena in construction research, even though this approach is not always appropriate. Agyekum-Mensah, Reid and Temitope (2020) state that it is the appropriateness of the research method, in conjunction with the applied research design, to examine the research problem in its totality that is the key. Overall, the literature encourages considering and designing construction research using a methodology and method appropriate to the individual research project to generate or develop theory without being constrained by construction domain traditions.

4.3.2 Epistemology and ontology

As previously discussed, construction research is characterised by two opposing philosophical stances or epistemologies, which are ways of knowing things about the world (Kight and Ruddock, 2008). These stances or epistemologies are positivism and interpretivism. Bryman (2016, p. 28) explain that positivism focuses on “*the application of the natural sciences to the study of social reality*”. This orientation considers the purpose of theory to generate hypotheses that can be tested. This approach tends to consider problems in terms of the relations between quantifiable variables, which often drives the use of statistics to make probabilistic claims.

On the other hand, Bryman (2016, p. 30) describes the contrasting epistemological orientation of interpretivism as “*a strategy ... that respects the differences between people and the objects of the natural sciences and therefore requires the social scientist to grasp the subjective meaning of social actions*”. Interpretivism tends not to quantify variables and instead tends to adopt a qualitative understanding of social phenomena. In the context of the social sciences, positivism focuses on *explaining* human behaviour, and interpretivism is concerned with *understanding* human behaviour. Table 4.1 is an adaptation of work by Agyekum-Mensah, Reid and Temitope

(2020). The table provides a comparison between positivism and interpretivism and the corresponding paradigms².

Table 4.1: Comparison of opposing methodologies/paradigms adapted from Agyekum-Mensah, Reid and Temitope (2020)

Epistemology	Positivism	Interpretivism
Theory	Deductive	Inductive
Ontology	Objectivism	Constructionism
Strategy	Predominantly quantitative	Predominantly qualitative
The observer	Must be independent	Is part of what is being observed
Explanation	Must demonstrate causality	Aim to increase general understanding of the situation
Research progresses through	Hypotheses and deduction	Gathering rich data from which ideas are induced
Unit of analysis	Should be reduced to its simplest terms	May include the complexity of the whole situation
Generalization through	Statistical probability	Theoretical abstraction
Sampling requires	Large numbers selected randomly	Small numbers of cases chosen for specific reasons

Table 4.1 demonstrates how positivism and interpretivism generally align with different; ontology, strategy, observational position, explanation of the findings, data gathering, unit of analysis, generalizability, and sample requirements. For example, regarding ontology, the opposing positions are objectivism and constructionism. So, in terms of social entities, Bryman (2016) explains that an objectivist view implies that social constructs are external factors that cannot be influenced, i.e., an organisation's formal rules and procedures. On the other hand, a constructionist view implies that social constructs are constructed by the actors, i.e. the informal culture and behaviour within an organisation. Agyekum-Mensah, Reid and Temitope (2020) discuss how an objectivist ontology naturally aligns with a positivist epistemological orientation through viewing the construct knowledge objectively. Agyekum-Mensah, Reid and Temitope also acknowledge that a constructionist ontology aligns with an interpretivist epistemological orientation. Both paradigms acknowledge that social constructs are beyond the limited observational sphere of the natural sciences.

Similar research projects to the current study that have observed 'live' construction management and design meetings have adopted an interpretivist epistemological orientation and constructionist ontological basis. These studies include Gorse *et al.* (2006), Boudeau (2013), Mehrbod *et al.* (2018), and Foley and Macmillan (2005). Foley and Macmillan (2005) observed and noted the

² Bryman and Bell (2011) define a paradigm as a cluster of beliefs and dictates in a particular discipline to influence what should be studied, how research should be done, and how results should be interpreted.

patterns of communications during construction and design meetings. The patterns were coded to explain the different communication trends during the interdisciplinary working of the groups. Thus, the research findings reflect an authentic representation of the events during the meeting while discussing the communication trends relating to existing knowledge.

On the other hand, Gorse and Emmitt (2007) and Gorse and Emmitt (2009) adopted a positivist epistemological orientation and an objectivist ontological view by applying the Bales interaction process analysis (IPA) (Bales, 1970). The Bales IPA framework is a quantitative measurement tool that can be used to observe team communications. The advantage of using the Bales IPA framework is that the findings from the construction management and design meetings can be directly compared to other settings, and conclusions can be drawn from similarities and differences in the findings with other comparable research. A disadvantage to using an existing framework, such as Bales IPA, however, is that it restricts the scope of the research exploration and confines it to predetermined categories, regardless of how well the categories suit, or do not suit, the natural setting during the 'live' observations.

The current study adopts an interpretivist epistemological orientation and a constructionist ontological basis to understand social interactions. Social interactions have been observed to allow the researcher to focus on finding meaning in the team behaviour, which involves reconstructing the meanings and understandings which led the meeting participants to act in a certain way. An interpretivist lens allowed an examination of the processes occurring in the setting. A constructionist view of the processes includes an examination of the social constructs the participants create in the setting (i.e., the culture). The observations have been analysed to identify patterns or trends of typical behaviour and subsequent meaning for the behaviour. At the same time as looking for patterns and trends, the researcher was mindful that variations in behaviour can also indicate relevant findings, which again will require consideration of the meaning and broader context implications of the variations. The main crux of adopting an interpretive orientation and constructionist basis during the current study is to allow the research to “*get into the heads of the subjects*” (Schweber, 2015, p. 844). The study observes the sequence of events and outcomes of the behaviour to pose broader implications of the social interactions during the meetings. Schweber (2015) acknowledges criticism of much interpretivist research specific to the construction domain, specifically research that neglects theory. The author suggests that many construction interpretivist researchers provide rich descriptions of cases but fail to reflect on the interpretation of the findings by producing frameworks that reflect a more general understanding.

4.3.3 Generation of theory

An important consideration of a research project methodology is the generation of theory.

Schweber (2015, p. 841) defines social theory as “*the elaboration of an abstract framework of*

concepts which involve the specification of entities and types or relations and interactions (which can be idealized in models) and are used by researchers in a given discipline or field to pose questions about some aspect of the physical or social world [which includes actors]". Bryman (2016) describes a deductive approach to the generation of theory as a researcher using existing theory and knowledge as the starting point. The researcher then deduces a hypothesis (or hypotheses) based on this knowledge. The hypothesis is then subjected to empirical scrutiny. The opposite approach is known as inductive. An inductive study is when the researcher views the theory as the outcome, based on the observations of the study. The starting point are the observations and findings, which lead to the generation or development of theory.

As presented in Table 4.1, a deductive generation of theory aligns with a positivist epistemological orientation and a predominantly quantitative research strategy. Equally, an inductive generation of theory aligns with an interpretivist epistemological orientation and a predominantly qualitative research strategy. In practice, however, Schweber (2015) and Bryman (2016) acknowledge that although interpretivism is "more inductive" than positivism, both orientations adopt a mixed and iterative relationship with pre-existing knowledge and theory. A positivist researcher will have some knowledge of the existing empirical data before deducing their hypothesis. (This is the basis of what is called 'post-positivism'). Equally, an interpretivist researcher will have some basis of pre-existing theory before capturing empirical data.

Kiernan, Ledwith and Lynch (2019) carried out a similar study to the current research project. The authors observed and video recorded 'live' design meetings (similar to CIDMs) to explore the conversation activities of design teams to negotiate task conflict to reach consensus. The research adopted a deductive approach to the generation of theory by applying an adapted version of the conceptual framework model devised by Beers *et al.* (2006). The model is about the moving of knowledge from unshared to constructed. Although Kiernan, Ledwith and Lynch adopted and applied this model as a starting point, their findings reflect a broader development of the initial model, informed by the empirical data they collected. The research demonstrates how the reality of deductive and inductive research approaches, in practice, can include an iterative approach which represents a blend of the two forms of dealing with theory, where theory shapes the collecting and analysis of the data, which then shapes the development of new theory and knowledge.

The current study adopts a primarily inductive approach to the generation of theory. This approach has allowed the constructs or themes to emerge from the data without being selected in advance. An inductive process has created a richer and authentic representation of the social interaction behaviour constructs of the meeting participants. 'Typical' examples of behaviour per theme were then subjected to analysis in light of existing knowledge and theory, where the role of the theory followed Schweber's (2015) guidance to help the researcher rein in or move beyond their own

subjective opinions and common-sense views of the data and to see the data differently than without the theory. This process of using existing knowledge and theory to examine the data moves the analysis beyond the state of researcher reflexivity (see Reflexivity statement) to something that combines this reflexivity with objective evidence. Additionally, the researcher's pre-existing understanding of theories of organisational behaviour enabled the initial structuring of empirical observations without restricting the natural and iterative process of developing this theory through observed and emerging constructs and themes. Overall, through applying an inductive approach, the findings from the case studies contribute to the development of existing knowledge and theory.

4.3.4 Research strategy

Robson (2011) suggest that a research strategy is required to provide a broad orientation to answer a research question. Agyekum-Mensah, Reid and Temitope (2020) state that a research strategy typically denotes the methodology combined with the techniques used to carry out the research. Bryman (2016) presents the two main research strategy classifications as the qualitative and quantitative routes, including the option to combine the two (mixed method). Table 4.2 is based on work by Agyekum-Mensah (2013). The table provides a comparison of the opposing research strategies:

Table 4.2: Comparison of the opposing research strategies of qualitative and quantitative, adapted from Agyekum-Mensah, Reid and Temitope (2020)

Predominantly quantitative	Predominantly qualitative
Numbers	Words
Distance interaction	Close distance
Theory testing	Theory generating
Static	Process
Structured	Unstructured
Hard data	Rich data
Macro	Micro
Artificial setting	Natural setting
Behaviour	Meaning

Table 4.2 demonstrates the differences between the two approaches relating to issues such; as the proximity of the researcher to the data (close or distance), the format of the data (hard or rich), and the scope of the investigation (macro or micro). See also Table 4.1 to see how predominantly quantitative and predominantly qualitative strategies correspond with the positivist and interpretivist epistemologies. Namely, a quantitative approach aligns most usually with a positivist epistemology, and a qualitative strategy commonly aligns with an interpretivist stance.

Regarding similar research projects to the current study, Pirzadeh, Lingard and Blismas (2021) carried out a mixed-method research strategy to understand the design decisions and interactions during CIDMs. Mixed-method interviews were used as the data collection method to provide quantitative and qualitative data, which informed the creation of a sociotechnical framework representing design decision-making as a multilevel network. Although the interviews took place shortly after the meetings, they only represent a retrospective account of the perceptions of the participants, rather than a rich version of the interactions that can be captured by using other means, for example, the use of field notes only (see Gorse *et al.*, 2006), audio recording (see Kiernan, Ledwith and Lynch, 2019) or video recordings (see Mehrbod *et al.*, 2018). The video recordings method used by Mehrbod *et al.* (2018) captured the most information during the meetings, compared to field notes and audio recordings. However, this video footage only captured one angle on the room, with a number of the participants sitting with their backs to the camera. This can be seen from the screenshots included by the authors in their paper. Moreover, the video camera only captured physically observable information. Retrospective qualitative and possibly quantitative methods would be required to capture *how* the participants feel and *what* they think. Thus, a gap exists to capture more physically observable information during CIDMs than has been achieved by existing research, to provide a new perspective on the meeting proceedings.

In sum, the current research project adopts a largely interpretivist epistemological orientation to study social behaviour. In addition, a predominantly inductive approach to the generation of theory has been adopted to allow the constructs or themes observed in the team behaviour to emerge. Both these methodological approaches point towards a qualitative research strategy. The focus of the current research is the natural, 'live' social interaction of meeting participants. A qualitative research strategy has allowed for the observations of natural conversations, during close interactions, in an unstructured environment, over time, which has provided observations of process (rather than static data), at a micro-level, providing the opportunity to generate meaning and theory from the rich data.

4.3.5 Data collection strategy

Hammersley and Atkinson (2007) and Symon and Cassell (2012) agree that ethnography is one of many approaches found within social research. Reeves, Kuper and Hodges (2008, p. 337) define ethnography as "*the study of social interactions, behaviours, and perceptions that occur within groups, teams, organisations, and communities*". Literature such as Pink, Tutt and Dainty (2013), O'Riley (2005), and Bryman (2016) generally agrees that an ethnographer usually; observes (overtly or covertly) ordinary people's daily lives for an extended period, within a natural context (i.e., in the field) and the data collection is generally unstructured. Categories used to interpret behaviour are not built into the data collection process. The typical sample for an ethnographic study includes a small number of case studies to provide an in-depth perspective. The analysis of

the data involves interpretation of the meanings, functions and consequences of behaviour. Finally, the data is usually presented as descriptions and explanations rather than quantification and statistical analysis (which may play a subordinate role).

Regarding how an ethnographic study should be designed, Hammersley and Atkinson (2007) state that the specific design should be shaped by the specific aims of the research project. Because ethnography is not a single research method, the researcher is granted the flexibility to design the research method based on the most appropriate data collection, structuring, analysis and data presentation methods and flavours available (O'Riley, 2005). Different flavours of ethnography include autoethnography (Grosse, 2019), short-term ethnography (Pink and Morgan, 2013), visual ethnography (Clarke, 2011), sensory ethnography (Pink, 2015), online ethnography (Hine, 2015), and digital ethnography (Pink, Lingard and Harley, 2016). These flavours reflect a need to understand a changing society concerning everyday, ordinary, audio, visual, and online practices. The flavours also reflect how ethnography has changed. For example, a traditional ethnographic approach involved the researcher actively participating in a group for an extended period of time to gain an insider's perspective of the group experiences. Hammersley and Atkinson (2007), discuss a far more varied and contemporary approach of ethnographic research which can include less active participation (non-participatory observations, for example) over a short timeframe, and include the use of technology to aid (and enhance) data collection.

According to Tutt and Pink (2019), ethnography has a vital role to play in construction research because it is sensitive to the local context by observing the practice of work as it is experienced and played out, which includes the cultural context of organisational and project life. Although the volume of construction research that adopts an ethnographic lens is increasing, the authors encourage further ethnographic research in a construction context to reveal "*the social, experimental and often unspoken ways of knowing*" (Tutt and Pink, 2019, p. 475). By further understanding these social phenomena, the authors suggest the industry can tackle its enduring challenges. The editorial calls for future ethnographic research in construction to focus on global issues that can be observed at a local level. This micro view to solve macro problems form of analysis can offer new questions, insights and understanding of human actions, feelings, tensions and relationships, including interpersonal attributes such as group needs, frustrations, hopes and anxieties. Oswald and Dainty (2020) have recently carried out an extensive review of ethnographic research in the construction industry. They found a lack of researcher reflexivity of their emotions, which the authors felt meant that many researchers failed to reflect on their role within the study culture. The authors called for greater reflexivity on the influence of the researcher's perspective. Overall, the existing literature encourages more ethnographic research in construction to provide greater knowledge and understanding of the unique construction context to inform its challenges and contribute to debates in other research domains and disciplines where similar challenges are

being explored. The current study responds to the criticism made by Oswald and Dainty (2020) by explicitly observing the emotions during the meetings (including the researcher's own emotions). The observations then provide a perspective of the emotional culture of the setting and consideration of the impact of this culture on the team's performance.

Research similar to the current study includes that of Boudeau (2013) and Mehrbod *et al.* (2018), both of whom observed 'live' CIDMs. Both adopted an ethnographic approach to the data collection and data analysis processes. Boudeau (2013, p. 78) carried out an ethnomethodological study, a form of sociological analysis that focuses on the situated methods by which activities are produced while reflecting on practices found in project management literature. The ethnomethodological stance provides a lens to observe and analyse a “*mundane and everyday*” conversation between a structural engineer and the landscape architect during a specific CIDM. This study demonstrates ethnography as being applied as a methodology to view the data and as a method to collect the data.

On the other hand, Mehrbod *et al.* (2018) aim to understand better the challenges of interacting with BIM during CIDMs through the use of artefacts by applying an ethnographic approach as the method only. The research team observed one project in-depth over two years. Of the forty-four meetings observed, thirty-two meetings took place in a purpose-built BIM trailer. Meetings were video recorded. 5-minute vignettes when the meeting participants interacted with design artefacts (for example, the 3D model or a 2D paper drawing) were transcribed and extensively coded using quantitative and qualitative methods. The research developed a taxonomy to represent the relationships between goals and artefacts, and the transitions for BIM-based design coordination processes. This study adopts ethnography as a method only, not as a methodological vehicle to provide a lens to view the data. The two ethnographic projects discussed demonstrate very different ethnographic approaches. Each approach is appropriate to its specific research aims. The current study has adopted an ethnographic method to collect the data. This approach has allowed for; observing overtly ordinary people's lives for an extended period; within a natural context; the data collection was unstructured, and the sample was limited to three case study projects. The method of video ethnography, as a specific flavour of ethnography, will be considered in more detail next.

According to LeBaron *et al.* (2018), video is relatively new to the field of organisation studies. They warn that video involves both opportunities and problems for the researcher. They argue that researchers should only use video methods if this is appropriate to the research question, scope of research, and epistemological and ontological orientation of the study. For example, a video-based method would be appropriate during research about behaviour (dynamic process) and face to face engagement (audio-visual). Furthermore, a video-based approach can be used with other exploratory methods, such as ethnographic research (Zickar and Carter, 2010) and case studies

(Yin, 2014), and to supplement other data collected such as field notes. LeBaron *et al.* (2018) stress that one of the key benefits of video data is creating a permanent, digital record that multiple researchers can observe multiple times. However, the sheer volume of rich data captured can create the problem of *what* to focus on. The authors urge researchers to avoid analysing everything and focus on the vital data relevant to the research question and findings.

Pratt and Kim (2012) discuss the benefit of using video during an ethnographic study to capture organisational group behaviour over a prolonged period to allow iterative reflection. Christianson (2016) considers the important and, in her opinion, rarely discussed decision of camera placement, which she urges should be thoughtful and deliberate. The two most popular perspectives of camera placement are the “insider” and the “outsider” view. LeBaron *et al.* (2018) suggest an insider perspective might include positioning the camera to capture the perspective of someone sitting at the conference room table. Hindmarsh and Llewellyn (2016) demonstrate an “outsider” perspective by mounting the camera on the wall to observe activities at a museum. According to LeBaron *et al.* (2018), by far the most video-based research adopts the “outsider” camera placement option during organisational studies to observe people at work. Less “insider” research may reflect the problem of access that is often experienced by researchers who aim to capture “insider” video data. LeBaron *et al.* discuss how researchers are often denied access due to concerns by the organisation or participants regarding access to sensitive information and the permanent nature of video creating a record of events that might ‘catch someone in the act’. Table 4.3 provides a summary of some of the theoretical considerations of using video to capture data. See Table 4.3.

Table 4.3: Theoretical considerations when selecting video as a data collection method

Theoretical considerations	Description	Relevant literature
Multimodality	More than one mode is observed simultaneously. For example, a focus on language (audio) <i>and</i> embodied interactions (visual).	Heath, Hindmarsh and Luff (2018)
Embodiment	The human body is part of the study. Individually and in relation to other people.	Liu and Maitlis (2014)
Materiality	The embodied interactions with the material and technological environment.	Luff, Hindmarsh and Heath (2000)
Sequence	The sequential organisation of audible and visible phenomena.	LeBaron <i>et al.</i> (2018)

Multimodality is a crucial benefit of video data compared to other methods such as audio-only or photographs. Video captures the complex modalities that orchestrate human behaviour in an organisational setting, such as talk, text, pictures, drawings, gestures and movements and facial expressions, as well as the physicality of the location. The capturing of embodied data is also a benefit of video. It can even record spatial manoeuvres that participants are consciously unaware of (Liu and Maitlis, 2014). The interactions between participants and materials or technologies are

also an important part of contemporary organisational life. *How* participants interact with artefacts and technologies can be studied once the behaviour is captured on video. Finally, the sequence captured on video is an essential aspect of observing behaviour. What people say and how they behave directly relates to the sequence and order of the interactions. Video, by its nature, captures the complexity of interaction sequences (who spoke first, who spoke second). By capturing the sequence of events, an understanding can be achieved of the impact of behaviour over time. Overall, the use of video to capture data provides many advantages over more traditional collection methods, such as field notes and audio recorders. However, the novelty of using video in organisational research is not a theoretical validation in itself. The aim of the research requires the theoretical considerations of multimodality, embodiment, materiality, and sequence to justify the method. The research findings also need to describe the behaviour *and* explain how the behaviour impacts broader social phenomena. This research project adopts an ethnographical video method to collect video data of CIDMs. The video footage collected has been observed multiple times to provide a deep analysis of the rich data.

4.3.6 Research rigour

The use of qualitative data raises the question of how to ensure the study provides rigorous findings. Rigour is concerned with the quality of the research created. Influential research by Tracy (2010) suggests that rigour during qualitative research should include inter-rater reliability. Inter-rater reliability, first popularised by Lincoln and Guba (1985), is the process of two or more independent researchers checking the coding of the data carried out by the principal researcher to confirm if a similar interpretation has been reached. However, Smith and McGannon's (2018) recent work identify numerous problems with this approach, including the human element of the process. It is difficult for researchers to ignore their existing knowledge and background and objectively code data. This difference between researchers existing knowledge and understanding can create differences in interpretation, where a single truth does not exist. The authors offer an alternative approach to inter-rater reliability that has proven very popular with many research disciplines and domains. Smith and McGannon (2018, p. 117) suggest that inter-rater reliability be replaced with the use of a "critical friend". This alternative process again includes independent peers reviewing the coding of the data. However, the exercise should be framed as an opportunity for dialogue and the reflexive acknowledgement of multiple truths and perspectives. The current study will adopt the "critical friend" process to ensure robust rigour of the data structuring and analysis process.

Lincoln and Guba (1985) also suggest that participant validation should be sought to provide credibility to qualitative research. They suggest that participants involved in the original data are involved with assessing the trustworthiness of the data and the results. Again, this approach has been criticised. For example, Morse (2016) claims that participant validation is not recommended

as a technique for achieving validity or reliability due primarily to the problem that researchers and participants cannot step outside of their own experience and history and separate themselves from the study. Instead of asking original participants to check the data and findings, Smith and McGannon (2018) suggest participants are instead asked to *reflect* on the findings to generate additional insight and explore gaps in the results or similarities they share concerning the interpretations of the findings. The current study adopts a “member reflection” approach through a meeting with some of the original participants to provide credibility and, subsequently, rigour to the study. Details of the member reflection meeting are presented in Section 4.4.6 - Analysing and presenting the data.

Finally, Lincoln and Guba (1985) suggest that qualitative research should adopt an “auditing” approach to provide dependability to a study. The auditing process involves the researcher creating and making accessible a complete record of all research processes and documentation, such as problem formulation, selection of the case studies, field notes, data analysis decisions, and so on. To allow an audit to take place at any time, the researcher has kept full documentation of the study throughout the project. Thus, all documents were made available, and her peers checked a sample before the completion of the work (For example, see Appendix A, B and C).

4.3.7 Summary

Table 4.4 draws the preceding pages together and illustrates the philosophical stance, methodological basis, data collection method, and approach to ensure the rigour of the current study:

Table 4.4: The philosophical stance, methodology and method of the current study

Epistemological orientation	Predominantly interpretivism
Ontological basis	Constructionism
Generation of theory	Inductive
Research strategy	Qualitative
Data collection method	Ethnography (video)
Approach to ensure rigour	Critical friend/member reflection/auditing documentation

In summary, the current study adopts a predominantly interpretivist epistemological orientation and constructionist basis. An inductive approach to the theory generation through a qualitative, ethnographic data research strategy has been performed. The specific flavour of the ethnographic method is video-based. An ethnographical method approach allows the study of a small number of case studies with similar attributes. The researcher collected the primary data for the study via a video camera. Careful consideration was given to the positioning of the video camera to provide the optimum location to capture the meeting proceedings. The video data creates a permanent, digital record, which has been observed multiple times during the structuring and data analysis

process. Rigour has been provided to the study through the use of a “critical friend” approach through discussing the data interpretation. A “member reflection” meeting took place to explore the reflections of some of the original participants of the findings. And finally, a sample of the full research documentation has been audited by peers to provide dependability to the study.

A discussion of the data collection method will be presented next.

4.4 Data collection method

The current research project adopts a longitudinal, video ethnography observational approach to the data collection to capture the dynamic social relationships across time and in a natural, ‘live’, work environment to provide an authentic construct of the team social interactions. CIDMs of construction design and build procured projects have been video captured and observed during the early design phase. The meetings have been observed to consider the social dynamics during the *forming* stage of team development (Figure 3.5 Adapted from Tuckman and Jensen, 1977), such as establishing group norms, socialisation, creating social cohesion, and managing intragroup conflict.

The research method of the current study will next be presented. Firstly, how access was gained to the organisation and the individual projects will be discussed. Next, information about the pilot study and details about the main study (Case studies A, B and C) is included. This chapter also includes how the observations were carried out, how the data was structured and analysed, and the data presentation format. The final section of the chapter presents the ethical considerations of the study.

4.4.1 Gaining access - selecting an organisation and access

The first step in collecting the research data was gaining access to an organisational setting. Marshall (2007) discuss the benefits of observing design work teams in their normal environment, as authentic situated practice can allow for natural dynamics to emerge. A regional manager (the gatekeeper) of a large, national main contractor, known to the researcher, was approached. The main contractor is a well-known organisation both regionally and nationally. It is involved with a number of commercial, privately funded, design and build procured construction projects located within a reasonable geographical distance of the researcher’s home location. The geographical proximity allowed the researcher to travel to the meetings and record the data during regular working days. The researcher explained the scope and focus of the research project to the regional manager, including the data collection method of attending the meetings and recording the conversations. The initial plan was to record the conversations via an audio recorder only. However, the data was captured via a 360° panoramic video recorder following the pilot study. (For more information, see 4.4.2 – The pilot study). The regional manager suggested five possible

projects that were either ongoing or about to commence that could be accessed for the research project. The regional manager next contacted the project managers of each of the individual projects and asked them to seek consent from the entire project team to allow access to the CIDMs. This consent included the clients and the design teams. Of the five project teams approached for consent, four agreed to be observed, and one rejected the proposal. The researcher selected the pilot study project from the four projects because the project had commenced. The remaining three projects were due to commence in six to twelve months. Thus, the pilot study could take place, including collecting, structuring, analysing and presenting the data before Case study A meetings commenced.

The current research project is based on the data from these four projects (the pilot study and Case Studies A, B and C). It should be noted that such open access can be very challenging to secure, especially when using a video to record the data (LeBaron *et al.*, 2018). The trust and confidence of the participants in allowing this level of scrutiny to take place are, perhaps, unusual. Fortunately, the researcher has contacts in the construction industry that she could approach due to her substantial industry experience. The researcher has agreed to share the research findings with the organisation on completion of the study.

A description of the pilot study and the impact the pilot study had on the main study will next be discussed.

4.4.2 The pilot study

According to Bryman (2016), the purpose of a pilot study is to ensure the research instrument, as a whole, works well. Therefore, the pilot study included the data collection and analysis process, but on a small scale. The pilot study consisted of nonparticipant observations of three consecutive monthly CIDMs of a single project. The pilot study included observations of the meetings of a design and build procured, new-build educational facility situated in the north of England. The purpose of the meetings was to coordinate design information and make decisions about the project's design. The three stakeholder sub-groups, i.e., the design team, the construction team, and the client team, were represented at each meeting. The number of participants ranged from between six and ten participants. The meetings lasted between 45 minutes and 1 hour 30 minutes.

During the first and second meetings, the researcher used an audio recorder to collect the data. This method was the original plan for the whole research project. During the meetings, the researcher wrote down which participant spoke and in what order to allow her to identify the speakers when transcribing the conversation later. This process was very challenging, with ten people attending the meeting, none of whom were known to the researcher. It can be seen from similar studies of 'live' construction and design meetings that observing the communication during 'live' meetings of

ten participants and identifying individual participants' contributions to the conversation have not previously been achieved. Instead, the data findings of similar studies focus on, for example, a short, single conversation (Boudeau, 2013), a maximum team of 7, (Kiernan, Ledwith and Lynch, 2019), or the patterns of communication, without transcribing the narrative (Foley and Macmillan, 2005).

During the pilot study, it became apparent how demanding and difficult it is to record enough information during the conversations to create a transcription. The process also left no opportunity to make any field notes about the social interactions, such as the atmosphere or observations about possible trends or patterns of behaviour. Symon and Cassell (2012) discuss how important it is to capture the narrative of the group discussions and the ability to allocate individual participants to the narrative. A process they call “meaning-making”. The trial run of the 360° panoramic video camera occurred during the third meeting to respond to the challenge of identifying who said what. Fortunately, consent to use the camera was quickly obtained by the whole project team. Although technical issues needed to be resolved, such as the battery running out in twenty minutes and the camera overheating, the video footage captured at this meeting demonstrated how crucial this form of video recording is to this kind of data collection, i.e., multiple voices during a group interaction. In addition, the use of the camera during the third meeting allowed the researcher to observe the meeting and take field notes beyond who said what. Observations included the emotions and dynamics in the room and notes regarding potential research questions to consider later.

The first recurring pattern of social interaction behaviour that emerged during the pilot study was joint laughter. Joint laughter was defined as when more than one participant was engaged in laughter at the same time. This theme became the focus of the data structure and analysis process for the pilot study. The times during the meetings when joint laughter occurred were explicitly noted; these occurrences formed ‘critical events’, which became the focus of the analysis. Following the success of the 360° panoramic video during the third meeting, consent was sought and gained to use the video during all the future meetings observed. The video data forms the primary data for the main study.

The process used to structure and analyse the pilot study data was based on Powell, Francisco and Maher (2003). This process is specially developed for video data. Figure 4. 2 illustrates the process.

Figure 4.2: Structuring and analysing the video data during the pilot study, adapted from Powell, Francisco and Maher (2003)

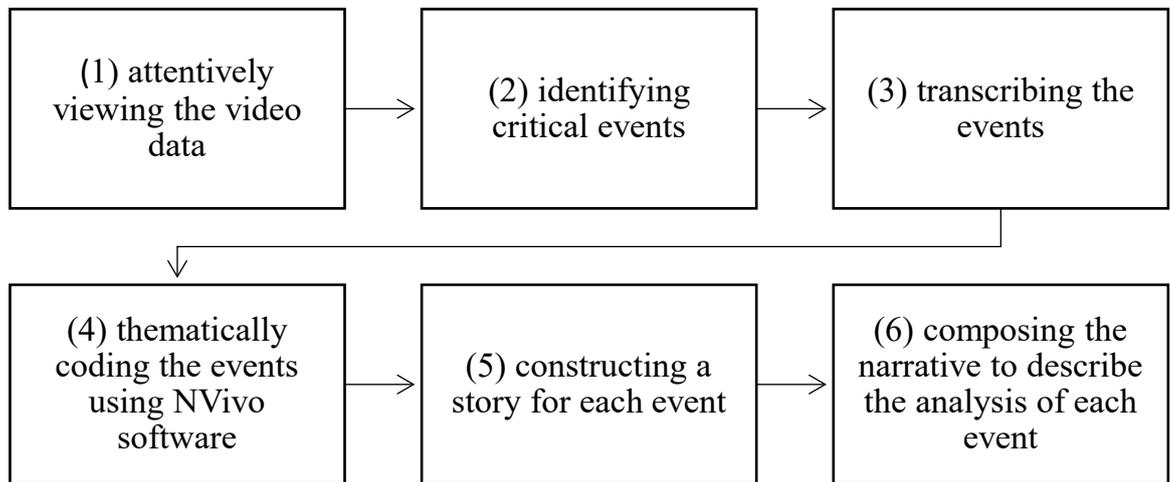


Figure 4. 2 illustrates the structuring and analysis of the video data, namely; (1) attentively viewing the video data; (2) identifying critical events; (3) transcribing the events; (4) thematically coding the events using NVivo software; (5) constructing a story for each event; (6) composing the narrative to describe the analysis of each event (based on Powell, Francisco and Maher, 2003, p. 413). Each critical event, i.e., where joint laughter occurred, was structured using NVivo software to thematically analysed to (i) consider its functions; (ii) to understand its contribution to group dynamics; and (iii) to acknowledge its contribution to future strategic behaviour about improving collaboration and integration. For the purpose of the pilot study only, the basis of the thematic analysis derived from the five primary functions of laughter according to Greatbatch and Clark (2003), namely; collegiality, superiority, support, relief, and conflict. The analysis of the joint laughter events focused on the verbal interactions of each meeting's participants. Non-verbal forms of communication lay outside the scope of the investigation at this point.

A further development during the pilot study that impacted the main study data collection method was the specific stage of the construction project being observed. During the observations of the pilot study meetings, it became clear that the design development stage was a critical determinant of the appropriateness of the case study project. The design during the observations of the pilot study was clearly too far developed for the main study. Examples of problem-solving and decision-making issues were about recycling bins and the detail of the bike storage. It was clear that data needed to be gathered far earlier in the design development process; ideally, as early as possible once the main contractor was awarded the project. This early involvement would allow the observation of more critical design coordination and decision-making during the CIDMs and earlier teamwork processes such as forming group norms, early socialisation, and group dynamics relating to the *forming* stage of team development. Following this realisation, the researcher contacted the regional manager and discussed access to the main three case study projects as early as possible.

4.4.3 The main study – case studies A, B and C

According to Schweber (2015), one of the common criticisms of the interpretivist epistemological orientation is that knowledge is limited to specific cases, limiting the identification of novel and surprising outcomes to raise new questions and foster further research. A multiple case study approach was adopted for the current study to allow comparison across the teams while looking for patterns in the social interaction behaviour in an authentic work environment (Yin, 2014). In addition, LeCompte and Goetz (1982) suggest that using multiple case studies provides greater generalizability than is possible with a single case study through the validation of the findings. Case studies are apt to examine social behaviour during construction management and design meetings. Meetings are frequently utilised in organisations to facilitate communications and actions and are therefore appropriate to observe organisational team social interactions. Meetings can offer a window into team dynamics within organizations (Boudeau, 2013). Case studies of project team meetings have been adopted by other researchers carrying out similar studies, such as Gorse and Emmitt (2007), Mehrbod *et al.* (2018), and Kiernan, Ledwith and Lynch (2019).

To provide a similar context to the case study observations, the following were the criteria for the projects to be included in the study; (1) the same main contracting organisation managed the project, (2) the project was privately funded, (3) the project was procured using a design and build form of contract, (4) the project was located in the north of England, (5) the project was ‘live’ during 2018 (when the observations took place) and finally, (6) the whole project team provided consent for the meetings to be observed and video recorded. The three case studies were selected because they met all six criteria. To reduce the variables of cultural differences.

Each case study project involved a unique set of participants to the other case studies. At times, during the ten months of observations, the participants of the projects involved with the CIDMs changed. For example, the construction manager of Case Study A left the project to move to a different project and was replaced. Personnel changes are routine for a construction project and reflect the temporary, transient and changing demands of a construction project team (Emmitt and Gorse, 2003). See Table 4.5 for further information about each case study project, including the project type, the number of meetings observed, the regularity of the meetings, dates of the observations, and the minimum and maximum number of participants at the meetings.

Table 4.5: Case study A, B and C overview

	Project type	No. of meetings observed	Regularity of the meetings	Dates of the observations	Number of participants	Total hours observed
Case study A	Multi-storey office development – new-build	8	Fortnightly	March 2018 – July 2018	5 - 10	17
Case study B	Education teaching facility – new-build	3	Monthly ³	July 2018 – August 2018	5 - 8	6
Case study C	Education teaching facility - refurbishment	6	Monthly	July 2018 – December 2018	5 - 11	11
Total		17		10 months	29	34

The frequency of the meetings varied. For example, most of the Case Study A meetings took place fortnightly, although two meetings were cancelled due to the annual leave of some of the key participants and delays with the project contract being signed by the client. The Case Study B meetings occurred monthly. Case Study C meetings were approximately monthly but were generally organised when the design manager saw the need, rather than scheduling the meetings to a fixed timetable.

The participants of the meetings included representatives from the main contractor and sub-contracted design disciplines. During the study's data collection and analysis phases, participants employed by the main contractor and subcontractors employed to provide the detailed design, manufacture and installation elements of the project are identified as 'constructors'. While participants subcontracted to the project team for design input only are identified as 'designers'. In most cases, the leader of a construction project team is the project manager; however, during the observed CLDMs, the design managers undertook this role. In addition, the design managers were responsible for setting the agenda before the meeting, recording the discussions during the meetings and communicating the discussions via meeting minutes. The minutes of the meetings were used to supplement the primary data (video recordings) during the data structuring and analysis process.

After ten months of data collection, the main contracting organisation had no further construction projects matching the six-point criteria. Consequently, after the third case study was observed to a point when the design was beyond the early design phase (see RIBA, 2020 - 8 stages), the

³ Meeting #2 and #3 occurred on the same day.

researcher decided to terminate the observations due to a lack of further available case studies. Hammersley and Atkinson (2007) support the need to terminate an ethnographical study once either no further data is available to collect, or a deadline looms to produce the research output. Now the data was collected, the researcher could focus on structuring and analysing the data.

4.4.4 Observing the meetings

The current research project adopts a video ethnography approach to observe the CIDMs during the early phase of the design process. An ethnographic approach gathers ‘rich’ data (Mehrbod *et al.*, 2019). In addition, the video ethnography form of data collection allowed the natural team dynamics of the meetings to be observed in their setting (Deanzin, 2017). According to Paquin, Miles and Kivlighan (2011), observing and recording behaviour is viewed as one of the most objective and direct measurement tools available to assess group behaviour. The primary data was collected over ten months. A total of seventeen meetings were observed, totalling thirty-four hours. The locations of the meetings varied between a large conference room in the organisation’s regional office, the on-site cabins meeting room, and a vacant room on the site of the multi-storey building being refurbished. (For more information about the physical setting, see Chapter 5).

The 360° panoramic video recordings form the primary data for the research project. See Image 4.1 to see a photograph of the recording device (a highlighter pen is added for scale).

Image 4.1: The 360° panoramic video camera used during the study



As illustrated by Image 4.1, the video camera is small, easy to transport, and discrete. Some participants commented that they forgot they were being filmed because the video camera was unobtrusive. The use of a small, single video can be contrasted with the alternative approaches of video filming, for example, having two cameras with different angles or roaming cameras that would be more obtrusive. During all the meetings, the video was positioned in the centre of the

meeting room table. Facial expressions of participants sitting behind a laptop were captured by raising the video four inches off the table (on top of an upside-down travel mug). Existing literature (see LeBaron *et al.*, 2018) discusses the importance of carefully considering the position of the video, with the majority of researchers adopting either an “outsider” or an “insider” perspective. The current research project offers a new “central” perspective, where the activities are occurring around the video while the video simultaneously captures the action from all directions. A gap in knowledge currently exists that considers this form of technology's possible applications and considerations during organisational research.

The video data is supplemented by the minutes of the meetings. The meeting minutes were used to verify the conversations during the meetings and the researcher's field notes, which capture observations during the ‘live’ experience, such as emotional feelings like the tension that might not be observable while watching the recordings later. The 360° panoramic video recording captured the participants' conversations and their non-verbal communications. The use of a digital video recorder was chosen because it has become ubiquitous in everyday life. People are increasingly comfortable being filmed while completing everyday activities (Forsyth, 2009). Pink (2013) suggests that video data offers ways to reveal, understand, and collaboratively reflect on research participants activities, practices, and experiences. Table 4.6 summarises the advantages the researcher found with using the 360° panoramic video recording.

Table 4.6: Summary of advantages of using the 360° camera, rather than audio recordings to capture team behaviour

Advantages of capturing 360° panoramic recording footage rather than audio recordings of the meetings
To identify the speaker during a conversation.
To identify who the speaker is addressing and who is engaging/who is not engaging, simultaneously.
To identify ‘in-group’ and ‘out-group’ reactions and responses.
To observe the use of virtual attendance, for example, skype attendance and the reactions of all participants in the room.
To observe the use of telephone only attendance and the reactions of all participants in the room.
To observe body language and the participant's reactions to it.
To observe to use of tools and artefacts.
To observe the behaviour of those not participating in the discussion. To see what participants were doing and the reaction of others in the room.
To identify where people position themselves around the table to see who sits with whom.
To observe the effects of a meeting room that may be too small, too large, too cold, too warm.
To observe the effect of people joining the meeting late, taking phone calls, leaving the room during the meeting.
The ability to take screenshots at any point in the meeting to support the presentation of the data.

In summary, the 360° panoramic camera simultaneously captured the visual, verbal and non-verbal information during the meetings. It allowed repeated observations of the data, allowing for a rich

understanding of the setting. However, the use of the camera also created issues that would not have occurred if an audio recorder had been used to collect the primary data. See Table 4.7 for a summary of the issues the 360° panoramic video created during the study.

Table 4.7: Summary of issues encountered while using the video camera

Issues encountered using the camera
A researcher needed to attend the meeting to operate the camera.
The camera cost approximately £300 — considerably more expensive than an audio recorder.
The camera battery ran out quickly unless the quality of the recordings was reduced and the camera was connected to a power supply throughout the meetings.
The camera overheated after about two and a half hours.
The camera is operated via a mobile phone. Unfortunately, the camera quickly drained the battery of the phone. Therefore the phone needed to be connected to a power supply throughout the meetings.
The video footage is difficult to anonymise. Therefore it is not possible to present the data in its raw state.

The use of a 360° panoramic video is a new approach in team, organisational and construction-specific research. The current study aims to provide new knowledge in this method of data collection. Gorse and Emmitt (2007, p. 1198) acknowledge the limitations at the time of in-person observations during a similar study, “*observing all communication stimuli would prove impossible, so verbal observations were limited to verbal interactions, while at the same time recognizing that body language and facial expressions provided important information in helping to understand the meaning of the verbal messages*”. The use of the 360° panoramic video allows for a far more comprehensive capturing of group social interactions than has previously been possible.

The researcher attended the entire duration of every meeting and took field notes that form a supplementary source of data, alongside the meeting minutes (produced by the design managers). The field notes recorded observations during the ‘live’ meeting. The observations focus on the social interactions and behaviour of the group to identify recurring patterns of behaviour that represent the social processes occurring during the meetings. Gaining a perspective from the setting during the live meeting is particularly important to capture feelings of tension during conflict events, for example. The researcher typed up the field notes shortly after each meeting while reflecting on the meeting proceedings and considering any emerging behaviour trends and patterns regarding the team social interactions. Gorse and Emmitt (2007) carried out a similar study, observing live face to face construction meetings. The authors acknowledged the time-consuming nature of direct observations to the researcher and highlighted that no additional time or resources are required by those being observed. In fact, it is desirable for those being observed to behave as if the observation is not taking place. Given the high demands on the time of construction project teams, this is a considerable benefit when collecting data in this industry.

The primary data (video) and supplementary data (field notes and meeting minutes) were collected while the researcher was observing in a non-participating capacity. This non-participatory form of observation means the researcher was present before, during and after each meeting, but she took no active role in the discussions. An area worth discussing is the ethnographer's problem of "invisibility" (Czarniawska, 2007). Klitgaard, Svidt and Gottlieb (2020) discovered that carrying out ethnographic observations in a similar setting while attempting to be as invisible as possible was difficult. Those being observed may "perform" for their audience (Goffman, 1959). Although it is not possible to be sure from observations alone if the researcher's presence altered the meeting behaviour, three particular observations suggest good invisibility was achieved. Firstly, the overall behaviour of the three project teams was consistent across the observations. As a prime example, Case study A was observed for eight consecutive meetings over four months. Behaviour relating to this research project's general themes, such as social cohesion, intragroup conflict, and group norms, were typical across the meetings. Secondly, behaviour that might be considered inappropriate to an 'outsider', such as expletives and politically incorrect references, were observed throughout the observations. Even though a camera was used and present in the centre of the table the participants were sat around. The third indicator of successful invisibility only occurred once in all thirty-four hours observed when a meeting participant verbally acknowledged the camera during a meeting. The participant stated, "*I'm not precious about the architectural side of things – sorry, I know you are recording this for Ben⁴*". Given that this is the only reference to the researcher or the camera during the observations, the aim of being invisible appears successful. The camera has proven to be an unobtrusive tool for collecting video data.

A similar study to the current study is Pirzadeh, Lingard and Blismas (2021), who carried out an ethnographic data collection, which included interviewing the participants. However, the current study did not include interviewing the meeting participants because the research focuses on understanding patterns and themes of social interaction behaviour. Identifying these patterns and themes takes time. Therefore interviews to discuss the themes with the participants would need to take place a year or more after the meeting. This extended timeframe between the data collection and the data analysis is a limitation to the approach adopted in this study. A direction for future research is to select specific events in the video footage and interview the participants to gain their retrospective reflections of the behaviour being exhibited.

4.4.5 Structuring the data

Once the qualitative data collection was complete, a lengthy process commenced to structure the data. The primary data for this research project is thirty-four hours of 360° panoramic video footage of CIDMs. By its nature, the data allows for repeated observation and analysis of the

⁴ Ben is the architect who is not in the room.

footage, which captures all of the meeting participants verbal and non-verbal interactions during the meetings. This degree of data capturing is not possible with more traditional ethnographic data collection methods, which rely on copious field notes that represent an interpretation of the setting where the researcher creates an interpretation of the interpretation through the analysis process.

The first step in structuring the data was to review the field notes and reflect on the observed trends and patterns in behaviour documented during the nonparticipating observation process. The observations followed the general guidelines provided by Angrosino (2007) regarding carrying out observations during an ethnographic study, which included, what are the group trying to achieve? and what is the context? These trends or patterns in behaviour included (in no particular order); collaboration between different disciplines, the tension created by conflict, lack of decision-making, confusion about the agenda, humour, lack of a consistent approach regarding the agenda, designers not attending the meetings, issues when using Skype, wasted time discussing problems without reaching a solution, the volume of design information delivered late, the inconsistent use of the meeting room monitor, and finally, minimal use of the BIM 3D model. From these trends and patterns, the following preliminary themes were identified and are presented from the most to the least recurring themes; cohesion, conflict, group norms, decision-making, interdisciplinary working, and the physicality of the meeting room. These themes became the starting point of structuring the thirty-four hours of video footage.

Next, the researcher watched the video recordings, starting from Case study A meeting #1. The aim was to identify the timestamp of a social interaction event and provide the interaction with a code name. Phelps and Horman (2010) and Mehrbod *et al.* (2018) advocate the use of code names to identify specific sections of lengthy data by using a word or short phrase taken from that section of data itself. For example, the first social interaction for Case study A meeting #1 occurred two minutes and forty seconds into the meeting. The team were discussing when they thought the client would sign the contract to allow the construction phase to commence. The project manager made a joke that perhaps the client was waiting until after the Easter weekend to sign the contract, in which case the team could celebrate by eating Easter eggs. The following is the timestamp and code name of this interaction. The key provides the specific reference of each letter and number in the timestamp;

Timestamp	Social interaction code name
A ¹ 1 ² A ³ 2:40 ⁴	Easter eggs

Key

A¹ = Case study A

1² = meeting #1

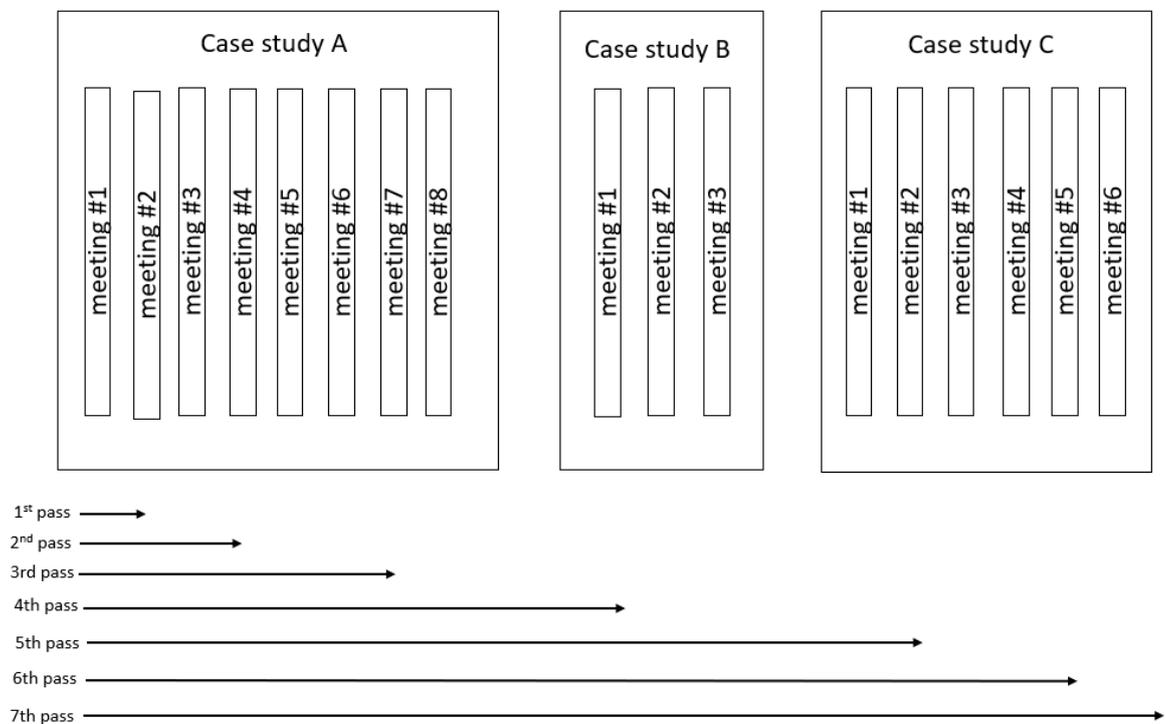
A³ = video A (more than one memory card was used in the early meetings before the researcher bought a memory card with more space)

2:40⁴ = the timestamp, i.e., 2 minutes, 40 seconds into the meeting

Easter eggs = the code name of the interaction

When the team displayed any behaviour that matched one of the social interaction themes, the time on the video was noted, and a code name was created. This process continued until the researcher identified a new pattern of behaviour or sub-theme. The new pattern was then either; structured under one of the existing themes, or a new theme was created. No new themes were required, but new behaviour sub-themes were identified, which meant the researcher had to start observing the meeting recordings again from Case study A meeting #1 to see if the new sub-theme had occurred, but events had not been identified and given a time-stamp and code name. The reiterative process of observing the video footage was very time-consuming, but it allowed a thorough examination of the data. Figure 4.3 illustrates the iterative process of structuring the data. The large boxes represent each case study. The smaller rectangles labelled meeting #1, #2, #3 and so on represent each meeting video recording. The 'pass' represents each time the researcher watched the recordings from the beginning, i.e., from Case study A meeting #1.

Figure 4.3: The iterative data structuring process



It took seven passes to identify, timestamp and code name all social interaction events without observing a new theme or sub-theme. Table 4.8 provides a breakdown of the total number of hours,

number of meetings and number of social interaction events identified per case study. See Table 4.8.

Table 4.8: Social interaction events breakdown

Case study	Number of meetings	Total duration of the meetings	Number of social interaction events
A	8	17 hours	195
B	3	6 hours	24
C	6	11 hours	110
Total	17	34	329

A total of three hundred and twenty-nine social interaction events were identified across the three case studies. Once all the social interaction events were identified, the next step was a thematic analysis. According to Clarke and Braun (2017, p. 297), a *“thematic analysis is a method for identifying, analyzing, and interpreting patterns of meaning (‘themes’) within qualitative data”*. NVivo software was utilised to organise and structure the social interaction events. The typed list of social interaction events was uploaded into the NVivo software. The researcher watched the video recording of each event again and coded each one. The nodes were consolidated, merged (due to similarities) and reduced (due to repetition) to form the themes. Two parent nodes or themes of cohesion and conflict emerged from the data. These nodes become the primary themes of the study. Child nodes were also created inductively. For example, the child nodes under the cohesion parent node were; familiar behaviour, humour, non-task talk, and solidarity, praise and support. Some of the child nodes under the conflict parent node included grievance, disagreements and extreme talk. Many of the social interaction events were coded under more than one theme or sub-theme. To see the NVivo nodes diagram see Appendix A.

It should be noted that the thematic analysis in the current study is a tool to identify trends and patterns in behaviour. It has not been used as a tool to carry out a quantitative analysis of the primary data. A full transcript of the thirty-four hours of meetings would be required to carry out a thorough quantitative analysis to the same level of enquiry as the conversation extracts presented in Chapters 6 and 7. Although the transcription of thirty-four hours of meetings would be possible, it is outside the scope of this research project. Instead, detailed conversation analysis has taken place of ‘typical’ conversation extracts, which have been identified via a thematic analysis structuring process.

The next step of structuring the social interaction events captured was selecting the events to analyse in detail. The researcher first identified and interpreted the social interaction events from the video recordings. She has over ten years experience working as a construction manager in the construction industry and ten years working in academia. As a result, her experience more than

fulfils the requirement of unique adequacy that knowledge of the research setting allows recognition and understanding of what the participants would ordinarily know about (Rooke and Kagioglou, 2007).

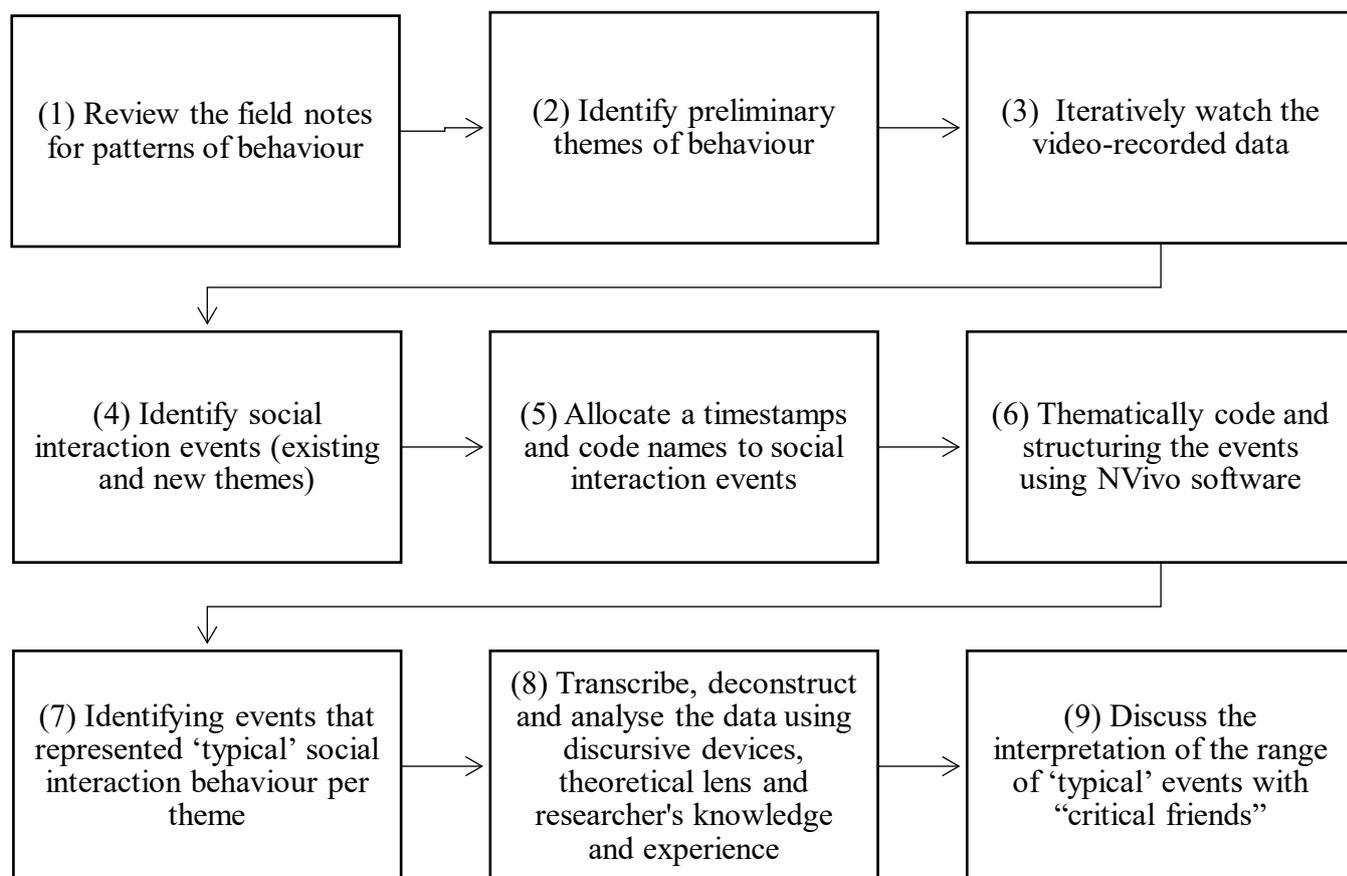
The researcher and two academic peers who were independent of the data collection and analytic process were invited to watch the video recordings of a range of ‘typical’ social interaction events per theme as part of a group workshop. They discussed each event and the interpretation the researcher has drawn from it. This process represents the “critical friend” approach (Smith and McGannon, 2018), whereby the interpretation and consideration behind the coding and thematic classification of the events were discussed. Then critical feedback was provided to the researcher. This approach also served to fulfil some of the important unique adequacy requirements or ‘ethnomethodological indifference’ (Wakefield, 2000) by allowing the researcher to take a step back from the data assumptions and take a more objective, non-judgmental assessment of what was taking place during the CIDMs.

The researcher next selected the events to transcribe. A total of twenty-two typical events were selected across the dominant themes of social cohesion and intragroup conflict. On several occasions, more than one typical example has been selected to demonstrate the team's behaviour. By selecting more than one example of social interaction, similarities and differences are identified that highlight productive behaviour or behaviour that hinders the group's performance. In addition, by considering good and poor practices, future best practices is posed.

A thematic analysis was also carried out using the supplementary data of the field notes and the meeting minutes. These documents were also inductively structured using an open coding process using the NVivo software. The parent nodes included; communication milieu, functions of the meeting, group norms, cohesion, conflict and the physical setting. To see the NVivo nodes diagram see Appendix B. This thematic analysis forms the basis for the thick description included in Chapter 5 – Social interaction overview. The aim of this chapter is to provide a detailed narrative of the team behaviour by looking at the setting and the interactions among actors to understand its organisational character and uniqueness. The thick description presents construction team and organisational practice in a new way by observing the ‘live’ reality.

Figure 4.4 summarises the data structuring process, (based on Powell, Francisco and Maher ,2003). The process has been adapted for this study.

Figure 4.4 Structuring and analysing the video data during the main study, adapted from Powell, Francisco and Maher (2003)



4.4.6 Analysing and presenting the data

Once the raw data of the video recording social interaction events were structured and the ‘typical’ events selected, the next step was to analyse the events. This process was multi-faceted and involved a variety of inputs.

Firstly, the conversation extracts were transcribed and presented using the Jeffersonian Lite (Jefferson, 2004) system of transcription notation. (See Table 4.9 for the Jeffersonian Lite key). Jeffersonian Lite is designed to capture *what* was said and *how* it was said. The resulting transcription provides a detailed version of the complex nature of the social interaction surrounding the events. Potter and Hepburn (2005) and Willig (2013) advocate that if the purpose of the exercise is not concerned with the more advanced complexities of turn-taking, then Jeffersonian Lite rather than the full Jefferson version is adequate. The simplified transcription format captures the words and some of the grosser elements of stress and intonation while leaving pauses untimed and not attempting to capture more subtle elements such as overlapping, closing, continuing intonation, and latching. See Table 4.9 for the Jeffersonian Lite key used for the current study.

Table 4.9: Jeffersonian Lite key, adapted from Jefferson (2004)

Symbol	Meaning
(.)	noticeable pause
(())	non-verbal activity
h	minimal (volume) laughter
ha	laughter

Producing an accurate Jeffersonian Lite transcription from the video footage meant that the researcher watched the footage repeatedly while focusing on not only what the speakers were saying but also how they were saying it and how the rest of the group reacted. This process enabled the researcher to become extremely familiar with the extracts from a verbal and visual perspective. In addition, since the researcher was also present in the meeting room at the time of the recording, she could also draw on her emotions and feelings while the event took place (including any field notes taken). This depth of multi-sensory perspective is crucial to the analysis process, particularly concerning the emotional aspects of the study, such as the cohesion and conflict present in the group.

Once the ‘typical’ conversation extracts were created as Jeffersonian Lite transcripts, they were next deconstructed to allow for a detailed analysis. The deconstructing of the conversations involved considering each word and phrase individually. Discursive devices, taken from social psychology, have been adopted to consider the role and function of individual words and phrases to examine the conversation's contribution to the group dynamics. Wiggins (2017) describe discursive devices as ‘tools’ that can aid the interpretation of talking but not in a mechanical sense. Instead, the discursive devices help locate ‘clues’ in the conversation that the researcher can examine further to help interpret what is going on. Examples of discursive devices include; pronoun use (Goffman, 1979), silences, pauses and hesitations (Jefferson, 1989), extreme words or phrases (Pomerantz, 1986), and metaphors (Wiggins, 2017). (For more information about discursive devices, see Wiggins, 2017). One of the benefits of using discursive devices is that future researchers can replicate this approach. Although the interpretation of the ‘clues’ in the conversation might produce different interpretations, locating the clues is straightforward and can be replicated across different settings to allow for comparison.

The ‘typical’ conversation extracts were also analysed using the theoretical background of knowledge and theory presented in Chapters 2 and 3. As stated earlier in this chapter, the current study generally follows an inductive approach to the generation of theory. Therefore, the theoretical lens was created from relevant literature relating to the data observed after all the data was collected. In practice, this involved the researcher recording in her field notes possible areas within the organisational behaviour subject domain to review and consider if relevant while she

attended the meetings or later during the structuring process. Although this approach felt daunting to begin with, over time, it became a thoroughly enjoyable part of the data collection process.

The final part of the multi-faceted analysis process involved using the researcher's ten years of experience working as a construction manager on similar projects to those observed in this study. (See Reflexive statement for more information). The researcher's experience was indispensable because it allowed her to follow the meeting discussions, which regularly became highly technical, and to understand the ramifications of the discussions and, specifically, the decisions being made, not just for the design but for the project. Finally, it is worth acknowledging that because human behaviour is not static in that situations and events influence it, no study can be replicated precisely, regardless of the method employed (LeCompte and Goetz, 1982; Mehrbod *et al.*, 2018). The structuring and analysis of the data presented follow the guidance (where possible) from existing literature and similar studies. However, the ability to fully understand the highly technical conversations that occur during the CIDMs, which often include inferred (not explicitly stated) information, relies on the extensive industry experience of the researcher. Without this wealth of knowledge, it would be challenging for another researcher to replicate the level of structuring and analysis carried out during the current study. It should be noted that although the findings from the current study cannot be generalised, the method used to collect and analyse the data could be transferred to a different context and replicated by others with similar experiences as the researcher.

During a similar study, Gorse and Emmitt (2007, p. 1198) suggest that "*trying to analyse who says what to who is often too detailed and too project-specific to identify trends or to have a wider application*". In response to this comment, the current study combines a thematic structuring of social interaction events with an analysis of 'typical' conversation extracts to provide a broader application to the findings. It should be noted that the approach of creating detailed conversation extracts that include verbal, non-verbal, body language and physical aspects of the setting is only possible because of the 360° panoramic video being used. Thus, not only have all the necessary data been captured by the video, but the data can be observed repeatedly to create very detailed transcribed extracts.

In terms of presentation, the field notes and the meeting minutes are presented as a thick description to provide a rich interpretation of the setting context. A thick description form of data presentation is commonly adopted in ethnographic research to convey to the reader a sense of being present in the setting. For example, Klitgaard, Svidt and Gottlieb (2020) utilise a thick description of data presentation to communicate a contract manager's practices on a construction site. The thick description in Chapter 5 includes an overview of the site context and direct quotations (recorded in the field notes). The thick description represents the author's interpretation of the

meeting setting and team behaviour context. The context provides the reader with a view of the setting.

As previously discussed, to provide rigour to the research project, Smith and McGannon's (2018) suggest that original members of the data collection engage in the process of "member reflection". The current study included a meeting with some of the original CIDM participants. After the research findings had been presented to the participants, they were invited to reflect on the findings. The participants were asked to provide their views regarding, if they thought the findings fairly represented the meetings, any items in the findings that were not reflective of the meetings and finally, any gaps that the findings did not include but might be relevant. The meeting was a very positive experience for the researcher. Overall, the participants thought the findings represented a fair and accurate investigation into the meetings and that the findings could positively influence future best practices.

4.4.7 Ethical considerations

The current study gained ethics approval from the Faculty Ethics Committee on 10th November 2017 (submission Ref: 2451). The informed consent form used to obtain permission from the participants is included in Appendix C. A number of measures were required to ensure ethical requirements were met during the ethnographic video observational study. The considerations will be discussed next.

The ethical considerations that took place during the data collection process included the following. Although the researcher attended all the meetings in person, the researcher did not speak or participate in any of the discussions. This behaviour is consistent with the principle of conducting ethnographic practice that "*avoids distress or disruption to the settings we study*" (Murphy and Dingwall, 2007 p.2225). The researcher acting as a non-participating observer did not artificially influence the behaviour being studied during the meetings. Overall, the behaviour of the participants appeared not to be disrupted. For example, the participants regularly used expletives and joking, which might be inappropriate if the presence of an outsider (or that of the video camera) changed the behaviour to a more formal atmosphere. The researcher was only referred to once during the thirty-four hours of meetings observed. Every effort was made to cause as little disruption as possible during the meetings while allowing the researcher to experience the meetings first-hand. For example, the researcher ensured that she arrived early to the meetings to set up the camera before the other participants arrived and the meeting commenced.

While the data was being structured, analysed and presented, the following ethical considerations were carried out. Firstly, the names of the organisations and participants included in the study were

replaced with pseudonyms to ensure anonymity. Every effort has been made to mask all the organisations and people represented in this study to ensure no identifiable information was included in the research. Next, care has been taken to present sensitive behaviour and specifically conversations that include controversial comments (i.e., negative humour and racist comments) sensitively. This kind of behaviour may be viewed as uncomfortable to discuss. Still, it is an important element of the culture of the setting and, therefore, has been included in this study.

Finally, every effort has been taken to ensure the primary data (video) and supplementary data (field notes and meeting minutes) have been stored securely. The digital data (video recordings and research documentations) are stored on a secure university server, which is password protected. The paper copies of the field notes are stored in a lockable, fire-proof cabinet. The data will be destroyed once all publications leading from this thesis are complete.

4.5 Summary

The chapter provides a discussion and justification of the methodological decisions taken regarding the design of the research project of the current study. The chapter presents the method undertaken to collect, structure, analyse, and present the data. A discussion of the application of the social sciences to examine construction practice has been provided to consider the benefits and challenges of interdisciplinary research. Next, the philosophical stance and the methodological design for the current study is justified. This justification includes the epistemological orientation, the ontological basis, the generation of theory, and the research strategy. A discussion of the data collection method includes an overview of the existing construction research, which has applied an ethnographical approach. The use of video ethnography as a specific flavour has been debated. This debate is followed by a description of the research methods, including how access was gained, information about the pilot study and the main study (Case studies A, B and C), how the observations were carried out, and how the data was structured, analysed, and presented. The final section of the chapter presents the ethical considerations undertaken during the study.

Chapter 5 Social interaction overview and discussion

5.1 Introduction

A review of construction-specific literature (see Chapter 2) has identified contractor-led design meetings (CIDMs) as the unit of analysis for the current research project. Seventeen meetings have been observed, across three case study projects. The field notes taken by the researcher during the meetings, and the meeting minutes provided by the design managers, have been thematically structured to identify the general themes of behaviour during the meetings. The general themes of the social interaction behaviour are; the design meeting setting; the functions and structure of the meeting; the communication milieu and practice, the group norms, the social cohesion, and the intragroup conflict and conflict management. The research aims to investigate the impact of social interaction on decision-making in construction project design meetings. This chapter will partly achieve this aim by addressing the fourth objective - *To extract from the meeting observations typical examples of social interaction events and to analyse these from the standpoint of theories of organisational behaviour*. The observations include verbal and non-verbal exchanges and reactions between participants that reflect the relationships in the group during task-orientated and non-task discussions.

The research attempts to “dig deeper” (Pettegrew, 2017, p. 160) into the setting and the interactions among actors to understand its organisational character and uniqueness. The aim is to illuminate certain construction and organisational practices in new ways by observing the ‘live’ reality.

An ethnographic, thick description is presented in this chapter to communicate the observations of the teams' social interactions and behaviour. The observations focus on the relationships between the meeting participants to get under the surface of what is happening, with the aim to offer new insights and understanding. Tutt and Pink (2019, p. 478) suggest that ethnographic research should look for “the elephant in the room”, intending to expose it by considering social, cultural and organisational practices which beg robust scrutiny.

The chapter will first discuss the meeting setting to provide a sense of the physical location of the venues.

5.2 The design meeting setting

Contractor-led design meetings (CIDMs) are standard practice in the UK on construction projects with a design and build form of contract. This form of contract means the main contractor is contractually responsible for the design of the project. The main contractor employs designers as subcontractors to create the design. Because the design is a collaboration of designer and

constructor knowledge and experience, compromises may have to be made in the early stages of the design process on related issues such as aesthetics and buildability. The CIDMs observed in this study took place during the early stages of the design process. The three projects were either preparing to commence onsite works or were in the very early stages of the site works. The early stages of the design development have explicitly been selected as the appropriate phase to examine Tuckman's stages of team development model (Tuckman and Jensen, 1977; Bonebright, 2010).

5.2.1 Physical setting

The physical locations of the seventeen meetings varied greatly. Eleven of the meetings were held in the main contractor's well-equipped regional office conference rooms, with glazed walling, a wide-screen monitor, air-conditioning, and tea and coffee making facilities. This location worked well for the meetings with a large number of participants (up to twelve people) in terms of sufficient space and adequate power sockets for laptops and phone chargers. But the setting felt unwelcoming and certainly lacked energy when only four or five people were in attendance. During one meeting, the five participants chose to sit away from one another. No one acknowledged the problems this created when the participants were trying to review together a large drawing replicated at A3 but from a distance.

In contrast, five of the meetings were held in the conference room of the project's site cabins. The room was smaller than the regional office and had a less formal atmosphere. Various power cables were stretched across the room, causing trip hazards. At times, the meeting room was used as a corridor by other site team members. The multi-functional use of the space did not cause any problems and added to the sense of a busy construction site environment. One particular meeting was held in a relatively small and dilapidated room in the multi-storey building that the project team were refurbishing. The furniture was a mismatch of tables and chairs. Sounds of the site works could be heard in the background. Many hand gestures and pointing were used to indicate the building's locations being discussed during this meeting. All three locations appeared normal and functional as a setting to hold a CIDM. The participants appeared as comfortable in the well-equipped conference room as the dilapidated on-site location. Gorse and Emmitt (2007) acknowledge the importance of observing the physical space during an observational study of CIDMs. They consider the physical aspect important to assist the researcher's interpretation of the event. Overall, different sizes of rooms and technology to hand did impact the behaviour during the meetings of the current study. Therefore, these differences warrant further investigation.

The participants of the meetings predominantly attended in person, with six instances when a participant attended via a phone speaker or Skype. The largest number of participants at a meeting was twelve, and the least number of participants was five, with an average of about eight people. When the meetings were observed (2018, therefore pre-COVID-19), attending meetings in person

was viewed as normal, and attending meetings virtually was considered (according to the observed DM and PM) as a poor substitute. For example, the virtual attendance of the civil engineer proved challenging to the team due to the technical problems it created, including no audio, very poor audio quality combined with English as a second language, and the disruptive background noise created from the civil engineer's open-plan office in London being broadcasted to a quiet conference room in the north of England. A colleague of the civil engineer could be heard in London telling him to "*keep your voice down*" as he was also disrupting his own working environment. A potential benefit of the difficulties encountered trying to facilitate virtual attendance was the humour it created in the team. Holmes (2000) supports the observation that the use of humour in the workplace can be a means of creating team cohesion. Gockel and Kerr (2015) recognise a function of humour as a means to create team cohesion can be through solidarity created by a common enemy. In this situation, technology was the common enemy. A sense of comradery was created through a common enemy of the technology, which had all participants laughing together.

The events and restrictions presented by the global pandemic present an opportunity to carry out similar observations to see how attitudes and behaviours have changed towards virtual meeting attendance. The pandemic has forced organisations to adopt virtual meeting attendance on a regular and wide-spread basis. This change in behaviour is worthy of future research compared to the behaviour and attitudes during the current study.

5.3 Functions and structure of the meetings

It is important to provide a narrative of the functions of the meetings to create a picture of the reality of the setting. In an observational study of construction team meetings to understand the functions of various construction meetings, Foley and Macmillan (2005) identified the following three meeting categories; problem-solving, progress, and technical meetings. Their study suggests that the construction meetings they observed could be classified as performing at least one of these functions. In Foley and Macmillan's study they also identified different forms of communication input and interactions between the participants. For example, the contractor dominated communications during the progress meeting, while the communication was more evenly divided between the different disciplines during the problem-solving meetings. However, in the current study, the CIDMs consistently include all three of these functions during each meeting observed. Sometimes the three functions are clearly separate sections of the meeting. For example, Case Study A consistently focused on the progress aspect of the meeting first for all three design disciplines before moving to problem-solving and technical issues. Case Studies B and C were less structured in terms of the order of the functions. However, all three functions were included in each

meeting. The presence of problem-solving, progress reporting and a discussion of technical issues and queries demonstrate the variety of different functions necessary for a single meeting.

Building on Boudeau's (2013) ethnographic research, CIDMs can be viewed as an example of “ordinary” work practice where the coordination of expertise is accomplished through the situated ways in which designers and constructors interact with and talk to each other. The observations of the meetings made during the current study included the same general design-related activities across the case study projects, often in a similar order. These activities were as follows; an update on the status and progress of design information per discipline; discussion of any design information coordination issues; design-related problem-solving and decision making (usually for the design interfaces between the disciplines), and specific buildability and commercial considerations raised by the constructors. The conversations throughout the meetings focused specifically on design coordination, planning, and decision-making. Most of the time spent discussing the status of design information focused on information that was due to be completed late, or needed to be revised. Little time was spent acknowledging the creation of design information that was on time or ahead of schedule. This lack of acknowledgement perhaps reflects the task-focused behaviour of the participants, who were more concerned with the future progress of the project rather than spending time celebrating relatively small successes. This behaviour could reflect the cultural nature of the construction industry as often failing to recognise team members effort and hard work. More research is required to understand the underlying reason why the teams consistently focus so little on actions that have benefited the project. Increasing the level of acknowledgement of progress could positively impact the motivation and task cohesion present in the team (Beal *et al.*, 2003; Yang and Tang, 2004), which could improve overall productivity and performance.

The designers required to attend the CIDMs across the three case study projects represent the same three key design disciplines, namely; architecture, civil engineering, and mechanical, electrical and plumbing (MEP) engineering. The general structure of the meetings and the interdisciplinary nature of construction design (i.e., separate design elements interface with each other in many highly technical junctions) mean that the meetings rely on all three disciplines being present during all the early design phase meetings to allow coordination, problem-solving and decision-making to take place. Without all three disciplines being represented, the meetings are only a mechanism for reporting the status of the design information per discipline. Çıdık and Boyd (2020) discuss the fundamental importance of multidisciplinary and interdisciplinary discussions during the design coordination of a construction project. Given the importance of design discussions, it was surprising to observe how often a designer failed to attend a meeting during the current study. According to Kerr and Tindale (2004), the impact of a key designer failing to be part of the decision-making process is a reduction in the team’s ability to solve problems due to a lack of

diversity of expertise, experience, and opinions. Therefore, designers attending CIDMs is fundamental to the effective management of the design process. Further research is required to examine why designers are not attending the meetings and the broader impact of this behaviour to inform future best practices.

All the meetings observed were chaired and led by the design manager (DM). The preorganised agenda of the meetings varied greatly across the 3 case study projects. For example, Case Study A meetings followed a complicated and difficult to follow set of minutes from the previous meeting, which formed the agenda of the next meeting. This structure ensured that all necessary points of discussion were included but a great deal of time was wasted repeatedly going over the same issues that could not be closed out, usually because the information was lacking to make a final decision. On a number of occasions, the DM left the room and the meeting ground to a halt because no one else in the meeting could follow the agenda and therefore, they did not know what was the next item on the list requiring discussion. All the meetings observed for Case Study B included no agenda or formal structure. Instead, the DM led the discussion loosely from a list only known to him. These meetings appeared to lack a focus and a clear purpose. Interestingly, no one acknowledged the lack of an agenda or questioned if one would be beneficial for the meetings in the future. According to Lapinski and Rimal (2005), teams do not develop group norms overnight. Informal, unexpressed and unconscious norms grow gradually over time and originate from the group's historical behaviour that becomes acceptable. Wheelan (2005) pose that teams incorporate cultural norms and values from their organisation. Since the preorganised agenda of the meetings varied a great deal, this would suggest the organisation has not provided direction or best practice in this important area of meeting facilitation. How the teams use the time allocated to the CIDM requires future research to ensure the time is used to create maximum benefit to the project.

Problem-solving and decision making was a key function of the meetings across the three case study projects. When a complex problem was raised, the design manager usually suggested that a separate workshop take place to gather the relevant disciplines together at a future date. For less complex problems, participants were asked to consider solutions to design problems, and if they could not produce a solution immediately, they were asked to bring the solution to the next meeting. This approach is consistent with Boudeau's (2013) observations of similar CIDMs. There were many on the spot decisions during the meetings of the current study. An interesting observation was the inconsistent use of the team either spending time generating alternative solutions, or a member of the team (usually the project manager or design manager) agreeing to the first workable solution offered. Tjosvold, Wong and Feng Chen (2014) consider that by spending time discussing alternative solutions, a group is preventing premature consensus and stimulating critical thinking. Further consideration of decision-making will be presented in more detail during Chapter 8.

Another observation regarding decision making was the frequent examples of relatively minor design decisions being discussed at length while significant design issues were only briefly discussed. For example, a lengthy conversation about positioning the weep holes in the brickwork⁵ compared with a short (but unresolved) conversation about the mains electricity supply to the building; ostensibly a much more significant issue. A specific example of the use of alternative solutions was observed during one of the few meetings that included members of the client team. The function of this particular meeting was to review the MEP design to solve the major problem of the current design not sufficiently tackling the solar overheating of the building being refurbished. The DM had to stop a lengthy conversation about alternative hand dryer specifications, when the team should have been using the limited time during the meeting to discuss more fundamental aspects of the design, for example, the ventilation system and the ability to open windows. Research by Lu, Yuan and McLeod (2012) suggests that team discussion tends to focus on information the team is familiar with (known as the bike-shed effect) rather than information that the minority of members are aware of. The bike-shed effect means that teams tend not to share and discuss all the information available to make an informed decision. Instead, they may focus on shared knowledge in the group and limit the number of possible solutions that may be available to solve a problem. A deeper drive is required to review the situations when alternative solutions are presented and the situations when no alternatives are presented, to guide future best practice.

In summary, the meetings represent the interdisciplinary coordination practices between the key design disciplines and the project constructors to create the project design information. Although the overall functions of the meetings were observed as reasonably consistent across the seventeen meetings, the organisation of the agenda varied greatly, with mixed results. The teams spent a great deal of time discussing design information that was late but did not particularly acknowledge the success of design information that was produced on time. Also, given the interdisciplinary coordination requirements of the meetings, it was surprising how often a designer did not attend a meeting. It was also surprising how inconsistent the teams were in their consideration of alternative solutions to minor and significant design problems. Instead, they often relied on the first workable suggestion made. Further consideration needs to be given to the impact of lack of attendance and alternative solutions to inform future construction practice in general.

⁵ Weep holes are used to remove moisture from the cavity of the external façade. This is a common and fairly standard issue for masonry façade design.

5.4 Communication milieu and practice

According to Marlow *et al.* (2018), communication is consistently identified as a critical component of team performance in organisational behaviour literature. Communication climate is generally defined by Putnam and Cheney (1985) as the atmosphere in an organisation regarding accepted communication behaviour. Therefore, it is important to consider the communication environment and atmosphere during the meetings to understand the behaviour of the participants. Overall, the atmosphere of the CIDMs was informal. The informal behaviour included informal indicators, such as first names terms, no titles or formal meeting etiquette. The meetings usually commenced after a few minutes of casual conversations that were usually task-related or were episodes of banter, i.e. teasing, playful or friendly remarks (see Plester and Sayers, 2007). An example of this was a meeting when most of the participants arrived wearing blue shirts. The group found this humorous. Once the meeting commenced, the informal atmosphere continued with further humour and banter, which will be discussed in more detail later in the chapter. A factor in the atmosphere being informal could be that the construction site activities were still to start or were in the early stages across all three case studies. For example, the project manager for Case Study A commented that the final contract with the client was yet to be signed. Therefore, the deadlines for completing the design could be moved back. Further research is needed to understand the different group dynamics that occur during each stage of team development (Tuckman and Jensen, 1977) and the impact on the social interactions and communication milieu of this setting.

As previously discussed, the designers required to attend the CIDMs across the three case study projects represented the same three key design disciplines. The interdisciplinary nature of design coordination clearly had an impact on the communication that occurred during the meetings. This is observable and replicates the view of Reinerstein (1997) and further discussed by Eynon (2013) as silos or “tribes” of designer and constructor. For example, the architects favoured aesthetic concerns over commercial issues, with comments such as “*this is going to look naff*”. The architects and civil engineers were rarely concerned with conversations about buildability or commercial issues. A civil engineer was challenged about the cost of an aspect of the concrete frame reinforcement, and the response was, “*that’s not my department*”. On the other hand, the constructors communicated more regularly and in more depth during discussions about the design that involved activities on the critical path of the programme (for example, the in situ-concrete stair cores), or discussions involving design issues which could potentially add additional costs to the project. During the meetings, examples of effective and ineffective interdisciplinary communication during problem-solving and decision making were observed, suggesting an inconsistent approach. Good interdisciplinary practice, which included a discussion of a design problem and involved the relevant parties, was generally led by the architect, who appeared to be viewed as the lead-designer, which matches the architect's traditional role (see Greenwood, Walker and Walker, 2008). A more challenging example of interdisciplinary communication was a lengthy

discussion regarding the basement plant room where the ceiling height of the room failed to provide adequate headroom for the plant equipment, but the design was too developed to increase the headroom at this stage. The constructors, noticeably, added little to the discussion, even though it presented a significant risk to the project. This example emphasises the possible void in sufficient design knowledge regarding MEP design elements by the constructors, which was repeatedly witnessed during the meetings. Overall, the constructors involved themselves far more with architectural and structural design problems and far less with the MEP design issues. This pattern indicates less cohesion at the constructor-MEP interface than at those between the architectural and civil disciplines. The communication between the designer disciplines and the input from the constructors demonstrated a multidisciplinary approach and an interdisciplinary approach during problem-solving and decision-making conversations with a clear reduction in the levels of communication that focused on the MEP-constructor interface.

5.5 Group norms

Feldman (1984) and, later, Innes (2003) suggest that group norms provide the framework for predictable and acceptable behaviour between team members, avoiding embarrassing interpersonal situations. Group norms were identified during the observations as recurring patterns of social interaction and behaviour performed by most of the team on a number of occasions. The first example of a group norm worthy of discussion is connected to the informal atmosphere consistently observed during all seventeen meetings. Ensuring the individual design disciplinary knowledge is shared during design interface problem solving and decision-making has already been discussed. Therefore, it was surprising to observe a lack of formal structure to ensure all relevant knowledge was shared while design interface problems were discussed. The discussions were consistently informal in structure. The appropriate person with the appropriate expertise was expected to contribute to the debate. When participants did not contribute to a discussion, they were not prompted to do so. In other words, very few invitations were made for participants to add their knowledge, even though some participants contributed very little to the discussion, perhaps through shyness or lack of social confidence. This group norm behaviour is also observed by Gorse *et al.* (2006), whose findings are also based on 'live' construction management and design meetings. The DMs regularly asked all participants if they had anything further to add during the final closing stage of the meeting, but this invitation only generated new items that required discussion, rather than the re-opening of a previous conversation. As an observer, it appeared as a group norm to assume the experts would involve themselves in a conversation. This group norm was consistent across all the meetings observed. It is perhaps an organisational norm that has not been challenged. A further consideration is that because the meetings were chaired and led by a constructor, who perhaps tend to focus on a linear, deadline-driven approach to problem-solving,

investigating a problem by applying an iterative approach that might increase the number of possibilities and options is not deemed necessary. Rather the focus is to complete the meeting as quickly as possible.

A further example of a group norm observed during the meetings was spending more time than was necessary repeatedly discussing a problem that could not be resolved, usually due to a lack of information. Case Study A appeared to waste a great deal of time due to this behaviour across the eight meetings observed. The repeated discussions were due to the lengthy minutes from the previous meeting being used as the agenda for the next meeting. Because the design and construction phases were at the early stage, the level of uncertainty in the project information was high, which meant a variety of issues could not be resolved, for example, specific details regarding the BREEAM certification⁶. The BREEAM issue appeared early in the minutes and was discussed for many meetings without being resolved due to a lack of information. The time wasted through unresolved discussions contributed to the meetings' lengthy duration, which for all three case studies regularly extended well past two hours (with no comfort breaks). It was clear to observe the lack of energy in the room after about two hours. Twice during the meetings, different DMs acknowledged the problematic length of the meeting. The following statements were made; *“Let’s wrap this up because I am getting bored. I think everyone is, aren’t they”* and *“We have all lost the will to live, so I am not going to go through that”*, (referring to the next item on the agenda). Even though many of the meetings felt too long and time was wasted repeatedly discussing issues that could not be resolved there and then, the teams did not suggest any change in this approach or behaviour. The situation remained unchanged at the next meeting. The groups appeared to accept the norm of long meetings that often ended when the team lacked the energy to continue. This behaviour may partly contribute to the previously discussed issue of lack of formal invitation to gain knowledge from the experts in the room since inviting additional responses to discussions would inevitably lengthen the meeting further. Future research is required that examines how to increase the value of the meetings through removing activities that do not add value, which would allow more time for activities that enhance the quality of the discussions.

The physicality of how design details were discussed is another example of a group norm that impacts the team's ability to resolve problems and make decisions. Across the seventeen meetings, a variety of means were used to review design details. These ranged from trying to share an A3 drawing⁷ with up to twelve participants, hand-drawn sketches on sketch pads, again in front of a large group of people, and using the monitor to review drawings, schedules and manufacturer product information. All three projects had an associated 3D Building Information Model (BIM),

⁶ BREEAM (Building Research Establishment’s Environmental Assessment Method) certification measures the sustainability rating of a building.

⁷ Large scale drawings, i.e. A0 and A1 were often printed at A3 scale and used as a tool to discuss the design.

but only on two occasions was a model utilised during the meetings to discuss design details. Both times it was shared on the monitor, and both times the designer acknowledged the model was several weeks out of date. This continued use of 2D information when 3D information is available is acknowledged by Mehrbod *et al.* (2018) as a cultural issue that, in Mehrbod *et al.*'s view, needs to be addressed to allow greater use of virtual information design coordination meetings. Given the advancement in virtual design meeting practice driven by the COVID-19 pandemic since the meetings were observed in 2018, further research is required to consider how the 3D BIM model can improve interdisciplinary design coordination and design interface problem solving and decision-making conversations.

The final group norm observed is the accepted use of mobile phones and laptops during the meetings. This behaviour was again consistently displayed across the seventeen meetings. Perhaps this behaviour is part of the informal atmosphere and driven by the lengthy nature of the meetings during which the MEP designer, in particular, would regularly not be involved with much of the discussion but still be expected to attend the entire meeting. Both designers and constructors used mobile phones and laptops during the meetings. It was not possible to observe if the activities the participants were carrying out with their devices were solely related to the meeting or the project since the laptops and phones were facing away from the video. Still, on a number of occasions, participants failed to hear a question that was asked of them due to their attention being on their device and not on the meeting discussion at the time. Therefore, this behaviour might impact the teams' ability to discuss problems and make team decisions. It is questionable if this behaviour would be acceptable if the client were present or if the meeting atmosphere was more formal. Given that the designers usually have access to their laptops during the meetings, they could have access to the 3D BIM model, but as previously discussed, the BIM model was shared only twice in seventeen meetings. Although a monitor was utilised to present design information, a monitor was not available in all locations the meetings were held. Even when the monitor was used to communicate digital information, the images were often too small, or the monitor was awkward to see depending on where a participant was sitting in the room. Further research is required that considers how to overcome this issue and maximise the physicality of the meeting room, which could improve meeting practices in many settings.

5.6 Social cohesion

Social cohesion is generally recognised as the team members' inclinations to forge social bonds, which create interpersonal connections that hold a group together (Casey-Campbell and Martens, 2009), or an individual's desire to develop and maintain friendships with work team colleagues (von Treuer *et al.*, 2018). Overall, many social interactions that could be considered as creating or

fostering social cohesion were observed. Many more occurrences of positive social cohesion were observed than negative emotional events, such as conflict events. The most dominant and obvious occurrences were the presence of humour and shared laughter. The researcher has ten years' experience working on construction projects. This experience meant the researcher expected to see humour as a normal part of the social interactions between the project team members. However, it became clear early in the observations that humour was not simply an everyday occurrence but fulfilled several functions. For example, humour was regularly observed as the participants gathered in the meeting room and during the meeting's early stage (i.e., the first five minutes). These social interactions as the participants were gathering together gave the impression that the participants who engaged in these interactions were pleased to see each other and were pleased to be gathering as a group. Not every member of the team took part in these interactions. Still, most participants exchanged information, which was usually task-related, or as light-hearted banter as defined by Plester and Sayers (2007). These familiar and friendly social interactions regularly extended past the first five minutes of the meeting, which created an atmosphere of support and informality, which often extended throughout the meeting. More detail about this observation can be seen in Ponton, H., Osborne, A., Greenwood, D., and Thompson, N. (2018) 'Understanding the dynamics of construction design team meetings through joint laughter', in *Proceedings of the 34th Annual ARCOM conference*. Belfast: ARCOM, pp. 88–97.

Humour was also regularly observed to unite the group against a common enemy, such as problems with the project. For example, the project participants waiting for the contract to be ready for the final signature by the client, which for Case Study A, took longer than expected. It is unclear if humour created the informal atmosphere that was consistent across the observations or if the informal atmosphere allowed humour to occur. Either way, humour was the most dominant and recurring form of social interaction across the ten months of meetings observed. Meyer (1997, 2000) suggests that humour within groups can generate collegiality by creating and maintaining social cohesion and group solidarity. In addition, Gorse and Emmitt (2007) observed a higher quantity of positive socio-emotional interactions during construction meetings than negative socio-emotional events. The current research project supports this finding and provides additional insight by identifying humour as a dominant, observable form of positive socio-emotional interaction in the CIDM setting. Chapter 6 will provide an in-depth analysis of typical examples of social interactions that occurred during the meetings relating to social cohesion. These social interactions include typical examples of; occurrences of familiar behaviour; humour (fulfilling various functions); the presence of banter, and finally, demonstrations of solidarity, praise and support between team members. This deep-dive analysis will allow for consideration in Chapter 8 of the potential impact social interactions relating to social cohesion may have on the team's ability to solve problems and make decisions.

5.7 Intragroup conflict and conflict management

Alongside social cohesion, intragroup conflict was observed as a dominant form of social interaction across all three case studies, and during all the meetings. De Dreu and Gelfand (2008) define intragroup conflict as the process emerging from perceived incompatibilities or differences among group members. The different forms of team conflict are generally recognised as task, process, or relationship conflict (Amason, 1996; Jehn, Northcraft and Neale 1999). All three forms of conflict were observed during the meetings; however, no extreme examples of conflict were observed, such as antagonism or physically volatile behaviour. This finding supports the observations by Gorse and Emmitt (2007). They also investigated live construction meetings and did not observe extreme negative (or positive) socio-emotional behaviour, even though they acknowledge the construction industry culture is often described as a volatile and antagonistic environment. The form of conflict that created the most social interactions and created the most observable reaction between the participants was process conflict, which included issues around the progress of producing the design to a deadline. Late design information was the most recurring reason for the process conflict. This situation clearly frustrated the constructors and resulted in confrontations between the constructors and the designers on many occasions. Some task conflict social interactions were observed during the observations but not on a regular basis and not during every meeting, unlike process conflict which did occur during the majority of the meetings observed.

Gorse and Emmitt (2007) applied the Bales interaction process analysis (IPA) model during 'live' construction meeting. However, the model did not specifically distinguish between task, process, and relationship conflict. An example of task conflict during the current study was the issue regarding the headroom in the plant room being too low for the MEP plant equipment, as previously discussed. Relationship conflict, on the other hand, involves disputes about personal relations such as a personality clash or negative emotional reaction between people. During the ten months of observing the teams, very few relationship conflict social interactions were observed. Based on the researcher's experience of working in the construction industry, this is typical behaviour for a meeting environment. Although conflict can and does exist and can sometimes escalate to old school fists pounding and raised voices, the content of the animosity and frustrations is usually process and task-based, and not personal. However, this is not to say that a meeting participant would not perceive a task or process conflict event as personal, which then creates relationship conflict.

Humour was used on a number of occasions to relieve the atmosphere when conflict interactions were occurring. This function of humour appeared to work effectively because no conflict events

escalated or became aggressive or unprofessional throughout the observations. Humour, however, was also observed as a negative function to mask a negative comment or in the form of passive-aggressive behaviour. Chapter 7 will provide an in-depth analysis of typical examples of interactions relating to intragroup conflict, including conflict due to; late design information; designers not attending the meeting; collaborative working and a design change request. The negative use of humour will also be discussed. This deep-dive analysis will allow for consideration in Chapter 8 of the potential impact social interactions relating to intragroup conflict may have on the team's ability to solve problems and make decisions.

5.8 Summary

In summary, an overview of the meeting observations, including verbal and non-verbal exchanges and reactions between participants that reflect the relationships in the group during task-orientated and non-task discussions, has been provided. The data analysis has applied knowledge and theory from existing organisational behaviour and construction-specific literature to demonstrate that social interactions across various themes occurred during the meeting setting. A thick description form of discussion has been adopted to present an overview of the design meeting setting, the functions and structure of the meetings, the communication milieu and practice, the group norms, the presence of social cohesion, and finally, the presence of intragroup conflict and conflict management.

The overview of the meeting observations has identified the following areas that require future investigation; an understanding of how to maximise the physicality of the meeting setting, including the technology to hand, and the use of the technology to access digital information; consider of the impact of Covid-19 on the attitudes of the meeting participants towards virtual attendance; an examination of the influence of an increased acknowledgement of positive behaviour (i.e., design information produced on time) on team performance; an examination of why designers are not attending the CIDMs; an investigation into how to maximise the time during the CIDMs to increase the value, and remove wasteful discussions; a consideration of the use of alternative solutions while making team decisions; and finally, an examination of the impact of the different stages of team development on the behaviour of the teams. The areas for future research identified in this chapter will be structured and presented in Chapter 9.

Following the thematic analysis of the primary data (video footage) and supplementary data (field notes and meeting minutes), social cohesion and intragroup conflict behaviour have been identified as the most recurring and dominant themes witnessed during the CIDMs. As the most dominant and recurring themes, social cohesion and intragroup conflict behaviour will be analysed more deeply.

A detailed analysis of the social cohesion and intragroup conflict typical events will be presented in Chapters 6 and 7.

Chapter 6 Social cohesion findings and discussion

6.1 Introduction

Social cohesion and intragroup conflict have been identified in the current study as the dominant themes of social interaction behaviour. The aim of this study is to investigate the impact of social interaction on decision-making in construction project design meetings. This chapter will partly achieve this aim by addressing the fourth objective - *To extract from the meeting observations typical examples of social interaction events and to analyse these from the standpoint of theories of organisational behaviour*. Chapter 6 will focus on typical examples of social cohesion. Chapter 7 will present and discuss the intragroup conflict data and findings.

The contractor-led design meeting (CIDM) video footage data has been thematically structured by applying an inductive approach to identify the sub-themes of social cohesion. The events presented in this chapter demonstrate potential social cohesion behaviour, which was identified and thematically coded using NVivo software. The observations focus on social interactions, including verbal and non-verbal exchanges and reactions between actors. The social interactions include behaviour that reflects the relationships in the group during task-orientated and non-task communications. The sub-themes of the social interaction thematic analysis are; familiar behaviour, humour, banter and solidarity, praise and support.

During this chapter, typical examples of conversation extracts will be presented and discussed in detail. Pseudonyms have been used to provide anonymity to individuals and organisations. The conversation extracts are presented using the Jeffersonian Lite transcription system by Sacks, Schegloff and Jefferson (1974) and Potter and Hepburn (2005). The extracts include verbal and physical information relevant to the conversation. Photographs in the form of screenshots taken from the video footage have also been included to accompany the conversation extracts to illustrate the physical setting. The anonymised photographs include a key of the meeting participants, which provides the seating arrangements, and a glimpse at the meeting room. For example, if the meeting is held in a well-equipped head office conference room, a site cabin meeting room, or a dilapidated room located on a refurbishment project site. (For more description of the physical setting, see Chapter 5).

The participants of the meetings included representatives from the main contractor and sub-contracted design disciplines. During the study's data collection and analysis phases, participants employed by the main contractor and subcontractors employed to provide the detailed design, manufacture and installation elements of the project are identified as 'constructors'. While participants subcontracted to the project team for design input only are identified as 'designers'.

Table 6.1 provides the key to the meeting participants included in the conversation extracts during this chapter. The meeting participants are divided into three categories; constructors ('C'), designers ('D'), and client representatives ('Cl').

Table 6.1: Key of meeting participants

Constructors – 'C'	Designers – 'D'	Client – 'CL'
CDM = design manager	DMEP = mechanical, electrical and plumbing designer	Cl = client representative
CSub = subcontractor (with design detail responsibility)	DEng = structural engineer	
CCM = construction manager	DArc = architect	
CQS = quantity surveyor		
CPM = project manager		

Table 6.2 provides the key to the Jeffersonian Lite system of transcription notation used during this chapter. See Table 6.2.

Table 6.2: Jeffersonian Lite key, adapted from Jefferson (2004)

Symbol	Meaning
(.)	noticeable pause
(())	non-verbal activity
h	minimal (volume) laughter
ha	laughter

The dominant sub-theme of familiar behaviour will next be presented and discussed.

6.2 Familiar behaviour

Familiar behaviour is defined as the verbal and physical behaviour that demonstrates familiarity between team members during a workplace meeting. Examples of familiar behaviour observed during this study include familiar speak, the use of expletives, familiar body language, and nicknames between team members. Occurrences of familiar behaviour were observed across the three case studies. Familiar speak and the use of expletives were the most frequent and regularly occurring forms of familiar behaviour. Other examples of familiar behaviour that will remain outside the discussion of this chapter include the use of nicknames, and familiar body language, such as physical contact that suggested a close bond between the participants. The recurring themes of familiar speak will be presented and discussed in more detail next.

6.2.1 Familiar speak

Familiar speak is defined during this research project as the use of words or phrases that would be considered overfamiliar and perhaps unprofessional in a work setting. Events involving this theme were identified across the three case studies. The two extracts presented and discussed are typical examples of this behaviour. The conversations to be presented occurred during the fifth meeting observed for Case Study C. The conversations are linked together. The extracts were analysed to consider the function and impact of familiar speak on the social cohesion of the team. This particular meeting includes members of the client team. Although this is unusual during the meetings observed across the case studies, it is common practice for CIDMs to include client and user representatives to provide their perspectives to resolve design issues. The familiar behaviour observed suggests the presence of trust and psychological safety in the team. Edmondson and Nembhard (2009) state that team members need to trust each other and feel safe to offer diverse viewpoints, share knowledge, and learn. Sun *et al.* (2015) suggest that trust and psychological safety are critical team dynamics required for collaborative teamwork, which is essential to create an innovative design.

Although the conversations took place three minutes apart, they are linked together and represent the start and end of the same familiar behaviour event. Before the event, the group were discussing a design issue regarding the steel frame. The design manager (CDM) had her laptop positioned directly in front of her. She needed to access an A3 folder of drawings to allow the discussion of the steel frame to continue. Rather than moving the laptop to an available space on the large conference room table, the CDM instead passed the laptop to the client representative on her left. For the first half of the conversation, see Figure 6.1.

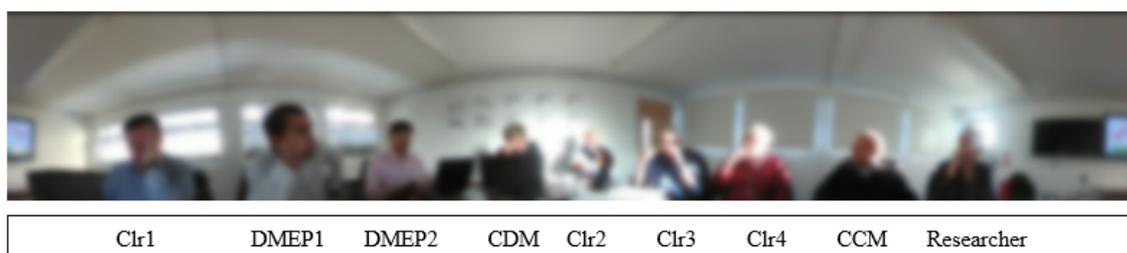
Figure 6.1: Extract 6.1 Case Study C, meeting #5



```
1  CDM : can I just ((smiles and passes laptop to client rep sat on left
2      to make way for A3 drawings))
3  C1r2 : certainly((takes laptop))
4  CDM : thank you honey ((smiles))
5  C1r3 : only reason he came to the meeting
6  C1r2 : chief laptop holder
7  CDM : so if we have got the project space here at the minute and we
8      have got the existing risers there, the steel is measured up to
9      here.
```

The conversation extract commences as the CDM realises that she requires more space in front of her to look at an A3 folder of drawings. Line 1, “can I just”, shows how the CDM does not need to complete a full request, e.g., ‘can I just ask you to hold this for me’. She is comfortable enough to make the action combined with the request -not make the request, wait for a reply, and then give the client representative (Clr2) the laptop. Likewise, the Clr2 response in line 3, “certainly”, is receipt of the embodied action. Although he does need clarification of “can I just”, he knows what it means and does not need to ask anything else. The CDM also smiles throughout carrying out the action to confirm that the action of passing her laptop is being presented in a positive and familial way. Line 4, “thank you honey”, demonstrates very familiar behaviour that is usually inappropriate in a work setting. In fact, this statement could be viewed as condescending or belittling to some people. However, the CDM’s smile continues to publicly affirm the behaviour as positive. Furthermore, there is confirmation that it is treated positively by onlookers making a joke of it – Line 5 “only reason he came to the meeting”, something which could be a joke at Clr2’s expense. However, the Clr2 responds positively to the event in line 6 by stating, “chief laptop holder”, making a joke at his own expense but in doing so registering the event as familial. The conversation returns to the task in lines 7-9. This kind of behaviour is typical of this particular CDM. It is also an indicator of the collective familiarity in the group. The conversation about the laptop is returned to three minutes later. See Figure 6.2.

Figure 6.2: Extract 6.2 Case Study C, meeting #5



```

1  CDM : Sorry Peter ((turns to client rep on left and reaches out to take
2      laptop. Smiles))
3  Clr2 : That's alright
4  CDM : ha ha thank you my beautiful little assistant
5  Clr2 : ha ha
6  Clr3 : ha ha

```

The CDM commences the conversation with “sorry Peter ...”, perhaps demonstrating that she does not take for granted the Clr2 helping her by holding her laptop for the past three minutes by acknowledging that it is an inconvenience that requires some form of apology or gratitude. This acknowledgement is important because the relationship between the two team members includes a level of formality as the constructor and the client due to the hierarchical nature of the project’s contractual arrangement. Hierarchical relationships traditionally expect participants to behaviour

with particular dynamics or protocol, such as courtesy and respect. The action of passing a laptop to a team member without asking permission is perhaps not formal, courteous, or respectful. However, in this example, the action is viewed as acceptable. The male/female role reversal is evident in Extract 6.2. line 4, “thank you my beautiful little assistant”, creates humour, which the rest of the team appear to accept through the laughter in lines 5 and 6. This label could be interpreted as objectifying and condescending language, which contrasts with the earlier self-label C1r2 stated of “chief laptop holder”, which includes an aura of authority. A team member referring to another team member in a workplace setting as a “beautiful little assistant” might be considered inappropriate. In this conversation, the rest of the team demonstrates that no inappropriate behaviour has occurred through laughter and smiles. The interaction flows, with little notable pauses to signal troubled talk or instances where the CDM instigates a correction to suggest anything out of the ordinary occurred. Line 7 demonstrates that the conversation returns to the task, and the event does not derail the team from the task-orientated focus of the conversation.

Conversation Extracts 6.1 and 6.2 demonstrate the CDM's warm and friendly, familiar behaviour, and a comfortable informality that the CDM instigates through her behaviour and use of humour. The function and impact of this behaviour appear to create and foster an environment of psychological safety and trust where team members feel comfortable taking part in the meeting discussions. In this setting, the CDM is the leader of the group. By the leader acting in this familiar way, such as the familiar behaviour demonstrated in Extract 6.1 line 4, “thank you honey”, and yet the acknowledgement of respect in Extract 6.2 line 1, “sorry Peter”, the CDM demonstrates that it is acceptable and the norm for the rest of the group to behave in a warm and friendly manner. Carmeli, Reiter-Palmon and Ziv (2010) link leadership and humour and discover an increased presence of psychological safety when the leader instigates humour during a teamwork setting. Consequently, this may strengthen the CDM's position, with both the designers and the constructors, potentially strategically aiding the delivery of the project and organisations' objectives, supporting the position that humour is often a management resource intended on boosting productivity (Avolio, Howell and Sosik, 1999; Lyttle, 2007; Romero and Pescosolido, 2008). These two short conversation extracts also demonstrate that, in this setting, familiar behaviour can occur without derailing the flow of the task-focused conversation, which can be seen from Extract 6.1 lines 7 – 9 and Extract 6.2, line 7, where the conversation immediately reverts back to the task.

6.2.2 The use of expletives

Expletives are defined as words commonly known as swearing, such as shit, fuck, crap, bloody and cock. The use of expletives during CDMs appears to be considered an acceptable group norm, based on the frequent use of expletives and team members' low or zero level reactions following their use. Consideration will be given to this language and its impacts on the social cohesion of the

teams. Feldman (1984) and, later, Innes (2003) suggest that group norms provide the framework for predictable and acceptable behaviour between team members, avoiding embarrassing interpersonal situations. Baruch *et al.* (2017) recognise that the use of swearing at work may hinder professionalism and performance and lead to bullying, aggression, and exclusion. However, they also find that swearing can lead to positive outcomes such as communication enrichment and socialisation-enhancement. Two conversation extracts will be presented to discuss the typical form and use of expletives across the three case studies.

Conversation Extract 6.3 occurred during a CIDM with a newly appointed mechanical, electrical and plumbing (MEP) design team after the original team was removed from the contract due to poor performance. The group are discussing the urgency for the designers to produce the design information as quickly as possible while acknowledging that this will not be an orderly or linear process due to the piecemeal nature of designing for an existing structure that requires refurbishment, compared to a new-build project. See Figure 6.3.

Figure 6.3: Extract 6.3 Case Study C, meeting #2



```

1  CDM    : we are never going to solve all the builders work in one nice big
2          clean exercise its gonna be like (.) fucking hell we need this
3          this this ((counts on fingers and smiles)) in the next four weeks
4          h h
5  DMEP2  : and that's the priority though
6  CDM    : absolutely

```

The CDM commences the conversation by describing the information sequencing problem the team faces due to refurbishing an existing structure. Line 2 includes the CDM using the term “fucking hell” as extreme terminology to express emotion about the urgency of the design information. The CDM does not raise her voice, which might have suggested shouting and could indicate the expletive as a means to abuse someone verbally. The pause (.) acts to provide more emphasis on what is coming next. It is not a run-through sentence, i.e., the pause makes what comes next clear and audible and with the expletive that follows it, emphasising the audience on the next sentence. The CDM also uses the pronoun “we” (line 2) to communicate that the problem is the team's problem, not just the subcontractor's problem, which instead might have warranted

'you' instead of "we". As the DMEP2 manager looks for reassurance in line 5, "and that's the priority though", the CDM again uses extreme terminology with "absolutely" (line 6).

The use of expletives and extreme language, plus the pronoun "we" during this example, appears to function as the CDM looking for support or buy-in by emphasising the extent of the problem and acknowledging the problem is shared by the team. The flow of the conversation continues uninterrupted after this event. The continuation in the discussion suggests the group share the emotion of the CDM concerning the urgency of the design information. It could be argued that the participants are too scared of the CDM swearing at them to confront her, but no evidence supports this view. No one questions her view or suggests that her urgency for the information is unachievable, even though she openly acknowledges this will be challenging.

To consider further the typical use of expletives during the meetings, Extract 6.4 will next be analysed and discussed. This extract is part of a conversation about a significant difficulty the project team experienced when establishing the external survey dimensions of the existing multi-story building being refurbished, to provide the setting out dimensions to design, manufacture and install the new facade. The brickwork and cladding subcontractors attended this meeting. Although the architect provides the overall design information for the building facade, the subcontractors need to produce the detailed design to manufacture and install the cladding and brickwork packages. The team has already discussed the significant problem of establishing survey dimensions for fourteen minutes before this extract. Unfortunately, no fully workable solution to the problem has been found. Extract 6.4 presents the discussion's turning point when the team accepts that a fully workable solution is not possible. Instead, the team need to accept a compromised solution that will contain an element of risk. See Figure 6.4.

Figure 6.4: Extract 6.4 Case Study C, meeting #6



1 **CDM** : yeh I mean I think the problem is always going to be isn't it
2 that we are never going to have everything exposed at one
3 time
4 **CSub5** : no that's true
5 **CDM** : so we are going to have to kind of
6 **CSub3** : yeh take an ess educated
7 **CDM** : ((turns to left and smiles)) put a cock on the block for want of
8 a better phrase to say h h
9 **CSub3** : h h h
10 **CSub4** : h h h
11 **CSub5** : h h h
12 **CDM** : that's the consistent dimension we are going to work with

During lines 1 to 3, the CDM is clarifying the situation that a full survey of the existing structure is not possible because the existing outer skin of the building cannot all be removed at the same time to allow the survey to take place. The CDM appears to have successfully gained support from CSub5 based on line 4, “no that's true”. The CDM then uses the extreme terminology metaphor “put a cock on the block ...” in line 7 to describe or label, in a non-literal manner, the risk she wants the subcontractors to take. Risk exists because a solution without risk cannot be sought for the design problem, but the subcontractor is still required to overcome the problem. The subcontractors still need to provide the detailed design, manufacture and installation of the project's envelope, even though this process will contain risk. The function of the extreme metaphor is to gain solidarity and support from the subcontractors by acknowledging the reality of the risk and also the fact that action still needs to be taken by the subcontractor despite the risk. The CDM is looking to gain support from the rest of the team members with the use of “isn't it” in line 1 and the pronoun “we” in lines 2 and 12. The expletive and extreme metaphor term “put a cock on the block” in line 7 creates humour (see lines 8-11). At this point in the conversation, the humour might function as humour to relieve tension (see, Greatbatch and Clark, 2003). Suppose the team already had low levels of social cohesion. In that case, the suggestion by the CDM that the subcontractor was being asked to take substantial design risk may have escalated into an adversarial conflict event. However, this does not occur, suggesting social cohesion already exists in the team to a sufficient level to mitigate some conflict.

Extracts 6.3 and 6.4 demonstrate the familiarity and established informal group norm that the team members have with the use of expletives in this workplace setting. Both extracts show how extreme

language is used to make sense of the reality of a challenging situation. The use of expletives may also demonstrate the stereotypical masculine culture of CIDMs. A view supported by Watts (2007), who considers the predominant construction culture to include machismo (along with other factors). Watts also stress that a work team's culture is a significant driver towards the team members' behaviour and social interactions. However, it is interesting to observe a female team member extensively using expletives to create potentially productive project outcomes. This finding can be compared to the work of Raiden (2016), who drew upon the narrative analysis of interview data to capture the lived experiences of Laura, a female project manager who managed a construction site in the UK. The research found that Laura successfully used a mix of stereotypical gendered behaviours, including horseplay and swearing (masculine) and caring (feminine), to manage the site. Laura's use of expletives was a strategy to "get on with the lads" (p. 512). Although the female element of the observations is outside the scope of this research project, it justifies future investigation to consider gendered strategies that could enhance team performance.

The use of expletives as a reflection of the setting culture may also reflect, to some degree, the construction team's social identity since the use of expletives in many other professional settings outside the construction industry is considered inappropriate in a setting such as a meeting. According to Ashforth and Mael (1989) and Hogg and Reid (2006), social identity is created by a psychological process. This process refers to the idea that the team is separate from other teams, creating a belief of "us versus them", which can foster task and social cohesion. Both Extracts 6.3 and 6.4 are examples of the CDM attempting to create an atmosphere of social identity to persuade the constructors to move forward with the detailed design development, even though it is challenging. This form of influence benefits the wider project by keeping the design creation moving forward.

The view of traditional workplace incivility literature considers uncivil behaviour (which includes the use of expletives) as a possible factor towards negatively impacted professionalism and performance as well as possible workplace bullying and aggression. However, research by Baruch et al. (2017) based outside the construction industry identifies that male and female business executives use expletives in the workplace to positively affect individual, interpersonal and group levels, including improved stress-relief, communication enrichment and socialisation-enhancement. Extracts 6.3 and 6.4 provide examples of the positive use of expletives to enrich group-level communication during difficult discussions that could lead to litigious and adversarial behaviour given the commonly accepted culture of the construction industry. The CDM steers the conversation positively, away from conflict, to benefit the project by carefully managing the situation. The current study supports Baruch et al. (2017) research that the use of expletives can aid positive group performance and communication enrichment.

6.3 Humour

Occurrences of humour were observed many times during the ten months of observations. This is by far the most frequent form of social interaction sub-theme relating to social cohesion observed during this research project. Humour was observed during every CIDM across all three case studies. The researcher has previously written about the extensive presence of humour (Ponton *et al.*, 2019) and that it is a recurring and functional aspect of CIDMs. These observations are expanded upon more extensively here across the three case studies. Holmes (2000) describe how social cohesion in the workplace often takes the observable form of shared humour. Pundt (2015) suggests that humour can be viewed as a management resource to motivate and stimulate creativity. Romero and Pescosolido (2008) describe how shared humour can boost productivity and enable the establishment of a team as a socially identifiable entity. Humour is associated with higher organisational commitment (Sasa, 2002) and higher levels of trust and inclusion (Terrion and Ashforth, 2002), which is important for interdisciplinary teams such as construction project teams. Based on the discussed literature, shared humour generally creates a positive impact on group dynamics, specifically regarding social cohesion and a positive working environment of a team.

Humour directed at self or others, humour directed at the project, the presence of an in-joke, and humour to relieve conflict tension will be the focus of the following section of the chapter. Humour linked to banter will be dealt with as a separate sub-theme later in the chapter.

6.3.1 Humour directed at self or others

A variety of forms of humour were observed across the three case studies. Humour directed at self or others is defined as humour that is specifically targeted at either the person creating the humour (self) or another person who is either at the meeting or not present at the meeting. A typical example of the conversation of each of these three categories will be examined in depth to consider the function of the humour in each case and the impact on the group's social cohesion.

The first example of a typical social interaction to be presented and discussed is an example of humour directed at another person at the meeting. Extract 6.5 is taken from the second meeting observed of Case Study C⁸. The team are discussing how the newly appointed mechanical, electrical, and plumbing design team will progress with the design information after the original team were removed from the contract due to poor performance. See Figure 6.5.

Figure 6.5: Extract 6.5 Case Study C, meeting #2

⁸ This is the same meeting as Extract 6.3 with a newly appointed mechanical, electrical and plumbing (MEP) design team.



DMEP1 DMEP2 DMEP3 DMEP4 CCM DEng CDM Researcher DMEP5 DArc DMEP6 DMEP7

```

1  CDM : what they are picking up in the model now incorporates comments
2      from Ian which will not be reflective of what is on their current
3      2-D drawings which is why you need to see Ian's comments while
4      you are reviewing that
5  DMEP2 : it might inherently be reflected because theoretically their
6          model should contain every all the sheet information anyway so we
7          should get their model without not purged with everything in
8          there so that we can verify it properly
9  CDM : ((turns to DENG and smiles)) he is hopeful isn't he ha ha ha ha
10 DENG : ((smiles)) ha ha I was going to say that's wishful thinking that
11         mind
12 DMEP2 : we can give it the BIM level 2 hammer ((mines hammering the
13         table)) they should be on board in terms of building the model up
14         instead of dropping it right down and rebuilding it just for
15         efficiencies h h we will see if they do

```

The extract commences with the CDM explaining that the new MEP design team will need to incorporate the architect's (Ian) comments into the design they have inherited because the previous MEP designers had not included the comments (lines 1-4). The DMEP2 provides an optimistic response in lines 5 – 8, “it might inherently be reflected because theoretically their model should contain every all the sheet information anyway so we should get their model without not purged with everything in there so that we can verify it properly”. The DMEP2 is referring to the architect's comments already being incorporated in the 3D model. The humour interactions commence at line 9 when the CDM says, “he is hopeful isn't he ha ha ha ha”. This verbal communication is accompanied by the CDM smiling and turning to face the DEng. By making this statement and non-confrontational body language, the CDM is suggesting that the DMEP2 is incorrect with his statement without directly confronting him. The DEng supports the opinion of the CDM with lines 10 - 11, “ha ha ... that's wishful thinking that mind”. In this example, the function of humour is to avoid a conflict event by relieving any tension while still suggesting a person is incorrect. The reaction of the DMEP2 is positive in that he continues the humour by contributing to the humour with a joke designed to get a reaction, “we can give it the BIM level 2 hammer” (line 12). The DMEP2 also uses physical body language to elaborate on the joke by motioning a hammer hitting the table (lines 12 - 13). The conversation immediately reverts back to focus on the task from line 13 onwards.

Extract 6.5 could have resulted in a conflict event, but instead, it resulted in a humour event that directed the focus at the project information as the common enemy, rather than the DMEP2 as incorrect. Kangasharju and Nikko (2009) found an important function of humour was the relief of a

tense situation in the workplace. Gockel and Kerr (2015) recognise that a function of humour is as a means to create team cohesion through solidarity created by a common enemy. Both of these functions are observable during this example of a typical conversation of humour directed at someone at the meeting. The CDM manages the situation of letting the DMEP2 know that he is incorrect with his assumption without creating a direct confrontation that could result in a negative reaction that could have a longer-term negative impact on the meeting. No evidence suggests this occurred.

The second example of a social interaction to be discussed is Extract 6.6, which represents a typical example of humour directed at self, i.e., the person creating the humour. The conversation took place during the first meeting observed of Case Study A. The team are discussing the digital administrative process of how the project drawings will be checked and approved by the whole team. See Figure 6.6.

Figure 6.6: Extract 6.6 Case Study A, meeting #1



DMEP	DEng	CCM	Researcher	CDM	CPM	COS	CMEP	DArc
------	------	-----	------------	-----	-----	-----	------	------

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1  CDM : I have a lot of drawings to push through the system
2  DArc : what status will they be? I am guessing they will go for another
3         workflow
4  CDM : yes
5  DArc : for final checking before release? M and E ones?
6  CDM : yes so M and E ones will go through and you will have access to
7  DArc : five, is it five days? five, seven?
8  CDM : I don't know because it's all ((points at DEng with pen))
9  DArc : ((turns to person on left and scrunches up his face)) I normally
10         do it in half a day I should be alright ha ha ha
11 CCM : ha ha ha
12 Deng : ha ha ha
13 CCM : you will get a phone call after half an hour don't worry
14 DArc : ha ha ha

```

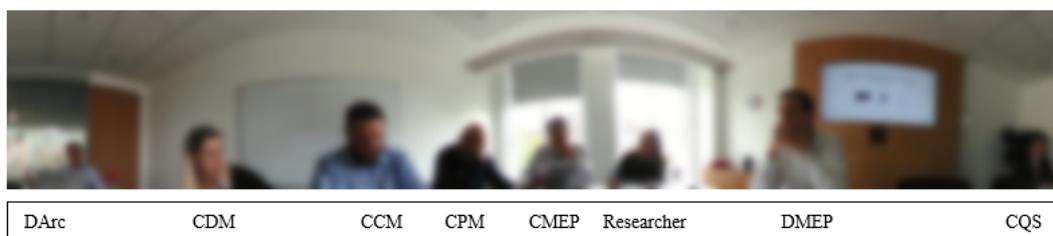
The conversation extract starts with the CDM communicating that she has “... a lot of drawings to push through the system” (line 1). The CDM refers to the document control software that administers the process of allowing the relevant designers, constructors and the client to review and make comments on each of the design discipline’s drawings as they are issued. It appears that the CDM is behind with her document control duties. The DArc in line 2 asks for clarification regarding the “status” of the drawings, (i.e., pre-construction or construction status). He also asks if “... another workflow” will take place (lines 2 and 3). This means the drawings will be invited for comment by the whole team before being elevated to construction status. The CDM confirms “yes” (line 4); therefore, another workflow is required. Line 5 include further clarification by the DArc as

to if the “M and E” drawings (the same as MEP) will be included. The CDM confirms yes this is the case. She is in the process of explaining the process in line 6 when the DArc interrupts her to ask the duration of the checking period, “five is it five days? Five, seven?” (line 7). The DArc then creates humour directed at himself to get a reaction in lines 9 and 10, “I normally do it in half a day I should be alright ha ha ha”. The perhaps over-confident statement is also accompanied by turning to face the DMEP and giving a checky facial expression. This kind of self-assured statement could come across as arrogant, but the reaction from the rest of the team is positive, as observed through smiles and joint laughter. The joke is also contributed to further by the CCM with line 13, “you will get a phone call after half an hour don't worry”. This statement is an example of a participant playing on the stereotype of constructors chasing design information from designers, sometimes in an unrealistic timeframe to create humour. For further discussion about the use of discipline stereotypes, see Extracts 6.9 and 6.10.

Extract 6.6 is a typical example of humour that requires the audience to understand a specific cultural reference. The cultural reference is demonstrated by the fact that line 13, “you will get a phone call after half an hour don't worry”, is considered humorous when this would not be obvious to an audience outside the construction industry culture. This required prior knowledge might be a significant assumption during only the second time this project team have met as they are, therefore still getting to know each other. Nevertheless, humour events during early meetings, which are enjoyed by the rest of the team, suggest a positive start to the *forming* stage of the team's development in creating a positive social environment for the remaining time the team is working on the task (Tuckman and Jensen, 1977; Curşeu and Schrujjer, 2010). During this stage, Goncalo, Polman and Maslach (2010) suggest that group members get to know each other (socialisation) and establish group rules and norms. According to Lapinski and Rimal (2005), informal, unexpressed and unconscious norms grow gradually over time and originate from historic behaviour the group have repeated and therefore has become acceptable. Therefore, humour events during this early stage, whose function is solely to make people laugh and are accepted by the group, is a positive start to future humour events, which over time contribute to greater social cohesion in the group.

The third example of a social interaction to be discussed is Extract 6.7, which represents a typical example of humour directed at someone not at the meeting. The conversation took place during the fifth meeting observed for Case Study A. The team are talking about the schedule of product samples the client has requested for the project. The DArc is justifying why he has asked for a sample of a WC pan since this is unusual for this kind of new-build commercial project. The client is usually happy that the architect selects the WC pan without physically checking the specific product sample. See Figure. 6.7.

Figure 6.7: Extract 6.7 Case Study A, meeting #5



```

1  DArc : I only added a WC pan because I recall something early doors
2         someone from Newberry city side of things Ben Coats that they
3         really liked this type of WC pan and they don't want to consider
4         this other type type thing they had some real passion over ha ha
5         don't go there don't go their ha ha ha that's why normally I don't
6         bother with the
7  CDM  : ha ha ha
8  CCM  : ha ha ha
9  DMEP : ha ha ha
10 CDM  : how weird
11 CQS  : he is Greek it's just a hole in the floor
12 DMEP : everyone has got a hobby I suppose
13 DArc : ha ha ha
14 CDM  : bazaar

```

The DArc commences the conversation extract by justifying why he has included a WC pan on the list of samples required by the client (lines 1 - 4). Although it would be unusual to discuss WC pans in most workplace settings, it is normal to discuss them in detail during CIDMs. However, the team does react with smiles and sniggers after the DArc makes the statement, "...some real passion over ..." (line 4). In this example, the humour is directed at a person outside the meeting, namely Ben Coats at Newberry City Council. The word "passion" concerning a WC pan creates humour with the function to ridicule Ben Coates. Interestingly, the ridicule humour is contributed to with further ridicule humour by the CQS in line 11, "he is Greek it's just a hole in the floor". This statement would generally be considered a racist comment. However, from line 12 onwards, no participants acknowledge the racist comment, suggesting the team's view that this statement is inappropriate to the setting.

Holmes and Marra (2002) and Janes and Olson (2000) acknowledge a negative function of humour can be ridicule directed at a person. Gockel and Kerr (2015) found that humour directed at out-group members increases perceived cohesion in groups, although not necessarily actual experiences of cohesion. Social cohesion can be specifically fostered through humour directed at someone outside the group via the connection to a group, or perception of oneness within a group, which, according to Ashforth and Mael (1989) and Hogg and Reid (2006), is created by a psychological process known as *social identity*. This process refers to the idea that the team is separate from other teams, creating a belief of us versus them, which can foster task and social cohesion. Extract 6.7 is an example of humour directed at someone not at the meeting who is also not part of the team and

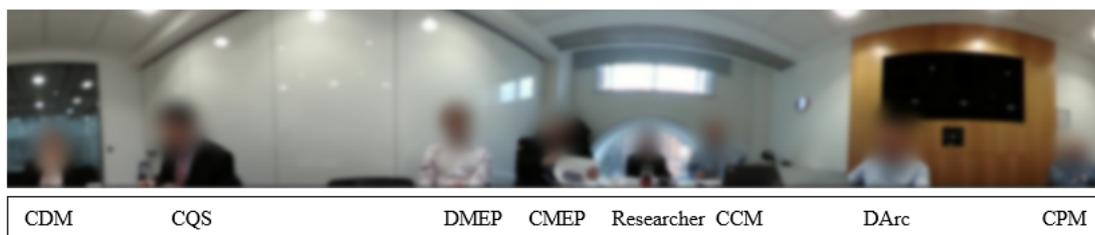
therefore outside the group. Even though this example includes possible ridicule and a racist comment, which are generally considered negative behaviours, the conversation could increase the group's sense of social identity and oneness, which in turn can increase social cohesion.

The three typical conversation extracts demonstrate how humour directed at people can function differently while contributing to social cohesion. Humour directed at the project will next be considered.

6.3.2 Humour directed at the project

Humour directed at a project can be defined as humour that is specifically targeted at any aspect of the project (as opposed to a person). This form of humour was observed across all three case studies. The team's humorous social interactions were regularly linked to aspects of the project itself, such as the design, commercial, or buildability issues. As the focus and purpose of CIDMs is the coordination of the project design, it is not surprising that the group links humour to the project regularly. Extract 6.8 demonstrates a typical example of humour directed at the project. The group are discussing an alternative flooring specification to the service risers than the one presently included in the design. The service risers are in the same position on each floor plan, stacked on top of each other. The present specification for the flooring is a stainless steel open mesh, commonly known as egg crate, which allows the eye to see through the floors from one riser to another. See Figure 6.8.

Figure 6.8: Extract 6.8 Case Study A, meeting #6



1 **DArc** : can you imagine on the 7th 8th floor you are standing on a on
2 an egg crate floor looking down ha ((smiles))
3 **CDM** : h h h h h h
4 **CPM** : you could sell sell that
5 **DArc** : ha ha ha ha ha ((makes inverted commas with his fingers)) thrill
6 seekers ha ha ha
7 **CPM** : yeah h h h h
8 **DArc** : hey (.) glass (.) hey hey
9 **CPM** : ha, ha, ha, ha I shouldn't have said that
10 **CCM1** : ha ha ha ha
11 **CDM** : ha ha ha ha
12 **DArc** : ha ha ha ha ha ha ha we did that in a building actually ended
13 up the users wouldn't use it was a stairs
14 **CMEP** : I wouldn't use it
15 **DArc** : the users wouldn't use the stair don't get me wrong it was like I
16 don't know 40 odd mil laminate glass
17 **CMEP** : nee chance
18 **DArc** : you know you weren't going to go through it yeah, a lot of the
19 users just went no I'm not using it at all
20 **CDM** : h h h h h h h h h h

The DArc describes in lines 1 and 2 how a person could stand on the egg crate floor on “... the 7th 8th floor ...” and be able to see down potentially eight storeys⁹. This statement creates humour observable from the reaction of the CDM who laughs (line 3). The CPM contributes to the humour with line 4, “you could sell sell that”. The DArc then suggests an alternative floor specification for the service risers in line 8, “hey (.) glass (.) hey hey”. This suggestion continues the humour, which is reacted to by laughing from the CPM, CCM1 and CDM. The DArc expands on his suggestion in lines 12 and 13 by describing a previous project he was involved with where a glass “stair” (line 13) was included. The CMEP responds at this point with the statement, “I wouldn't use it” (line 14). The DArc provides further details of the past project by describing that “the users wouldn't use the stairs don't get me wrong it was like I don't know 40 odd mil laminate glass” (lines 15 – 16) and “you know you weren't going to go through it yeah a lot of the users just went no I'm not using it at all” (lines 18 – 19). The conversation ends with further laughter from the CDM in line 20. The meeting then reverts back to the task after line 19.

⁹ Which would be a height of about 35m.

What is apparent from Extract 6.8 is the inclination of the team to offer humour that puts the project as the focus of the humour, not just linked to it. In this sense, the group are framing the project as the butt of the joke. Thus, possibly, creating a united perspective where the enemy is the project and the group are united against a common enemy, i.e., social identity. Gockel and Kerr (2015) found that such perspectives can form a perceived bonding of group togetherness. The function of humour in this way, therefore, may be a form of group cohesion.

Another example of humour directed at the project is Extract 6.9. This conversation occurred during the fourth meeting observed of Case Study A. The discussion is focused on a new set of double doors that have recently been added to the design on a staircase half-landing to provide additional access to a service riser. However, when the team view the 3D model via the meeting room monitor, the half-landing handrail is still indicated on the wall including in front of the new doors. This is clearly a mistake since the doors could not open with the handrail positioned in front of them. The DEng1 is explaining to the group a design detail by pointing at the monitor screen. See Figure 6.9.

Figure 6.9: Extract 6.9 Case Study A, meeting #4



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1  DEng2 : obviously the handrail isn't going to be there ((smiles, points
2  at television))
3  DArc : yeah no no no no no ha ha ha ((shakes head/smiles))
4  DEng2 : ha ha ha ha ha ha
5  DEng1 : ha ha ha ha ha ha
6  CDM : ha, ha, ha I like it ((smiles]) ha ha ha
7  DArc : fine
8  CDM : we will build it like that mind ((smiles, turns head to DArc))
9  ha ha ha ha
10 DEng2 : ha ha ha ha
11 CCM1 : ha ha ha ha

```

The DEng1 commences the extract by clarifying that “obviously the handrail isn’t going to be there” (line 1). He accompanies this statement with a smile which suggests that he can see the humour in this error. Other team members, such as the DArc and the CDM, respond with joint laughter in lines 3, 4, 5 and 6. The statement “fine” made by the DArc in line 7 suggests the humour event has ended. However, the CDM interjects by saying, “we will build it like that mind” (line 8). She also directs this statement to the DArc, which is observable by her body language of

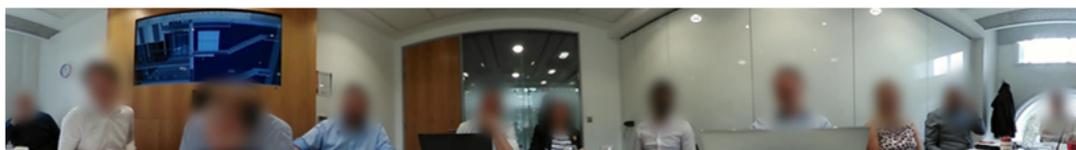
turning and speaking directly at him. This statement creates an additional wave of joint laughter by the DEng1 and the CCM1 in lines 10 – 11.

Firstly, the error disclosed here demonstrates that members are willing to acknowledge their mistakes without fear of repercussion, which is evident from the smiles and laughter and lack of criticism by any meeting participants. This example of positive behaviour is supported by Sun *et al.* (2015), reflecting a degree of perceived psychological safety. Therefore, it would appear that by this meeting, i.e., the fourth meeting observed and the fifth time this group has met, a beneficial level of psychological safety is present.

Extract 6.9 also demonstrates a facet of this form of project-directed humour through the use of stereotypes as the basis of the humour. In this example, the CDM uses the stereotype of constructors who blindly build anything if it appears on a drawing to create humour. Although Loosemore and Tan (2000) describe the stereotypical traits of designers and constructors, which are generally regarded as having a negative influence on the culture of the construction industry, Extract 6.9 suggests the stereotypes present in the construction industry may be used with a positive function, namely to foster social cohesion.

Thirteen minutes after Extract 6.9 took place, the team demonstrated another example of a cultural stereotype used to create humour. During Extract 6.10, the DEng1 talks about a necessary change in the design of a large concrete retaining wall. The DEng1 is describing the design change required to increase the volume of earth the wall is required to retain. See Figure 6.10.

Figure 6.10: Extract 6.10 Case Study A, meeting #4



CPM	DEng1	CCM1	CCM2	DEng2	Researcher	DMEP1	DArc	CDM	CMEP	DMEP2
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1  DENG2 : stands up and walks towards the television/points at the screen))
2          can we make that a triangular wedge, yeh, exactly, so it can be
3          cut back in the future to form
4  CCM1   : ((smiles)) out of polystyrene?
5  DENG1  : ha ha ha ha
6  DENG2  : ha ha ha ha
7  CCM1   : ha ha ha ha ((turns to face DEng1))
8  CCM2   : ha ha ha ha
9  DARC   : ha ha ha ha ha
10 CDM    : ha ha ha ha ha
11 DMEP1  : ((Smiles))
12 DENG2  : not polystyrene ((smiles/sits back down)) maybe out of blockwork
13          or something like that ((smiles))(.) or gabions if it is a
14          temporary structure

```

The DEng1 again explains to the group a design detail by pointing at the monitor screen, which shows the 3D model. The DEng1 asks the group, “can we make that a triangle wedge ... so it can be cut back in the future to form ...” (lines 2 – 3). The CCM interrupts at the point by asking if the material for the triangular wedge could be made from “polystyrene” (line 4). The CCM accompanies this question with a smile which suggests a level of humour is present in his suggestion. The suggestion by the CCM also plays on the cultural construction industry stereotypes that constructors will spend the least amount of money possible to deliver a solution. There is an immediate understanding of what the CCD refers to as six of the meeting members responded with laughter (lines 5 – 10). This form of humour is another example of humour that requires specific audience awareness of the content of the conversation, i.e., that the CCM1 is being serious but that he knows the suggestion might be rejected as too cheap a material. The humour in the joke is not apparent given the words uttered. A level of construction knowledge is required to understand this humorous statement which is very specific to the meeting participants. There is a chance the designer could accept the suggestion of polystyrene, but it is unlikely. It is the almost cheeky request that creates the humour.

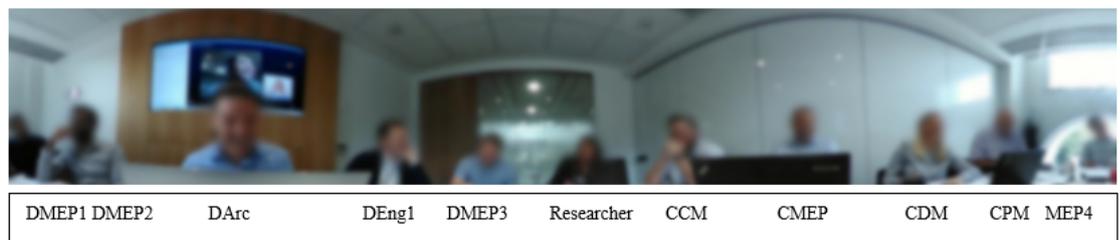
Extracts 6.9 and 6.10 demonstrate the constructors and designers' ability to create and engage in humour at the expense of the project as well as cultural stereotypes. The collective engagement in the humour demonstrates an efficacy that relies on those involved understanding one another (Romero and Pescosolido, 2008). It also represents a degree of collective familiarity (Meyer, 1997, 2000) the team has developed during the meetings prior to the meeting observed, which is a relatively short space of time. The group appear to function on an informal level. They are not purely focused on the task-in-hand but do not lose sight of the task, as they ensure the meeting functions alongside humour.

6.3.3 In-joke

During the current study, in-jokes are defined as an ongoing joke a team repeats more than once that receives a positive reaction from the team. The presence of an in-joke is a significant observation because it demonstrates the unifying form of humour that, includes the whole group (Meyer 1997, 2000). A facet of social cohesion is the connection to a group or perception of oneness within a group. According to Ashforth and Mael (1989) and Hogg and Reid (2006), it is created by a psychological process known as social identity. This process refers to the idea that the team is separate from other teams, creating a belief of us versus them, which can foster task and social cohesion. According to Hogg and Reid (2006), membership or self-categorisation to the team becomes personally valuable to the members so that they define themselves as members of the group. Hüffmeier and Hertel (2011) highlight how a sense of social identification allows the group to manage stress and conflict between the members because people are more supportive of each other.

The conversation in Extract 6.11 represents when an in-joke became apparent for the first time during the observations of Case Study A. The team are discussing a possible review of the structural design package, which has already been completed and issued by the civil engineering design team. The DArc has identified a possible change in the design that could reduce the build cost of the structure. This change in design would benefit the constructors by reducing the cost to build the structure, which would save money. However, the DEng is reluctant to revisit the design because it is already considered complete. See Figure 6.11.

Figure 6.11: Extract 6.11 Case Study A, meeting #8



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1  DENG1 : I think right now it would be a bit too late to do that if
2          I am honest it is a lot of urm detailing work that has
3          already occurred all over the building we don't want
4          to be revisiting such items
5  DARC  : okay
6  DENG1 : I mean we need to be looking for not
7  CPM   : there is a potential lot of cost saving
8  DENG1 : it is just a general comment
9  CPM   : well let's have a look and see it might it might come to
10         nothing it might it might not be an issue anyway but it's
11         definitely worth looking at Simon in terms of if there is a cost
12         saving
13  DARC  : if there is a potential saving if there is a sizeable saving
14         there amongst the team you know I am sure collectively we can
15         come to some agreement okay yes it's additional works and all the
16         rest of it I'm sure we can get somewhere to
17  CDM   : we can have a night out
18  DARC  : aye want Simon we can have a night out
19  CDM   : ha ha ha ha ha
20  DMEP2 : ha ha ha ha ha
21  DMEP3 : ha ha ha ha ha
22  DMEP4 : ha ha ha ha ha
23  DARC  : ha ha ha ha ha right
24  DENG1 : yeh that's fine that's fine if it needs looking at then that's
25         fine

```

During lines 1 – 4, the DEng1 states that he is reluctant to revisit the design information, “... it would be a bit too late to do that ... it is a lot of urm detailing work ...”. The DArc tries to persuade the DEng1 to revisit the design by highlighting the potential cost savings that could benefit the whole team in line 7, “there is a potential lot of cost-saving” and lines 13 – 16, “if there is a potential saving if there is a sizable saving ... I am sure collectively we can come to some agreement okay yes it's additional works ...”. The CDM then suggests, “we can have a night out” (line 17). The CDM appears to be providing a positive outcome if the DEng1 does carry out

additional work that saves costs by a reward of a “night out”. The DArc quickly supports the suggestion of a night out by reinforcing the suggestion in line 18, “aye want Simon we can have a night out”. At this point the other participants either smile or laugh (lines 19 – 23). The laughter here perhaps acts as a softener. The argument about cost savings is strong, but the designer is clearly reluctant to do it. However, it is hard to argue against cost savings that would benefit the project. The DEng1 then agrees to look again at the information in case a cost-saving is possible, “yeh that’s fine that’s fine if it needs looking at then that’s fine” (lines 24 – 25). The conversation immediately reverts back to the task. The presence of humour and, specifically, the suggestion of a night out has not derailed the focus of the meeting.

Extract 6.11 includes an example of humour that is potentially productive for the project financially as well as providing potential funds for a team social activity. The presence of the in-joke is included again later in the same meeting. Following Extract 6.11, the team move on to discuss a different element of the structure design that could be changed when the DEng1 asks, “is that going to be enough savings to have a party then”. The question demonstrates that the in-joke has the potential to be further repeated. Notably, while the earlier turn “we can have a night out” was said by the CDM and supported by the DArc, the DEng1 later returns to the in-joke. The occurrence of the in-joke commences during the eighth meeting. The fact that the team have been working together for some time at this point might suggest that the group are required to work together for a period of time to reach the stage when an in-joke can take place, which may reflect a need for developing an understanding of the audience before evoking this kind of jokes (Romero and Pescosolido, 2008).

A function of the in-joke may also be to reduce the tension created by the problematic subject area and the initial reluctance of the DEng1 to revisit the design (Kangasharju and Nikko, 2009). The DEng1 is being asked to show a willingness to invest in the short-term pain (time reviewing existing design details) to allow for long-term project gain (improved buildability that saves time during the construction phase). Therefore, the laughter from the DEng1 and the audience may reflect the establishment of support by the team for the proposed extra design work (Meyer 1997, 2000). The use of humour and jokes requires further research in a construction-specific setting to understand better this common social phenomenon's nuances and possible benefits. However, Extract 6.11 demonstrates the need to look at jokes and humour using methods that allow the examination of longitudinal data where understanding can be provided as to how things like in-jokes or shared references appear and influence the team dynamics over time.

6.3.4 Humour to relieve conflict tension

Humour to relieve conflict tension is defined as humour that occurs explicitly during a tense moment in the meeting to relieve the tension. Otherwise, the discussion could escalate to a conflict

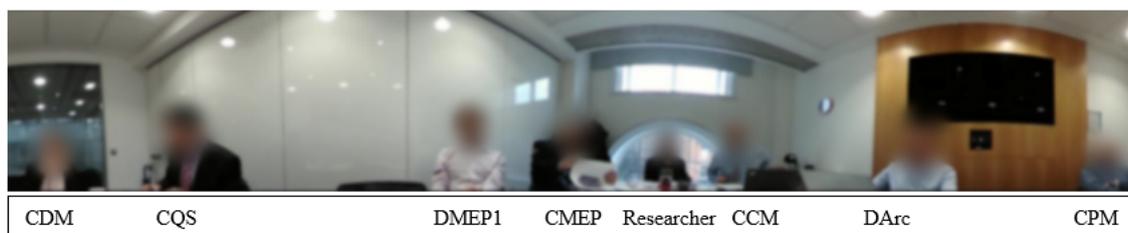
event. This form of humour occurred many times across the three case studies. According to O'Neill, Allen and Hastings (2013), groups with good social relations and cohesion are better equipped to manage conflicts constructively than groups with poor social relationships. Social cohesion is particularly essential to performance when the team's task requires high levels of interaction, coordination, and interdependence (Beal *et al.*, 2003).

Few studies exist that examine humour as a resource for mitigating conflict during social interactions. One exception is work by Norrick and Spitz (2008) that explores the structures and dynamics of conflict talk, showing how participants contextualise their interaction as conflict. Albeit novel in exploring various types of humour and their impact on conflict sequences, Norrick and Spitz's study is contextualised in interactional sociolinguistics. This is far removed from observations of live CIDMs being undertaken by the current research project.

Extract 6.12 is a typical example of humour being used, not to remove conflict from the meeting, but instead, the humour functions to relieve the tension created by the conflict. Extract 6.12 takes place during the sixth meeting observed of Case Study C. Earlier in the meeting, it was revealed by the DMEP1 that the MEP contractual arrangement with the constructors and client does not include the need to populate a 3D BIM model fully. This news received a negative reaction from the constructors, and from the DArc and DEng1, who both intend to populate the 3D model with detailed design information. Without the MEP input, the 3D model lacks key information, which will reduce opportunities for effective digital collaboration. Extract 6.12 takes place after the tense conversation about the 3D model. The team are discussing manufacturers literature on the closed-circuit television (CCTV) cameras the client has requested¹⁰.

¹⁰ The 4Ps referred to in the extract is the common digital repository for project design information.

Figure 6.12: Extract 6.12 Case Study A, meeting #6



1 **CMEP** : urm I think they have issued urm any literature on urm
 2 the likes of the CCTV that's been issued have you seen that
 3 gents?
 4 **DMEP1** : I haven't seen it
 5 **CMEP** : I believe it has been issued maybes check with Michael
 6 **DMEP1** : is that on 4P's?
 7 **CMEP** : I don't think so but it can be uploaded to 4P's can't it?
 8 **DMEP1** : to be honest I would prefer to get an email
 9 **CMEP** : ha ha ha ha ha right
 10 **DMEP1** : I will see if I can
 11 **CDM** : they don't work in 3D they don't work in 4P's ha ha ha ha ha
 12 **CMEP** : ha ha ha ha what do you like?
 13 **CDM** : ha ha ha ha we have got drawing boards you know in the
 14 office
 15 **DMEP1** : this isn't really a laptop it's just a cereal box I have
 16 painted ha ha ha ha ha
 17 **CMEP** : ha ha ha ha ha
 18 **CDM** : ha ha ha ha ha

The CMEP is clarifying that literature about the CCTV information has been issued, and he is confirming if the MEP designers have received it (lines 1 – 3). In line 4, the DMEP confirms that he has not received this literature, “I haven’t seen it”. The tone of voice used by the DMEP1 is curt. The DMEP1 does not hedge his response or offer moderation to placate the negativity. Next, the CMEP provides further information, “I believe it has been issued maybes check with Michael” (line 5). This statement implies that the fault could be with the DMEP1. The DMEP1 seeks further clarification in line 6, “is that on 4Ps”. The CMEP follows this question with a solution, “I don’t think so but it can be uploaded to 4Ps can’t it”. At this stage, CMEP attempts to resolve the issue by suggesting they can upload the information onto 4Ps (line 7). He has likely picked up on a slight insinuation in line 6 from DMEP1 that as 4Ps is the common information repository used, it should have been on there and was not. At this point, DMEP1 has the option at line 8 to accept the offer, which would have resolved the issue. However, despite referring to 4Ps earlier, he states, “to be honest I would prefer to get an email” (line 8). This response could be viewed as pedantic or inflexible. The statement serves to reject the offer provided as an act of concession at line 7. The CMEP's response is immediate laughter, reflecting a degree of awkwardness, and the “ha ha right” (line 9), can be viewed as the CMEP openly acknowledging or recognising that DMEP1 is aversive and not looking to help to resolve the situation. However, this does prompt some concession by DMEP1 (line 10), suggesting he might be open to seeking a solution “I will see if I can”. At this point, the CDM interjects with humour to ease the tension, “they don't work in 3D they don't work

in 4Ps... we've got drawing boards you know in the office" (lines 11 and 13 - 14), which refers back to the tension generated by the disappointment of the contract not including a fully populated 3D model alongside the preference here to have the CCTV information via e-mail. The effect of the intervention here is to de-escalate the disputed issue immediately. The de-escalation is evident through the smiles and shared laughter of the rest of the participants. The DMEP1 follows up with a joke in lines 15 - 16, "this isn't really a laptop it is a cereal box I have painted", which prompts further shared laughter and appears to prevent any further tension. Extract 6.12 also demonstrates how humour directed as self, i.e. the DMEP1's laptop being a cereal box, can contribute to a positive outcome collectively, and in this case, be productive.

As the conversation in Extract 6.12 demonstrates, the conflict event observed does not escalate into additional occurrences of conflict with greater severity (see, Glasl, 1982), the intervention appears to have worked. The lack of escalation would suggest that, as a strategic social tool, humour offers a potentially productive function in managing conflict of this kind. Dysfunctional intragroup conflict is well recognised in academic literature as problematic to group performance (de Dreu and Weingart, 2003) and is particularly so in the construction industry (Vaux and Dority, 2020). However, if managed, conflict can be viewed as a catalyst for innovation and creativity (de Wit, Greer and Jehn, 2012). Therefore, it is essential to understand the impact conflict might have on group social interactions and effective ways to manage an event if it can escalate and become dysfunctional, particularly during the design development phase of a construction project.

6.4 Banter

Banter is defined as teasing that invites verbal and non-verbal teases in response (Trouvain and Truong 2017, Raiden 2016). The occurrence of banter occurred across the three case studies. Banter occurred more often between the constructors as a subgroup than between the constructors and the designers. No events of banter occurred between the designers without the constructors being involved. The amount of time the constructors spend together might explain this trend of informal familiarity and, therefore, more established social cohesion as a subgroup. During the ten-month observation period, the constructors spent a lot of their working lives together focusing on a single project, while the designers were effectively independent subcontractors brought together to develop and deliver the design of a project. Consequently, the relationships between the design consultants as multiteam members (MTMs) of different professions have not formed the same informal familiarity exhibited by the constructors. Typical examples of banter involving the constructors demonstrate a level of comfortable informality (Haugh and Bousfield, 2012) and, interestingly, the presence of familiarity during the first and subsequent meetings per case study appears to create a positive, comfortable working environment throughout the development stages of the group. The division where humour is viewed as positive or negative can be somewhat

blurred, particularly when social interactions include teasing and jocular mockery that can descend into verbal abuse and aggressive humour that alienates others (Hemmasi *et al.* 1994). These counter teases are typically construed as jocular, can be directed at the same target or others, and often involve elaboration on the original tease (Norrick 1993).

Extract 6.13 occurred during the first meeting observed of Case Study A. The conversation extract demonstrates the typical use of humour through banter that was replicated across the three case studies. The focus of the humour in Extract 6.13 is connected to a task-focused interaction. The group are discussing the design of the drainage and a misunderstanding that the CPM and the CCM1 had the day before the meeting regarding the drainage design in the basement. See Figure 6.13.

Figure 6.13: Extract 6.13 Case Study A, meeting #1



DMEP1	DEngl	CCM1	Researcher	CDM	CPM	CQS	CMEP	DArc
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1 CDM : are we happy with our buildability on that because I know we had a
2 discussion about it yesterday
3 CPM : yeah we talked about it because I had it my head that it was going down
4 into the basement urm (.) of the lower ground floor
5 DArc : ha ha ha
6 CMEP : ((smiles))
7 CDM : ((smiles, moves head from side to side))
8 CPM : urm but it is not is it so I think we are probably a little bit more
9 comfortable with that now
10 CCM1 : me and Brian had very much convinced ourselves that it was in the
11 basement and were having a lot of conversations about it
12 CDM : ((Sniggers/smiles/shakes head))
13 CPM : ha ha ha
14 DArc : ha ha ha
15 CDM : and then they came and asked me and I sorted them out
16 CCM1 : and then Alex just pitched up and put us both in our place ha ha ha
17 DArc : ha ha ha
18 CPM : Alex was the only one that could was going to be able to get in to
19 actually install the pipes
20 DArc : ha ha ha ha
21 CDM : ha ha ha ha
22 CMEP : ((smiles))
23 CDM : there they are look there they are ((points at drawing)) ha ha ha
24 CCM1 : she was wondering why she was going to have to become our drainage
25 installer
26 CPM : I think that might have gone away now
27 CDM : it has I think yeah so
28 DArc : I mean to be fair they were shown in the model down to the basement
29 because we didn't know what was happening with the connection that grey
30 area in the tender
31 CDM : ((smiles/nods))
32 CPM : so it was there
33 CPM : so we were right
34 DArc : yeah yeah yeah
35 CDM : no no no there was drawings that suggest
36 CCM1 : you didn't tell us that
37 CDM : there was drawing suggesting that they were going down into the basement
38 DArc : but they were clouded there was a red comment saying needs to be resolved
39 in terms of civil engineering
40 CDM : but that's
41 CCM1 : but these were the contingency drawings before we knew it she was
42 holding them back
43 CDM : no no no(.)because you had seen Robinson's new drawings which suggested
44 that there was some underslab drainage on the ground floor ((looks at
45 CCM1 with large grin)) so engage brain ((points finger to her temple))
46 and you should have known
47 CMEP : that's you told
48 DArc : ha ha ha ha ha
49 CCM1 : ((grins))
50 CDM : ((move head side to side to mimic cockiness))

The CDM is checking in lines 1 and 2 if the team are happy with the buildability of the drainage in the basement, “are we happy with our buildability ... I know we had a discussion about it yesterday”. In response, the CPM confesses to his misunderstanding about the route of the drainage down to the basement, “I had it in my head that it was going down into the basement ...” (lines 3 – 4) and “ ... but it is not is it ...” (line 8). The CCM supports the CPM by stating that “me and Brian had very much convinced ourselves that it was in the basement and we were having a lot of conversations about it” (lines 10 – 11). This confession leads to smiling and laughter reactions from three of the other group members. This acknowledgement, which could be viewed as reflecting poorly on them, demonstrates how banter can show the speaker is not taking themselves too seriously, which is possible in a close-knit group. That this is treated with light-heartedness is then emphasised by the CDMs role in the conversation. She makes it clear that she “sorted them out” (line 15) and “put us both in our place” (line 16). This response could have risked being viewed as a put-down or undermining, which can be common in banter. However, her comments are treated positively, which is evident from the collective laughter and observed smiling. A further elaboration of the banter is offered through CCM1 and CPM by acknowledging the smallest person in the room, namely the CDM, who would have been the only one who could have fitted into the space to install the pipework (lines 18-19). The CDM further elaborates upon this by suggesting that she would become the “drainage installer” (lines 24-25).

At this point, there is potential for the banter to conclude at line 26, where the CPM, who raised the topic, attempts to move the topic along by saying, “I think that might have gone away now”. However, the DArc, at lines 28 - 30, becomes involved by introducing some insight to justify the initial confusion. In doing so, he is regenerating the banter by challenging the position that the CDM was correct. Lines 32 - 33 demonstrate that both the CPM and the CCM1 responses suggest they had been wronged or leads to some teasing that this was intentional misleading “you didn't tell us that” (line 36); “she was holding them back” (lines 41 - 42). The banter comes to a climax by the CDM stating they should have “engage brain” in lines 45, accompanied with non-verbal behaviours such as grinning and pointing her finger to her temples. Following conversation Extract 6.13, the conversation reverts back to the focus of the task, and although there are still some residual instances of more low-key laughter, the group moves on, and the banter concludes.

Although literature exists that indicates the potentially harmful use of banter during organisational meetings, especially concerning switching between informal and formal conversations (Rogerson-Revell, 2007) and excluding specific members of the group. Extract 6.13 provides no indications from those directly involved or those in the meeting (but not making any actual comments), which would suggest that the banter was not perceived negatively. Furthermore, no events were observed across the three case study observations that support this perspective. This occurrence may be due to the overall informal nature of the meetings. Consistently during all the CIDMs, an informal

atmosphere was observed, where a formal atmosphere includes excessive procedural structure, seriousness, increased structure, predictability of discourse, and respect giving (Irvine, 1979). The consistently informal atmosphere appeared to create a familiar, informal working environment. Though working with the same construction and design professionals, project after project may create the condition for limiting conflict but also risk dysfunctional team performance behaviours such as *Groupthink* (Janis, 1982). The presence of some level of conflict has often been considered a requirement for innovation and creativity (Jehn and Bendersky 2003) and could be crucial to produce a design based on innovative integrations of ideas. The presence of banter is evidence of a degree of cohesion within the team, but also an indicator that this is not to the extent that team cohesion has subsumed the scope for individuals to articulate their opinions or engage in this level of humour between members.

The observed social interactions demonstrate that, in the setting observed, banter can materialise amongst rational, legitimate task discussions without derailing the flow of the meeting, whereas banter has often been viewed as disruptive due to those taking part vying for influence or competing. The observations demonstrate banter materialising effortlessly as part of the ongoing behaviour of the routine meeting tasks, further evidencing banter as symptomatic of a familiar, close-knit group (Plester and Sayers 2007). This outcome might suggest that concerns around disruption have been previously overplayed. However, some team members may have found these non-task interactions disruptive but simply did not express this in the meeting. Further research is required to investigate banter's potential benefits and disruptive influence during meetings.

Overall, while previous research has demonstrated a negative side to banter, this was not observed across the three case studies. Furthermore, banter has often been associated with “horseplay” (see, Trouvain and Truong 2017) which is considered rough and boisterous play; however, the examples in the case study are strikingly different from previous studies (see Raiden 2016). Primarily, the presence of banter illustrated the ease that the group worked together and was symptomatic of the broader team cohesion on display. Based on these observations, further research is required to understand the conceptualisation of banter is warranted to understand the function and manifestation of banter across different social settings.

The next and final sub-theme of social cohesion to be discussed is the presence of solidarity, praise, and support.

6.5 Solidarity, praise and support

Solidarity, praise and support are defined as demonstrations of unity and expressions of warm approval. For example, when team members help each other, speak to each other with encouraging words, reward the contribution of another participant, support each other verbally, or use verbal or

physical language that suggests team solidarity towards a common goal. Events of solidarity, praise and support were identified during the data analysis process but not during every meeting.

Extract 6.14 took place during the first meeting observed of Case Study A. The group are discussing the Scope of Services document. This document outlines the contractual scope of the work each of the design practices is providing to the main contractor for this project. The team are specifically discussing this document concerning the architectural design agreement. See Figure 6.14.

Figure 6.14: Extract 6.14 Case Study A, meeting #1



DMEP	DEng	CCM	Researcher	CDM	CPM	COS	CMEP	DArc
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1  CQS : If you send them to Kelly cause she is pulling everything
2      together in that respect so
3  CDM : ok I am yeh it is taking some doing h h
4  CQS : no you are doing well
5  CDM : ha ha
6  CQS : you are doing well
7  CPM : you were on it yesterday
8  CDM : I know I was very productive very I think I might just stay here
9      forever is that alright ha ha
10 CQS : yeh that's what we are hoping

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The CQS starts the extract by explaining to the DArc that “if you send them to Kelly cause she is pulling everything together in that respect so” (lines 1 – 2). “them” being the documents necessary to complete the Scope of Services document. The CDM suggests in line 3 that she finds her role in pulling the information together for the document challenging, “it's taking some doing”. The CQS responds to the CDM with praise (line 4), “... you are doing well”, and repeats this in line 6. The CPM offers further praise and support, “you were on it yesterday” (line 7). This is particularly relevant because the CPM is the CDM's direct senior manager. Other examples of typical statements from other meetings observed were, “thanks for all your help with that one” and “brilliant great stuff”.

Low levels of socio-emotional behaviour observed across the current study support the findings by Gorse and Emmitt (2007). The authors observed similar behaviour when applying the Bales interaction process analysis (IPA) framework. The conversation Extract 6.14 would be classified as showing solidarity according to the Bales IPA framework, which was one of the least occurring

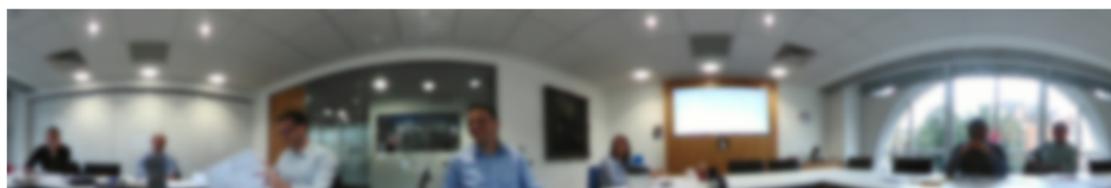
interaction types observed during their study. Overall, the data collected from all three case studies include examples of praise and support being offered to fellow team members during the meetings but not at a frequent rate. As discussed in Chapter 5, the majority of the interactions during the observations focus on the task. However, the occurrence of praise linked to the task was still relatively rare. By contrast, social interactions were observed more frequently when an individual was confronted for not performing a task. A discussion of these conflict events will be presented in Chapter 7.

While discussing the conversation Extract 6.14, it is worth considering further that this event occurred during the first meeting observed for Case Study A. This meeting was only the second CIDM this team had held for this specific project. According to Tuckman and Jensen (1977), this early stage of team development is categorised as the *forming* stage when internal team relations start to develop. Goncalo, Polman and Maslach (2010) suggest that when examining social interactions during the *forming* stage, it is important to note that group members are getting to know each other (*socialisation*) and establishing group rules norms. Extract 6.14 is perhaps a demonstration of the *socialisation* the team are experiencing as they get to know each other. Other issues that cannot be fully understood through video observations and field notes alone include the impact of a female¹¹ CDM, who is also relatively young and inexperienced in the role. She also openly expresses that she is challenged by this aspect of her job role as a design manager. Perhaps these factors may also create the environment for public praise in this setting. Future research is needed to combine video observations with follow-up interviews to understand in more depth the reasons why solidarity, praise and support events occur, or equally, do not occur.

Extract 6.15 is another example of a conversation that includes praise but is directed at the team rather than an individual. The team are discussing the challenge of completing and issuing the roof design package. The roof package has been especially problematic for the designers. See Figure 6.15.

¹¹ The impact of the female element is outside the scope of the current study.

Figure 6.15: Extract 6.15 Case Study B, meeting #2



DEng1 DEng2	DArc	CDM	Researcher	DMEP1 DMEP2
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1  DArc : it's on the roof package but it's not quite issued
2  CDM  : I know I didn't see that appear yesterday (.) we have got a
3          bottle of champagne ready for when the roof package is done like
4          and issued ((smiles)) h h
5  DArc : ((smiles))
6  DEng1: ((smiles))
7  DEng2: ((smiles))
8  All  : ((long pause))
9  DArc : basically there is insulation straight on top of the concrete
10         deck

```

The DArc commences the extract by confirming, “it’s on the roof package but it’s not quite issued” (line 1). The CDM responds to the statement with, “... we have got a bottle of champagne ready for when the roof package is done like and issued” (lines 2 – 4). This statement is met with smiles from the other meeting participants. The conversation returns to the task after a long pause (line 8).

Extract 6.15 is similar to Extract 6.4 in that it includes a metaphor to create a point. The CDM is using the “bottle of champagne” (line 3) to symbolise or make sense of and acknowledge both the challenge of issuing the design of the roof package, as well as the celebration that would be deserved by the team when the roof package drawings are issued. The pronoun “we” in line 2 ensures the statement is referring to the team. Although the CDM clearly makes the statement about the champagne as a positive gesture of acknowledgement and solidarity, which can be seen by his smile and laughter, the reaction by the rest of the team is less enthusiastic, with only smiles and no verbal acknowledgement of the statement. Lines 9 - 10 demonstrates that the conversation then moves on to discuss a different aspect of the design. The lack of acknowledgement of the metaphor may suggest a lack of social cohesion in this team at this point, i.e. 2nd meeting, therefore the early *forming* stage (Tuckman and Jensen, 1977). A further reason for the minimal response to the statement and the general low energy levels observed by the researcher during this particular meeting was the physical location of the meeting. As discussed in Chapter 5, some meetings observed were held in a large head office conference room, even though only six people were in attendance. This meeting is an example of the physical setting potentially hindering the meeting outcomes through the physical environment, which felt unwelcoming to the researcher and appeared to create a lack of energy among the meeting participants.

Across the three case studies, examples of solidarity were observed in the same way that Extract 6.15. acknowledges the task-focused, team challenge of creating the design. Similar statements included, “We have talked about this before. I am sticking up for you there, Paul”, “It is getting there though isn't it the coordinated design it is ticking along”, and “you have got plus and minus twenty millimetres that's what we need as a project team to be upfront and understand ...”. As previously discussed, the findings support research by Gorse and Emmitt (2007) that the teams spend the majority of the meetings discussing the task, rather than the social aspects of the team dynamics. von Treuer *et al.* (2018) state that social cohesion is an individual's desire to develop and maintain friendships with work team colleagues, including relationships that stem from a commitment to the task. Extract 6.15 and the above direct quotations suggest that task-focused solidarity interactions are occurring. Perhaps social cohesion may be occurring through the extent to which the team aspire to work together and unite to achieve a common task goal. Therefore, by expressing solidarity, which is focused on the task, the teams are inadvertently also potentially fostering social cohesion.

In sum, solidarity, praise, and support do occur during the meetings as both social and task-focused behaviour. Both these occurrences may foster social cohesion in the teams. However, it should be noted that the frequency of these events is lower than other forms of social cohesion, such as humour.

6.6 Summary

The aim of this study is to investigate the impact of social interaction on decision-making in construction project design meetings. This chapter has partly achieved this aim by addressing the fourth objective - *To extract from the meeting observations typical examples of social interaction events and to analyse these from the standpoint of theories of organisational behaviour.* Chapter 6 has focused on typical examples of the social cohesion sub-themes of; familiar behaviour, humour, banter, and solidarity, praise and support. Both verbal and physical information relevant to the conversations has been considered.

Overall, the observations suggest that social interactions do shape social cohesion during CIDMs. Social interactions may shape social cohesion through the creation and presence of trust and psychological safety that are apparent from the familiar behaviour of the teams. Familiar behaviour is observable through familiar speak, the use of expletives, and the presence of banter. The existence of trust and psychological safety might allow the teams to disclose errors without fear of repercussion. The use of expletives appears to enrich group-level communication during difficult discussions as well as foster a sense of social identity. The repeated use of humour during every meeting observed also appears to encourage a sense of social identity, which could help team

bonding. Humour is seen to relieve tension and de-escalate potential conflict events. The inclusion of humour based on construction industry cultural stereotypes is surprising, given that these stereotypes are generally considered to harm interpersonal relations. However, the shared knowledge specific to the team the stereotypes create appears to bond the teams together through being part of an industry-wide in-joke. However, humour can also be used to ridicule, which, although it may increase social cohesion, could harm group norms long-term if negative behaviour is seen as acceptable. Finally, although instances of solidarity, praise, and support were observed, this was not frequent. It could be argued that an increased level of solidarity, praise, and support could further increase the levels of social cohesion in the teams. Overall, the social interactions relating to social cohesion benefit the team performance and, therefore, the project. The teams remain focused on the task during the meetings and are not derailed by social interactions that foster social cohesion.

The following gaps in knowledge have been identified during the chapter; they include a requirement for; a greater understanding regarding the functions of humour in organisational settings; an examination of the links between humour and conflict management; an investigation of the benefits and disruptive influence of banter; an understanding of why occurrences of solidarity, praise and support are rare, and the impact of these events on team performance; an exploration into the impact of a meeting room's physical attributes on the performance of the meeting. These identified gaps in knowledge will be structured and presented in Chapter 9.

Two of the case studies observed included a female design manager. The female element of the behaviour during the meetings is outside the scope of this research project and, therefore, a limitation of the current study. However, there is scope for future research to investigate this aspect of team dynamics in this setting.

Chapter 7 will next present typical examples of social interaction behaviour observed during the CIDMs that focuses on the most occurring reasons for intragroup conflict.

Chapter 7 Intragroup conflict findings and discussion

7.1 Introduction

Social cohesion and intragroup conflict have been identified in the current study as the dominant themes of social interaction behaviour. The aim of this study is to investigate the impact of social interaction on decision-making in construction project design meetings. This chapter will partly achieve this aim by addressing the fourth objective - *To extract from the meeting observations typical examples of social interaction events and to analyse these from the standpoint of theories of organisational behaviour*. Chapter 6 focused on typical examples of social cohesion. This chapter will present and discuss the intragroup conflict data and findings.

The contractor-led design meeting (CIDM) video footage data has been thematically structured by applying an inductive approach to identify the reasons for intragroup conflict. The events presented in this chapter demonstrate typical intragroup conflict behaviour, which was identified and thematically coded using NVivo software. The observations focus on social interactions, including verbal and non-verbal exchanges and reactions between actors. The social interactions include behaviour that reflects the relationships in the group during task-orientated and non-task communications. The reasons for intragroup conflict included in this chapter are conflict due to; late design information; a designer not attending the meeting; collaborative working; a design change request, and finally, negative humour.

The same as Chapter 6, typical examples of conversation extracts will be presented and discussed in detail during this chapter. Again, pseudonyms have been used to provide anonymity to individuals and organisations. The conversation extracts are presented using the Jeffersonian Lite transcription system by Sacks, Schegloff and Jefferson (1974) and Potter and Hepburn (2005). The extracts include verbal and physical information relevant to the conversation. Photographs in the form of screenshots taken from the video footage have also been included to accompany the conversation extracts to illustrate the physical setting. The anonymised photographs include a key of the meeting participants, which provides the seating arrangements, and a glimpse at the meeting room. (For more description of the physical setting, see Chapter 5).

As discussed in Chapter 6, the participants of the meetings included representatives from the main contractor and sub-contracted design disciplines. During the study's data collection and analysis phases, participants employed by the main contractor and subcontractors employed to provide the detailed design, manufacture and installation elements of the project are identified as 'constructors'. While participants subcontracted to the project team for design input only are identified as 'designers'.

Table 7.1 provides the key to the meeting participants included in the conversation extracts during this chapter. The meeting participants are divided into constructors ('C') and designers ('D'). See Table 7.1.

Table 7.1: Key of meeting participants

Constructors – 'C'	Designers – 'D'
CDM = design manager	DMEP = mechanical, electrical and plumbing designer
CSub = subcontractor (with design detail responsibility)	DEng = structural engineer
CCM = construction manager	DArc = architect
CQS = quantity surveyor	
CPM = project manager	

Table 7.2 provides the key to the Jeffersonian Lite system of transcription notation used during this chapter. See Table 7.2.

Table 7.2: Jeffersonian Lite key, adapted from Jefferson (2004)

Symbol	Meaning
(.)	noticeable pause
(())	non-verbal activity
h	minimal (volume) laughter
ha	laughter

According to de Dreu and Gelfand (2008), intragroup conflict is generally defined as the process emerging from perceived incompatibilities or differences among group members. Bradford, Stringfellow and Weitz (2004) describe conflict as when two or more individuals interact to attain their individual or mutual objectives. It is accepted that their relations may well become incongruous or inconsistent. Tjosvold, Wong and Feng Chen (2014) discuss how incompatibility may occur due to competition, scarce resources, or having divergent attitudes, values, beliefs, skills, and abilities. Intragroup conflict is a natural and inevitable part of team processes and is an inherent attribute of social interactions and behaviour.

The first reason for conflict to be presented and analysed is late design information.

7.2 Conflict due to late design information

The general design-related activities that take place during the CIDMs across the three case study projects are; an update on the status and progress of design information per discipline, discussion of

any design coordination issues, design-related problem-solving and decision making, and specific buildability and commercial considerations raised by the constructors. Across these activities, the most frequently recurring reason for a conflict event was the status and progress of discipline-specific design information. These conflict events could be defined as conflict due to the designers not meeting the constructor's deadlines to issue design information, i.e., drawings and specifications. This reason for conflict occurred during most of the meetings observed. Boudeau (2013) describes how CIDMs can be viewed as an example of "ordinary" work practice where expertise is coordinated through the situated ways designers and constructors interact with and talk to each other. The observations of the three case study meetings made it apparent that the same general design-related activities took place across the case study projects as observed by Boudeau during a similar ethnographic study. The three conversation extracts presented and discussed represent the typical range of conflict behaviour due to late design information. The three extracts will be discussed to illustrate the behaviour and social interactions of the participants during the event.

The first conversation to be presented (Extract 7.1) occurred during the second meeting observed for Case Study A and is part of the conversation of the MEP designer providing the progress and status update of the MEP design information. See Figure 7.1.

Figure 7.1: Extract 7.1 Case Study A, meeting #2



CDM	CQS	DMEP	CMEP	Researcher	CCM	DArc	CPM
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1 **DMEP** : Okay and then (.) couple of items we still need to do erm the
2 diversion drawing I have had a quick chat with Davie this morning
3 before the meeting erm we have identified I think a little bit
4 more information on where the diversion goes certainly foor
5 **CMEP** : so that's for the gas and water or not
6 **DMEP** : gas and water
7 **CMEP** : yeh
8 **DMEP** : I'll get that I'll get that drawing updated and issued issued
9 next week (.) and then couple of things
10 **CPM** : but to be fair Michael you did say that last time
11 **DMEP** : I know ((takes and glasses and holds hands up)) absolutely I did
12 absolutely you are right
13 **CPM** : are we definitely getting it next week
14 **DMEP** : yes and I was expecting to get a bit of a (.)
15 **CMEP** : ((smile))h h h
16 **CDM** : ((smiles))
17 **DArc** : ((smiles))
18 **DMEP** : for it to be commented on
19 **CPM** : ((smiles)) that was a little bit of a one then
20 **DMEP** : for it to be commented on no you are right it has just been (.)
21 yeh (.) erm and then the design deliverable matrix and the
22 resources programme we still need to do those

The conversation commences with the DMEP explaining that a "... couple of items we still need to do erm the diversion drawings ..." (lines 1-4). The CMEP next questions the scope of the diversion drawing in line 5, "so that's for the gas and water or not". The DMEP clarifies that the scope of the drawing is gas and water (line 6) and that the drawing will be "... updated and issued ... next week ..." (lines 8-9). The DMEP appears aware that reporting late design information is problematic. This behaviour is observable through repeating words and stuttering, such as line 8, "I'll get I'll get ..." and mid-sentence pauses, which suggests the speaker is uncomfortable with what he is saying. This concern is realised in line 10 when the CPM interrupts the DMEP by stating, "but to be fair Michael you did say that last time". This confrontational statement by the CPM individualises the failure of the design information being issued on time as resting with the DMEP through using the pronoun "you". The CPM also chose to use a direct confrontational statement, forcing the conflict. He could have used a different strategy but chose not to, for example, a problem-solving strategy. The DMEP responds by accepting the failure. It appears that he either takes responsibility for the late information and agrees with the CPM through his response, "I know absolutely I did absolutely you are right" (lines 11 – 12), or he accepts that the CPM is calling him out. He agrees to the fact that he had said this last week. Noticeably he does not offer any excuses or caveats. He simply

makes the statement, “you are right” (line 12). This statement is him yielding. In terms of conflict strategy, he is backing down rather than escalating the conflict. The DMEP uses body language of removing his glasses, looking directly at the CPM, and holding his hands up, which suggests his acceptance of the failure. The CPM responds with a direct question, “are we definitely getting it next week” (line 13). To which, the DMEP provides a definite answer, “yes” (line 14). The DMEP appears to have satisfied the CPM by providing a direct response, and as a result, the conflict event does not escalate.

The explanation for why this conflict does not escalate might be that the respondent DMEP reacts by taking ownership of his mistake and acknowledging the failure. However, a different strategy employed here to de-escalate the conflict is through DMEP’s use of humour directed at himself to deflect the focus of the conversation. Line 14 “... I was expecting to get a bit of a (.)”. It is safe to assume the next word might have been ‘kicking’ or ‘telling off’. The reaction of smiles and laughter from the CMEP, CDM and CPM support this assumption. However, although the smiles and laughter have already occurred, the DMEP completes his sentence with “for it to be commented on” (line 18). Line 19, “that was a little bit of a one then”, the CPM uses the same terminology “bit of”, so there is an acknowledgement of the humour and a return of the use of humour with Line 19. Finally, in lines 20 - 21, the DMEP offers an opportunity for the team to question why the design information is late, “... it has just been (.) yeh (.) erm ...”. Even with this open invitation and two pauses in the conversation, no one at the meeting challenges or comments at this point, and the DMEP moves to his next point without further explanation.

In terms of the form of conflict, this example is interpreted as representing process conflict (Jehn, Northcraft and Neale 1999) because the issue of late information is related to the process of producing the information, rather than the design itself. Conflict due to the design would, during this research project, be considered as task conflict. The use of a direct question by the CPM “are we definitely getting it next week” (line 13), and a direct answer from the DMEP, “yes” (line 14), matches the preference for the “tribe of construct” as suggested by Eynon (2013), where constructors prefer to work with deadlines, certainty and facts. Even though the CPM used a confrontation style and forced the conflict (De Dreu *et al.*, 2001) in line 10, “but to be fair Michael you did say that last time”. The DMEP de-escalated the event by yielding as a conflict management strategy, which De Dreu *et al.*, 2001 suggests represents the DMEP’s high concern for the CPM and low concern for himself. The use of humour also appears to de-escalate a potential conflict event by relieving the tension (Greatbatch and Clark, 2003). The CPM effectively turns a potential process conflict situation into a cohesion building occurrence by contributing to the humour.

Another typical example of conflict due to late information is Extract 7.2. This example is a similar conversation to Extract 7.1. It took place during the first Case Study A meeting observed. The DMEP is communicating the status and progress of the MEP design information. See Figure 7.2.

Figure 7.2: Extract 7.2 Case Study A, meeting #1



DMEP	DEng	CCM	Researcher	CDM	CPM	COS	CMEP	DArc
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1  DMEP : next one is services diversions Stuart is being a bit patient
2          with me here I did suggest I was going to do me updates services
3          drawing some time ago
4  CMEP : ((smiles) h h
5  DMEP : and I still haven't done so I do I do need to do that and I will
6          get that done
7  CMEP : when do you think you will have that Bill
8  DMEP : I did tell you it was going to be this week if I push it into
9          next week Stuart is that causing you any issue or not
10 CMEP : the only thing is that's one of the drawings I wanted to issue to
11         Northern Power
12 DMEP : right right
13 CMEP : sooo (.) erm I don't think it is going to cause annny real issues
14         in the short term but just as soon as you can please
15 DMEP : yeh of course right right sorry to keep messing you about

```

The DMEP communicates the late status of the services diversion drawing during lines 1-3. He states in lines 2 – 3, “... I was going to do me updates services drawings some time ago” and lines 5 - 6 “and I still haven’t done so I do I do need to do that and I will get that done”. The CMEP asks for a revised deadline in line 7, “when do you think you will have that Bill”. This is a direct question. Rather than a direct answer, the DMEP seeks a compromise by suggesting, “...if I push it into next week ...” (lines 8 – 9). The CMEP does not initially accept this response, “the only thing is that’s one of the drawings I wanted to issue to northern Power” (lines 10 – 11). However, the CMEP quickly relents and compromises with the diversion drawing, “... as soon as you can ...” (line 14), demonstrating an agreed negotiation between the participants. Line 15 includes an apology “...sorry to keep messing you about”.

Lines 8-11 includes an example of problem-solving and negotiation, “if I push it into next week Stuart is that causing you any issues or not”. The DMEP is asking for slack and compromise. The CMEP acknowledges this request includes a compromise “the only thing is that’s one of the drawings I wanted to issue to Northern Power” (lines 10-11). He accepts this compromise in line 13, “I don’t think it is going to cause annny real issues in the short term ...”,

Again, the DMEP is not challenged about *why* the information is late. The focus of the conversation is on agreeing when the information will be provided. Conversation Extract 7.2 demonstrates typical behaviour when pre-empting conflict due to late information. This form of behaviour is repeated across the three case studies. When pre-empted, conflict events did not escalate during all examples of conflict due to late design information of the current study. This approach appears to manage the conflict event successfully, not escalate it, and a resolution is agreed.

In contrast to conversation Extract 7.1 and 7.2, Extract 7.3 is an example of conflict occurring due to late information, but is an example where the conflict is not effectively managed. Extract 7.3 occurs during the first meeting observed in Case Study C, although the CIDMs had been ongoing for two months before this point. The conversation occurs at the same point in the meeting as Extract 7.1 and 7.2., namely when a designer communicates the progress and status of design information. Prior to the conversation Extract 7.3 taking place, the meeting conversation has already discussed a number of MEP drawing packages that are late relative to dates agreed at the previous meeting. During the meeting observed the designer had missed several deadlines for a range of MEP drawing packages. The scale of the problem of late information has implications for the escalation of the conflict. The severity of the problem is evidenced in the time dedicated to resolving this problem in contrast to the earlier two examples.

Figure 7.3: Extract 7.3 Case Study C, meeting #1¹²



Clr	Researcher	DMEP	DArc	CPM	CDM
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1 CDM : but I think what we are saying is is it's it's we are not going
2 to have it for Monday from what you are telling me ((smiles))
3 DMEP : we aren't going to have it for Monday
4 CDM : so when realistically
5 DMEP : let me revisit those dates I think it's probably a week behind
6 CDM : right (7 second pause) okay (4 second pause) ((turns to CPM)) I
7 think we just need to (.) flag that up with the supply chain
8 CPM : suppose basically what we are saying there is that we have not
9 had any (.)issues this week that are on time apart from we have
10 we got half a we have got half a
11 DMEP : we we we have had a slowdown from our end yeh
12 CDM : first two first two packages came out
13 DMEP : yeeeh
14 CDM : we knew the we knew the lighting
15 DMEP : down to down to 3
16 CDM : from this week is just
17 DMEP : it's this week is when we have slowed down and it has been our
18 process not just the way we mark up the way we get it modelled
19 the way we get it back and check it and the sheer volume
20 CDM : yeh
21 CPM : the volume the volume has always been there
22 CDM : the problem is
23 DMEP : not in 3D
24 CPM : ridiculous
25 CDM : if it's a resource issue and we know that that's
26 going to be the case for the next two weeks we need to do
27 something about it
28 DMEP : we've we've got the resource now it is just taking a bit of time
29 getting them to understand what we want out of them cause they
30 are not (.) traditionally they are not an M and E resource erm
31 it's an architectural partner of ours that we are working with
32 BIM Solutions they are called in Whitby (.)
33 CPM : (whispers) yeh
34 DMEP : you know them?
35 CPM : mmm
36 DMEP : and as much as they said yeh we can do all that when we give them
37 the information we have got it back it really wasn't what we
38 wanted first time round but now we think we have got them
39 CDM : are they working with you in your office?
40 DMEP : eerr they are working they come to our office they are working
41 remotely but but they come to our office for
42 CDM : can I suggest that it's worth suggesting to them that they come
43 and sit in your office
44 DMEP : yeah we've we've suggested that
45 CDM : cause their is no reason why they can't and
46 DMEP : it's only down to the fact their resource they haven't got an
47 unlimited resource pool either so they are juggling our job with
48 other jobs

¹² Please note, line 9, “issues” refers to drawings not being issued, rather than the traditional use of the word, i.e., topic, problem, or discussion.

Figure 7.3 Extract 7.3 Case Study C meeting #1 continued

49 CDM : erm
50 CPM : so it does realistically go back to resources so can we not throw
51 some money at it and split it split some of the packages or
52 something I mean
53 DMEP : it's it's easier said than done getting somebody out who can
54 physically do M and E
55 CDM : I know what you are saying to bring somebody else on now you are
56 going through the same process
57 DMEP : we are going through all the same processes again yeh
58 CDM : but I think all Martin and I are saying is from our side I
59 think it's gonna it's gonna massively throw out a problem with
60 returns with returns on the M and E erm obviously it's one of the
61 well obviously it's one of the biggest packages I don't need to
62 tell you that
63 DMEP : I will update it tomorrow with those dates knowing what I know
64 now and then we will have to commit to not being any further
65 slippage erm we are in the process of bring our own internal
66 resource in but there is a month's waiting time for that getting
67 somebody to come in we have got a new BIM manager coming to join
68 us but he is a month away
69 CDM : right
70 DMEP : which is not going to help us
71 CDM : it is not going to help us now is it no no (.) Okay (8 second
72 pause) right eeerrmm(.)drawings out for review and coordination ...

The conversation commences in a very similar fashion to Extracts 7.1 and 7.2. The CDM asks the DMEP a direct question about when the design information will be ready to issue, “so when realistically” (line 4). Instead of providing a precise response, the DMEP gives a vague answer in line 5 “let me revisit those dates I think it’s probably a week behind”. The use of the adverb “probably” creates uncertainty. The use of long pauses totalling eleven seconds following this response suggests this is not a response the constructors prefer as their reaction would have been to respond immediately. The conversation moves on by the CPM requesting clarity on the status of the drawings already issued. Rather than providing a clear status of the drawings already issued, the DMEP explains *why* the information is late (see lines 17 – 19). The reasons provided for the delay include process, marking up drawings, modelling, checking and volume of information. The CPM responds to the “volume” reason by stating, “... the volume has always been there” (line 21). At this point, the DMEP provides an opposing view “not in 3D” (line 23), suggesting he feels that creating 3D information rather than 2D information has increased the overall volume of work. The CPM gives a confrontational and dysfunctional response of “ridiculous” (line 24). The response indicates a conflict event is occurring, and it also indicates a problematic relationship between the CPM and the DMEP. The CPM is not attempting to problem-solve or look for an alternative solution. Instead, he personalises the conflict in a negative manner. Neither the DMEP nor the CDM react or respond to the dysfunctional word. The conversation does not escalate at this point, but it does continue.

Next, the CDM changes the direction of the conversation and asks the DMEP to clarify if the situation of late design information is due to a resourcing issue, line 25 – 27, “if it’s a resource issue and we know that that’s going to be the case for the next two weeks we need to do something about it”. The CDM has framed the statement as a team problem, rather than the DMEP’s problem, through the use of the pronoun “we”. The DMEP continues with the use of the pronoun “we” with his response. The initial response from the DMEP is positive, line 28 “... we’ve got the resource now ...”, but the DMEP moves on to explain a variety of issues as to why the subcontracting out of the design production still results in late information. This explanation ends on another vague statement “... now we think we have got them” (line 38). Again, the DMEP is creating uncertainty by using the phrase “we think”. The use of vague language is observable throughout this example of conflict.

The CDM demonstrates that she is not satisfied with the DMEP’s response by changing the direction of the conversation again with another direct question, “are they working with you in your offices” (line 39). Rather than providing a direct answer of ‘no’, the DMEP provides another vague response “eerr they are working they come to our office they are working remotely but but they come to our offices for” (lines 40 – 41). The CDM provides a diplomatic response given that she has no contractual relationship or authority over the DMEP’s subcontractor, “can I suggest that it’s worth suggesting to them that they come and sit in your office ... cause there is no reason why they can’t ...” (lines 42-43 and 45). This suggestion shows that she is dissatisfied with the two previous responses made by the DMEP as she is suggesting a solution to the problem described in lines 28-32 despite him trying to suggest it is not an issue. However, this suggested solution is met with reasons from the DMEP why it will not work in lines 46 – 48 “it’s only down to the fact their resource they haven’t got an unlimited resource pool either so they are juggling our job with other jobs”. The CDM again attempts to clarify the root cause of the situation with line 50, “so it does realistically go back to resources ...”. He goes on to suggest a solution of “... so can we throw some money at it and split it split the packages ...”. The CDM also uses the pronoun “we” to suggest this is a team rather than an individual issue. However, the DMEP responds with a further reason why this suggested solution will not work in lines 53 – 54 “... it’s easier said than done getting somebody out who can physically do M and E”. The CDM provides support to the DMEP by agreeing with him. It is noticeable in line 58 that the CDM states “from our side”, emphasising different sides to the problem, i.e. ‘us’ and ‘you’, by separating the constructors (‘us’) and designer’s (‘you’) position. The CDM then summarises the situation using extreme terminology in line 59, “it’s gonna massively throw out a problem”. The adverb “massively” attempts to communicate the extent of the problem from the constructor’s perspective. The DMEP responds with, “...we will have to commit to not being any further slippage ...” (line 64 – 65). The term “have to” shows reluctance, something they will have to do, rather than want to do or ensure gets done. Again, the DMEP has failed to provide certainty regarding a solution or

timeframe. He says that a new manager is joining his team, but this is a month away. The CDM responds with, “it is not going to help us now it is no no (.) okay (8 second pause)” (lines 71 – 72). The CDM has communicated her frustration verbally and through an extended pause in the conversation, a common feature of conversations that include conflict. Line 73 demonstrates how the conversation moves on to discuss the review and coordination of drawings that the DMEP has issued. It is interesting to note the conversation is moved to a different topic by the CDM. In lines 71-72, the DMEP has two opportunities (the pauses) to reclaim the turn by responding, e.g., saying, ‘of course, it will not help us now, but in the longer term of the project it will’, or by giving further assurances. But he does not. This lack of a clear resolution can be compared to the other conflicts in Extract 7.1 and 7.2. The earlier extracts demonstrate an end of the discussion following an agreement and resolution whilst the meeting participants are still talking in natural turn-taking way. Here they have stopped talking, as evidenced by the pause when it appears no one wants to talk.

Extract 7.3 is an example of a process conflict event that is not resolved. The constructors are not provided with a precise and reliable deadline when the design information will be provided. The low level of commitment offered by the DMEP is provided in lines 64 – 65, “...we will have to commit to not being any further slippage ...”. According to Jehn *et al.* (2008), the negative effect of process conflict on trust and cohesion can be reduced when team members effectively resolve their process conflict. However, in this example, the team has not managed to resolve the process conflict, and, therefore, it may negatively impact the group's trust and social cohesion, as well as task performance.

According to De Dreu and Weingart (2003), dysfunctional or unhealthy intragroup conflict behaviour will negatively impact group outcomes and relationships. Unhealthy conflict is considered to be members using emotionally undermining language or intimidation tactics. The CPM uses the phrase “ridiculous” (line 24), which demonstrates his frustration, rather than providing a comment that adds value by suggesting an alternative solution to the problem. Combined with the curt tone used to speak it, the word itself could be classified as unprofessional in a work setting, emotionally undermining or intimidating. The impact of the response is the potential damage it may cause to the team's psychological safety (Sun *et al.*, 2015). The word “ridiculous” not being responded to or supported by the other meeting participants might contribute to why the conflict did not escalate at this point.

Extract 7.3 highlights a problem associated with multiteam membership (MTM). Male, Bower and Aritua (2007) define MTM as where team members are members of various groups simultaneously. In this example, the constructors have employed a design practice who are themselves multiteam members, who have further subcontracted work to another design practice who are also multiteam members. A problematic issue of subcontracting the design can be observed from lines 46 – 48, “...

their resource they haven't got an unlimited pool either so they are juggling our job with other jobs". It has already been noted that the construction industry is highly fragmented, with many relatively small organisations involved in a single project (Pryke, 2004). Extract 7.3 demonstrates the potential for unreliable workflow due to a design practice further subcontracting work to other design practices that are also MTMs. Research in this field in a construction industry context is very limited, and to date, no research exists that considers the impact of this arrangement on the social impact of the project team. Further research is needed in this area.

Overall, conversation Extract 7.3 contains similarities to Extract 7.1. and 7.2. Conversation Extract 7.3 includes repeated words, phrases and stuttering, suggesting the speakers feel uncomfortable with the situation. For example, the CDM repeats herself during line 1, "is is it's it's", the CPM repeats himself during lines 9 and 10, "we have got we have got" and the DMEP stutters during line 11, " we we we". The inclusion of extended pauses during and at the end of the event is also a common theme of this kind of conversation (Wiggins, 2017). The extended pauses reflect the tension in the room and also the hesitation to move the conversation on. It is also interesting to note that during all the conflict events included in this chapter, no conversations include the use of expletives, even though literature supports the idea that expletives are traditionally used to demonstrate aggression (Baruch *et al.*, 2017). Again, the lack of expletives suggests the team recognise a different group norm is appropriate during conflict events, including a more formal atmosphere and etiquette. A further similarity between the three extracts is silence from the other meeting participants while the conflict occurs. The conversation is limited to a small number of participants directly related to the action. Again, this represents an understanding of the social norm of the bystander's behaviour during this kind of event. Chekroun and Brauer (2002) discuss the importance of social norms to allow groups to function and avoid chaos. In this extract, the behaviour of both the speakers and the audience is worthy of observation. The group norms during the event also suggest a higher degree of formality than what usually exists during the CIDMs observed when participants contribute freely to the conversation.

There are several differences between Extract 7.3 and Extracts 7.1 and 7.2. The first difference is the lack of ownership of the failure to issue the design information on time by the DMEP. The earlier extracts included the DMEP taking responsibility for the late information. Extract 7.3 includes many reasons why the information is late; see lines 17 – 19, 28 – 32, 36 – 38, 46 – 48 and 53 – 54, and a general lack of responsibility and ownership by the DMEP to commit to a new deadline. The DMEP appears to be avoiding the conflict and the problem by providing excuses. The conflict management strategy of avoiding conflict is suggested by De Dreu *et al.* (2001) to represent a low concern for self and low concern for others. If the DMEP had a high concern for himself and a high concern for the constructor's position, he would be more inclined to offer

solutions to the problem rather than excuses. Which, at best, might create a compromise of more time to complete the late design information.

Another difference between Extract 7.3 and Extracts 7.1 and 7.2 is the format of the responses by the DMEP when asked direct questions by the constructors. The earlier examples demonstrate direct answers that provide the constructors with clear deadline information. This practice appears to remove the desire or the constructor's need to know why the delay occurred. However, the vague answers included in Extract 7.3 lead to further direct questions from the constructors, which extends the conflict event. For example, lines 40 – 41. Another difference is the extensive use of overlapping talk. On many occasions during Extract 7.3, the three speakers spoke over each other, indicating discomfort with the situation. This behaviour did not occur during Extracts 7.1 and 7.2. It signals an uncomfortable atmosphere and frustration in the room. Finally, it is also worth noting the absence of humour from this example. Although the teams use humour regularly to relieve tension, for example, Extract 7.1, the severity of the situation during Extract 7.3 suggests that humour to relieve tension is limited to more minor examples of conflict. The differences in the social interactions of the teams perhaps indicate the increased severity of the situation in Extract 7.3 and the less effective means of managing the conflict by the participants.

The next conflict event to be presented is conflict due to a designer not attending the meeting.

7.3 Conflict due to a designer not attending the meeting

Case Study A and C included meetings when a designer was due to attend the meeting in person but failed to attend. Either they did not attend at all, or they attended virtually via Skype or on the telephone. However, this form of attendance was met with frustration by the constructors. It is worth noting that the meetings took place in 2018 before the impact of Covid-19 resulted in most CIDMs taking place virtually during much of 2020 and 2021. In 2018, virtual attendance was considered a compromise on the constructor's part, usually due to virtual meeting hardware and software problems. Case Study A experienced many technical issues using Skype virtual meeting software and the telephone conference speaker while hosting a hybrid meeting. Dewlaney and Hallowell (2012) support the notion that designers and constructors from different disciplines need to share their knowledge about the design to create a design that fulfils the client's brief and allows a safe, sustainable and cost-effective construction process. Based on the work of Andreasen, Hansen and Cash, (2015), Pikas *et al.* (2016) suggest the term "*collaboration in design*" be used to describe this complex phenomenon. To this end, the critical design disciplines must be represented during CIDMs, particularly during the early design phase of contractor-led design procured projects. The absence of a designer represents a critical problem. Extract 7.4 is a typical example of the conversations that occurred during the CIDMs about a missing designer. This particular

conversation extract took place during the seventh meeting observed of Case Study A. The senior structural engineer was expected to travel from London to the Northeast of England to attend the meeting in person. Instead, his junior colleague attended the meeting virtually via Skype on the conference room monitor. The team is about to discuss the status and progress of the structural design information when this conversation occurs. See Figure 7.4.

Figure 7.4: Extract 7.4 Case Study A, meeting #7



1 **CDM** : actually first of all can I just start off by (.) it was agreed
2 with Ian early doors erm because he'd he'd kind of came to the
3 first DTM and then for the la for the next four he it was just
4 all video conference which isn't ideal for us and he did agree
5 **DENG** : yeh okay
6 **CDM** : that he was going to come up every other DTM (.) erm so I was and
7 I am pretty sure last time he did say to us that he would be here
8 today so it is just obviously to reinforce the fact that I was
9 fine with him coming every other
10 **DENG** : yeh no (.) our apologies I wasn't aware that their was an
11 agreement like that erm I didn't know so he called me last minute
12 yesterday and you are going on Skype today ((smiles)) ha ha ha
13 **CDM** : right Okay
14 **DENG** : so my apologies
15 **CDM** : I mean at least we have got Skype working properly now so it's
16 not as bad as it has been but erm yeh just erm if if if you could
17 just erm one of yous be present at the next meeting
18 **CPM** : I think you need to minute that
19 **CDM** : yeh I will minute that erm
20 **DENG** : yeh yeh yeh I'll I will let Ian know as well (long pause)

The CDM commences the conversation by explaining to the junior DEng that an agreement had been made with his senior colleague that his colleague would attend the meetings in person “every other” meeting (lines 1 – 4 and 6 - 9), equating to once a month. Also, the senior DEng was expected to attend in person at this particular meeting. See lines 7 and 8 “... he did say to us that he would be here today ...”. The junior DEng immediately offers an apology (line 10) and goes on to state that “I wasn’t aware that there was an agreement ... I didn’t know” (line 11). He further elaborates and deflects the blame away from himself and towards his colleague by stating that “he called me last minute yesterday and you are going on Skype today” (lines 11-12). The junior DEng also smiles while speaking during this turn and ends the sentence with laughter. The laughter may suggest a need to relieve the tension or an attempt to gain support, or through nervousness or face-

saving. Whatever the intended function, the laughter is not reciprocated by anyone else in the group. When the humour and laughter are not reciprocated, this suggests the rest of the meeting participants might not want to demonstrate solidarity to the DEng. They do not support his position in the conflict. The CDM responds with a positive comment by acknowledging the Skype technology is at least working during this meeting (line15) and perhaps is looking to add a peacekeeping comment to relieve the conflict. Her response also requests reassurance from the DEng that "... erm yeh just erm if if if you could just erm one of yous be present at the next meeting" (lines 16 -17). Her response includes repeated words and stuttering, which suggests the CDM is uncomfortable with the conflict situation. The CDM's response could have signalled the end of the event. However, the CPM adds, "I think you need to minute that" (line 18). It is unclear what the CPM wants to be recorded in the meeting minutes. Perhaps, that the senior DEng has not attended the meeting, or perhaps that the CDM has raised the issue during this meeting. Recording a conflict conversation in the meeting minutes is generally considered a litigious act, which suggests that the statement by the CPM could be considered adversarial. As previously discussed, the event ends with a long pause, consistent with this kind of conflict event.

The conversation extract is linked to Extract 7.3 (see Figure 7.3) in that a subcontracted design practice is not fulfilling its duties to the project. The litigious statement made by the CPM, "I think you need to minute that" (line 18), perhaps reflects the cultural nature of the construction industry as adversarial and confrontational (Farmer, 2016). A problem is occurring in the team due to the designer not attending the meetings, and this problem needs to be addressed, but the question is whether the design meeting is the appropriate vehicle to voice a litigious response when the priority perhaps should be creating and fostering trust and psychological safety.

The longer-term effect of a key designer not attending the CIDMs is the impact on the interdisciplinary conversations that occur, or do not occur, during the meetings, ultimately resulting in the finished design. Atkinson and Westall (2010) emphasise how effective relations between designers and constructors are vital when striving for high levels of integration. Knotten *et al.* (2015) supports this view and stress the importance of effective communication, interface management and team management; in other words, managing the relationships and interactions between designers and constructors are key success factors to good design management. If designers are repeatedly not attending the CIDMs, knowledge sharing, problem-solving, and decision making will be negatively impacted. This may also create a growing feeling of frustration from the meeting participants who do attend the meetings as they view this as a critical group norm. Innes (2003) suggest that group norms aid the completion of tasks by supporting coordination through established ground rules. They pose that a further function of the group norms is to highlight deviant behaviour within the group when this kind of behaviour can have a detrimental impact on the task. The observations during the current study suggest that designers

repeatedly not attending the CIDMs could be classified as deviant and unacceptable behaviour which will inevitably negatively impact on the task of creating a coordinated project design.

The attempt to use laughter, perhaps to relieve the tension (Vinton, 1989), or to gain support (Meyer, 1997, 2000), or through nervousness or face-saving (O'Donnell-Trujillo and Adams, 1983) is typical during conflict events. This particular example in lines 12 and 20 by the DEng demonstrates when other group members do not support the laughter. No one else smiles, sniggers or laughs in response to the DEng's laughter. The lack of reciprocation suggests the rest of the meeting participants do not want to demonstrate solidarity to the DEng and do not support his position in the conflict. This is understandable since this is the seventh meeting observed for Case Study A, and the lack of attendance of the senior DEng has been a recurring problem. The lack of response to the laughter suggests the group is aware that the designer not attending the meeting is considered inappropriate behaviour in terms of the team's established group norms.

Conflict during collaborative working will be discussed next.

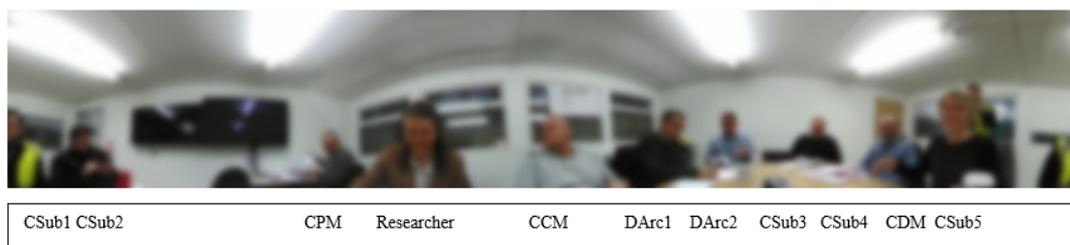
7.4 Conflict during collaborative working

During the meetings observed across the three case study projects, many examples of collaborative working were witnessed. The different design disciplines appeared to be comfortable and familiar with problem-solving design interface issues. Kiernan, Ledwith and Lynch (2019, p. 273) define task conflict during design meetings as "*A disagreement between team members about the task and where team members oppose the contribution of another*". Few examples of conflict occurred due to designers opposing the contribution of another designer specific to the design. This finding supports the findings by Gorse and Emmitt (2007). They observed live construction meetings, including design meetings and observed low levels of task conflict and interpreted this as an unexpected finding and acknowledged further research is needed. Kiernan, Ledwith and Lynch (2019) also observed live design meetings (not specific to the construction industry) and discovered that collaboration of interdisciplinary communications does not *always* require conflict to reach consensus when solving a design problem. Across the three case studies observed, the conflict that did occur during collaborative communications was generally created by either the process aspect of the design or the allocation of design responsibility. Deep, Gajendran and Jefferies, (2019) support the widely recognised view of the importance of collaborative working between design disciplines. Atkinson and Westall (2010) emphasise how effective relations between designers and constructors are vital when striving for high levels of integration. Knotten *et al.* (2015) stress that managing the relationships and interactions between designers and constructors are key project success factors. Authors such as Barrett *et al.* (2013) and Emmitt and Ruikar (2013) acknowledge the challenges that collaboration between designer and constructor creates. They highlight the high

dependency of effective management of the social process within the project team environment. Mehrbod *et al.* (2018) acknowledge that scant attention is being paid to behavioural approaches in understanding this critical relationship; instead, research predominantly focuses on operational improvements and technological advancement.

Extract 7.5 is a typical example of conflict that occurred during collaborative working when the issue of design responsibility creates conflict. Before this conversation extract, the team discussed for about ten minutes how to solve the problem of water ingress at an interface junction between the curtain walling and brickwork packages where a degree of movement of the building structure is expected. The meeting is being attended by the curtain walling and brickwork subcontractors responsible for the detailed design to allow for manufacture and installation. The meeting is also attended by the two project architects and the relevant constructors (i.e., project manager, design manager, construction manager). The conversation has so far been productive, with a variety of alternative solutions considered. The team has decided to manufacture a sample window to install on-site as a mock-up to test the detailed design for water ingress. See Figure 7.5.

Figure 7.5: Extract 7.5 Case Study C, meeting #3



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1  CDM : cause I am nervous about fixing the two together I think that'll
2      (.) don't know just doesn't seem to leave any movement between
3      the two systems
4  DArc1 : I would say that is the obvious place the only place you are
5          going to get movement isn't it
6  CPM : if something goes wrong it's who's fault is it
7  CDM : yep
8  CPM : that's the next thing isn't it
9  CDM : ooo we are always so positive aren't we
10 CCM : ((smiles))
11 DArc1 : ((smiles))ha ha ha
12 CDM : ((raises voice)) when it goes wrong who are we going to point the
13       finger at ((smiles)) ha ha
14 CSub1 : it just means there is a shadow gap then
15 CDM : I think that might be the best cause then it's also then allowing
16       the drainage
17 CSub1 : yeh
18 DArc : like you say it seals beyond that so
19 CDM : yeh yeh
20 DArc : that would be nice that's fairly easy
21 CDM : right they were the two critical things today

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The extract commences with the CDM sharing her concern regarding the design detail the team have been discussing in lines 1 - 3. The DArc1 provides reassurance by stating, “I would say that is

the obvious place the only place you are going to get movement ...” (lines 4 and 5). The DArcl then looks for reassurance with the phrase “isn’t it” (line 5). Up to this point, the ten minute conversation has been a productive collaborative, problem-solving exercise for the whole team. However, the CPM interjects with the statements in line 6. “if something goes wrong it’s who’s fault is it” and “that’s the next thing isn’t it” (line 8). He is referring to which subcontractor will take design responsibility if the interface design detail fails once the brickwork and curtain walling is installed. Although the CDM initially appears to support the CPM’s negative comment with “yep” (line 7), she quickly changes tactic and attempts to defuse potential conflict by injecting humour through the statements “ooo we are always so positive aren’t we” (line 9) and “when it goes wrong who are we going to point the finger at” (lines 12 and 13). The CDM also changes her voice to an upbeat tone. She smiles and laughs to communicate that she is joking. This change in communication climate could function to relieve the tension. Alternatively, she could be diverting the tone of the conversation away from the adversarial tone created by the CPM back to the environment of psychological safety present in the team during the collaborative conversation. The CDM appears to gain support from the CCM and the DArcl, who respond with smiles and laughter.

Interestingly, the adversarial comment by the CPM does not derail the conversation or convert the communication climate to being risk averse. On the contrary, from line 14 onwards, the conversation focuses on resolving the design detail, with positive and productive input from the CSub1, CDM and the DArcl. The ability of the team to not let the comment derail the collaborative atmosphere perhaps suggests a degree of cohesion in the group to want to resolve the problem with a practical and workable solution without being distracted by the potential contractual design risk. This observation suggests an existing level of psychological safety already exists in the team. Schein and Bennis (1965) propose that psychological safety reduces perceived threats. Edmondson and Lei (2014) describe how the presence of psychological safety changes people's perceptions of the consequences of taking interpersonal risks in a group setting. In other words, the group do not automatically become risk-averse because a team member makes a controversial comment. This appears to be the case with this specific conversation. The possible presence of psychological safety benefits the team by allowing the communication climate to remain productive rather than the negative effect of the conflict escalating, which could be a negative outcome during this meeting and possibly future meetings.

The point the CPM is making is an issue that will need to be addressed, perhaps contractually. The question is if the CIDM is the vehicle for this kind of statement when the function of the meeting is the coordination of the design and not the contractual arrangements between the parties involved in the design. The CPM’s statements perhaps reflect the cultural nature of the construction industry as adversarial (Farmer, 2016) in a similar way to Extract 7.4. line 18, “I think you need to minute

that". A project's quantity surveyor usually deals with contractual arrangements, and no quantity surveyor is attending this specific meeting. In fact, of the seventeen meetings observed, a quantity surveyor only attended two meetings, both for Case Study A. The inclusion of an adversarial comment is likely to hinder the interdisciplinary problem-solving process, which to operate at its best requires creative and innovative ideas (Eynon, 2013), which require an atmosphere of psychological safety.

A further consideration regarding Extract 7.5 is that it demonstrates a problem when attempting to categorise conflict behaviour in a construction culture-specific context in the ways that existing literature suggests, for example, categorising a conflict event as either task, or process, or relationship conflict (De Wit, Greer and Jehn, 2012). Alternatively, as functional or dysfunctional conflict (De Dreu and Weingart, 2003). By observing an authentic 'live' conflict event and applying conversation analysis using 360° video footage, which can be watched many times, it is apparent that Extract 7.5 could be categorised as task, process *and* relationship conflict individually and simultaneously. The team are discussing the task. The design responsibility could be interpreted as the task or the process (or both). The adversarial comment could be interpreted as a relationship issue because it refers to the parties involved' contractual relationship. Equally, the extract could also be categorised as functional *and* dysfunction (again, as one or both categories simultaneously), depending on who's perspective this interpretation is taken. The CDM appears to have considered the adversarial comment as dysfunctional, which is why she interjects humour to deflect the negative connotation. However, the CPM may consider his comment necessary and functional to allow later discussions to resolve the design responsibility issue. Choi and Cho (2011) acknowledge that the categorisation of task and relationship conflict events can be intertwined through the interpretation of the task communication by the individual. Still, the research does not consider process conflict or the added dimensions and complexities of a specific culture and context. These limitations reflect the methods used in previous research, such as requiring participants to retrospectively account for conflict situations or consider how they would hypothetically react to different events. Such approaches aggregate the conflict events as a whole. In contrast, by focusing on the granular detail of the live conflict event unfolding, it is clear that the events are more dynamic and turbulent, which likely go beyond the methodological scope of retrospective data collection. Existing literature suggests that different forms of conflict result in different positive and negative team and project outcomes. Therefore, more research is required to understand conflict behaviour's nuances that consider the construction industry's cultural and contextual aspects to understand the conflict's broader impact.

Conflict due to a design change request will be examined next.

7.5 Conflict due to a design change request

Conversation Extract 7.6 is a typical example of a conversation when conflict occurs between the constructors and designers due to a design change request relating to the differing priorities of the designers and constructors involved in the conversation. This example demonstrates traits identified by Eynon (2013) in his discussion of the “tribe of design” and the “tribe of construct”. Such as the constructors focus on practicality. The example also highlights a task conflict conversation that has potentially evolved into a relationship conflict event due to the behaviour of one of the actors involved. Tjell and Bosch-Sijtsema (2015) and Emmitt (2016) state how vitally important the effective management of the design process is to a construction project. Since the increase in popularity of contractor-led procurement routes (design and build), the requirement for effective design process management is widely acknowledged by authors such as Knotten, Lædre and Hansen. El Reifi *et al.* (2013) and Emmitt (2016). They agree that this management process is critical during the early design development phase due to its propensity to create certainty from uncertainty through an iterative process. Kelly, Morledge and Wilkinson (2002) raise the salient point that although the design process accounts for a relatively small proportion of the overall project cost, it significantly impacts project characteristics, construction, and life cycle success. Knotten, Lædre and Hansen (2017), supported by El Reifi, Emmitt and Ruikar (2013) and Emmitt (2016), acknowledge a lack of research in managing the construction design process from the perspective of the processes and the actors involved.

The conversation in Extract 7.6 occurred near the end of the third meeting observed in Case Study A. The main meeting agenda has already been covered, and the CDM has asked the CCM if he has any additional issues he would like to raise before the meeting closes. The CCM raises several design queries. Conversation Extract 7.6 is the last design query on his list. Please note, the DEng is attending the meeting via the telephone speaker on the table. The team failed to get the Skype software to operate. See Figure 7.6.

Figure 7.6: Extract 7.6 Case Study A, meeting #3



(DEng via speaker)	CCM	CDM	DArc	DMEP	Researcher
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1 CCM : and the last ones from me was drainage (.) erm whether this is
2 one that is worth us just having a chat offline with Ian but (.)
3 on erm on the internals there is a manhole that we manhole 3 that
4 we can't really see why it is required erm our preference is
5 always to get rid of as many internal manholes as we can they are
6 not particularly aesthetically pleasing and they just cause
7 hassle (.) erm Craig had commented back to John that we couldn't
8 remove manhole 3 (.) we just can't understand why not erm (.) it
9 is taking one soil stack it is why we can't put that soil stack
10 into one of the other manholes (.) erm I know Craig had mentioned
11 about it going against the flow but I think there is about four
12 or five manholes four or five pop ups in the basement that
13 already go against the flow so we we weren't sure why that one
14 then suddenly was the the one that would be the problem erm
15 DENG : Okay I will check with erm I will check with Craig but yeh he's
16 he's a very competent engineer erm but I will check
17 CCM : I'm I'm I'm not suggesting he is not Ian I am certainly not
18 DENG : yeh no no no that's fine but if he if he is saying it's required
19 then he probably has a reason to it but we need to finalise the
20 drainage seems to be a lot of things hanging around the drainage
21 design we've gone through it already erm
22 CCM : well we we can't
23 DENG : basically I just want to minimise the amount of work that we have
24 to do like you have mentioned the Northern Power stuff it seems
25 like it's something that we have to re-coordinate later now this
26 crops up but I will check with him what's the issue but it should
27 CCM : we we we
28 DENG : we should have a definite finished package
29 CCM : we made quite a few comments on the drainage drawing initially
30 erm and and to see if we could do some small alternations erm and
31 none of them have been incorporated I believe erm and and yeh
32 there is just a few of them from a buildability point of view it
33 makes it a lot easier from a maintenance point of view it makes
34 it a lot easier erm erm (.)
35 DENG : Okay I will check with Craig I will check with err Craig you said
36 manhole 3 okay
37 CCM : he'll he'll know which one it is ((smiles)) erm because of the
38 DENG : on the issue of the aesthetics I think all of all of the manhole
39 locations and covers have been coordinated with err your finishes
40 and floor tiling err Allan
41 CCM : yeh
42 DENG : is that correct
43 DARC : Eeerrr yes
44 CCM : it's just the the (.) as much as the eerrr they never look
45 particularly nice do they
46 DARC : lucky it's a back of house area which is the one saving grace

Figure 7.6 Extract 7.6 Case Study A meeting #3 continued

47 CCM : it is the one on the shower that they are wanting to get rid of
 48 DARC : yeh
 49 DARC : the the accessible shower
 50 CCM : ((points to a paper drawing))it's that one there
 51 DARC : alright
 52 CCM : so it's to take it from the bathroom and take it straight across
 53 so there is two in the shower at the minute and we just think
 54 that should be just be going straight like we should just be
 55 going from manhole 2 to manhole 4 (.) erm whether that soil stack
 56 then goes into manhole 1 1a or 2 it doesn't bother us erm but I I
 57 I from my point of view I can't get my head around why it can't
 58 erm
 59 DARC : ((points at paper drawing)) yeh you can get a direct connection
 60 into there is that right
 61 CCM : that's what we are thinking
 62 DARC : then you have got this stack which is hanging out
 63 CCM : so that either goes
 64 DARC : yeh
 65 CCM : into there into there into there like it it
 66 DARC : mmm
 67 CCM : I can't get my head round that one more than any of the others he
 68 has responded Ian with why he doesn't want to change it erm but
 69 manholes in (.) yeh manholes internally we we just don't like
 70 them if we can avoid them erm it just yeh it's a lot nicer it's
 71 just not erm (.) and I think that was about it from me (.) yeh
 72 that's it from me so

The CCM commences the conversation extract with a delayed pause which indicates some reluctance to discuss the design query at this point in time, “(.)whether this is one that is worth us just having a chat offline ...” (lines 1-2). However, the CCM continues with his turn and raises his design query. The CCM communicates the constructors want to understand why internal manhole 3 cannot be removed from the drainage design (lines 1 – 14). The description of the issue includes some hesitation and repeating of words, which suggests the CCM is uncomfortable with the situation. The DEng waits his turn to speak without interrupting the CCM and responds with the statement, “okay I will check with erm I will check with Craig but yeh he's he's a very competent engineer erm but I will check” (lines 15 and 16). The DEng is also showing signs of being uncomfortable with the situation. He changes the form of conflict from task conflict specifically related to the design to relationship conflict by personalising the conversation, naming the DEng “Craig”, and questioning Craig's competency. The CCM interrupts the DEng at this point to quickly clarify his position with line 17, “I'm I'm I'm not suggesting he is not Ian I am certainly not”. Again, the uncomfortable nature of the conflict is clear from the stuttering. The DEng then interrupts the CCM with lines 18 – 19, “yeh no no no that's fine but if he if he is saying it's required then he probably has a reason to it ...”. The DEng embellishes his reluctance to review the requirement for internal manhole 3 by stating that, “... we need to finalise the drainage seems to be a lot of things hanging around the drainage design we have gone through it already” (lines 19 – 21) and “basically I just want to minimise the amount of work that we have to do ...” (lines 23 – 24). It

is worth noting that this is the same DEng failing to attend the CIDMs in person discussed earlier in Extract 7.4.

Line 26 sees the DEng agrees to check the design issue regarding the problematic manhole. This suggestion could be the end of the conflict event since the DEng has agreed to review the drainage design as requested. However, the conflict continues by the CCM stating in lines 29 - 31, “we made quite a few comments on the drainage drawing initially erm and and to see if we could do some small alterations erm and none of them have been incorporated I believe ...”. The form of the conflict appears to have changed again to process conflict. The CCM suggests that reviewing and implementing design feedback from the constructors has not taken place. The CCM clarifies the changes as required for “buildability” (line 32) and “maintenance” (line 33) purposes. By stating these two specific requirements, the constructor suggests that the constructor’s design input has been ignored due to these issues traditionally being the priority of constructors, rather than designers, with the design. The DEng again responds by saying that he will “... check with Craig ...” (line 35). Again, the conflict event could end here. Still, the DEng decides to defend the drainage design against the CCM's point in line 6 regarding the “aesthetics” of the internal manholes. Lines 38 - 40, “on the issue of aesthetics I think all of all of the manhole locations and covers have been coordinated with err your finishes and floor tiling err Allan”. The DEng, “Allan”, and the CCM then continue the conversation about internal manhole 3 while referring to a paper copy of the drainage drawing in front of them in the meeting room. Since the DEng is attending the meeting via the telephone speaker, he cannot make any meaningful contributions during this part of the conversation. The DEng agrees with the CCM that, in his view, the problematic internal manhole could be removed by the DEng agreeing with the CCM's interpretation of the drainage layout, “yeh you can get a direct connection into there ...” (lines 59 – 60). The conversation extract ends with the CCM reiterating his initial points about wanting the internal manhole removed from the design. The DEng is silent until after line 38, and the conversation ends with a long pause which is characteristic of all of the conflicts presented in the earlier extracts.

Qualitative research by Vaux and Kirk (2018) suggests that relationship conflict in construction teams is partly sourced from an old-school attitude that still exists in the construction industry. Particularly between project management and subcontractors. Old-school being an attitude of “*fist-pounding, yelling and screaming*” and “*my way or the highway*” (Vaux and Kirk, 2018, p. 043018032-5). Combine this culturally complex and problematic environment with the deep-rooted stereotypes identified by Loosemore and Tan (2000) that exist between professional disciplines, and it is clear to see the benefits and challenges of establishing a working environment of trust and psychological safety, which Sun *et al.* (2015) highlights is essential for collaborative team working, especially to create an innovative design. Edmondson and Nembhard (2009) express that both designers and constructors need to trust each other and feel safe to offer diverse viewpoints, share

knowledge and learn from each other. Although conversation Extract 7.6 includes no evidence of an old-school attitude of “*fist-pounding, yelling and screaming*” or “*my way or the highway*”, it could be argued that the CCM is intent on controlling and dominating the conversation until the drainage design is revised to remove the internal manhole. This interpretation is based on the repeated number of times the CCM provided reasons why the manhole should be removed. For example, lines 4 – 14, 32 – 34, and 69 – 70. In sum, the point is not if an internal manhole should be kept or removed from the design. The point is that design change requests conversations are a vital coordination event during contractor-led design projects. The communication climate during these conversations needs to be examined in detail to understand how to effectively manage the differing priorities of the designers and constructors in terms of buildability and maintenance issues, and engineering and design best practices.

Gibb (1961) highlights positive and negative patterns of group communication behaviour. The study demonstrates how a communication climate can be created as either *supportive* or *defensive*. A *defensive* communication climate can be created from a discourse that aims to control or dominate the situation. Perhaps the DEng responds in an emotionally defensive manner (line 16) by changing the form of the conflict from task to relationship-focused because he felt the CCM was attempting to overly control the design to suit the priorities of the constructors rather than allow the design to reflect engineering best practice. Behaviour that includes an overly controlling or dominating communication climate may be categorised as dysfunctional conflict, which, in a work team, is problematic, according to Farh, Lee and Farh, (2010), if used as an opportunity to dominate the views of a team member. This kind of conflict can cause strong negative emotions and stress, negatively impacting the team's ability to perform a task. Wu *et al.* (2017) and De Wit, Greer and Jehn, (2012) agree that an adverse or negative communication climate can reduce productivity, lower social cohesion and increase conflict. Conversation Extract 7.6 raises an issue about contractor-led design and how the observed conversation could be better managed. The aim of interdisciplinary design between designers and constructors needs to ensure the best design is created. Any necessary satisficing results in good design, rather than designers or constructors emotionally feeling like they have won or lost a conflict event.

de Wit, Jehn and Scheepers (2013) researched whether team members are less likely to adopt the viewpoint of others during team decision-making if relationship conflict and task conflict are present. The authors identify that the presence of perceived relationship conflict during task conflict increases group members rigidity in holding onto suboptimal initial solutions during team decision-making which thus leads to poor decisions. However, an important limitation of the study by de Wit, Jehn and Scheepers (2013) is that the participants took part in a controlled exercise rather than a real-world situation. Extract 7.6 potentially demonstrates this scenario during an authentic meeting where task and relationship conflict is evident during a decision-making event.

Unfortunately, the fate of internal manhole 3 was not discussed again during the observed CIDMs therefore, the final decision to keep it or remove it cannot be discussed further. However, the detailed analysis of this conversation extract does suggest how the presence of relationship conflict during a task (and process) conflict event may create an emotional response that could negatively sway decision-making. The finding from the current study, which is based on observational ‘live’ data, indicates shortcomings in the findings of previous authors. A controlled exercise may not provide reliable results in this instance, and more understanding is required by applying an appropriate methodology and method that observes genuine behaviour in a ‘live’ organisational setting.

Conversation Extract 7.6 also demonstrates the additional level of complexity the physicality of the meeting brings to the social interactions of the group. The fact that the DEng attended the meeting via the telephone speaker rather than in-person meant that he could not participate in the discussion that focused on a paper copy of the drainage drawing. Alternatively, if the DEng has attended the meeting virtually, he could have viewed an electronic 2D or 3D version of the drainage drawing simultaneously with the other meeting participants. The physicality of meetings is a crucial factor to consider in terms of how productive the meetings are. Mehrbod *et al.* (2018) emphasise the importance of *how* designers and constructors communicate during design coordination meetings, including the use of 2D and 3D artefacts. They also acknowledge that scant attention is being paid to behavioural approaches in understanding this critical relationship; instead, research predominantly focuses on operational improvements and technological advancement. More understanding is required that links the use of 2D and 3D artefacts to meeting attendance in terms of in-person, virtual or hybrid attendance to design coordination and interdisciplinary meetings.

The negative use of humour and laughter will next be discussed. This section is the final section of this chapter.

7.6 Negative humour

Chapter 6 considers the positive impact of humour on social cohesion and the successful management of conflict events. During the three case study projects observed, humour directed at self or others usually involved positive interactions. However, some instances included potentially negative behaviour. Extract 7.7 is a typical example where the focus of the humour is negative. Greatbatch and Clark (2003) postulate that humour and laughter can function to manipulate relationships between individuals and groups. However, Evans and Steptoe-Warren (2015) found that negative humour is more likely to damage teams when used without positive humour styles. For example, where a manager uses primarily aggressive humour styles, subordinates often report them as weaker leaders and that their working environment is lacking.

The conversation Extract 7.7 took place during the first meeting observed of Case Study A. The senior design engineer has not attended the meeting in person and instead sent a junior designer as his replacement. The substitution of a junior colleague is frustrating to some of the constructors and designers attending the meeting. Therefore, the lack of attendance becomes an ongoing issue for Case Study A (see 7.3 Conflict due to a designer not attending the meeting for more discussion). Extract 7.7 is the end of a conversation about the numbering system of the drawings for the project. See Figure 7.7.

Figure 7.7: Extract 7.7 Case Study A, meeting #1



DMEP	DEng	CCM	Researcher	CDM	CPM	COS	CMEP	DArc
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1  CQS : I don't want to be particularly the one that says to
2      Robinsons "what's happening here lads? look we have been
3      told X, Y and Z" I don't want to be that person
4  DEng: yeh you should bring that up with Ian it's a bit out
5      of my (.) ((smiles)) ha ha ha
6  CQS : yeh we have got a meet- telephone conversation
7      this afternoon with Ian so Alex will bring it up with
8      him
9  DEng: yeh, yeh ((nods head))
10 DArc : I think in the spirit of the project for the sake of
11      changing some numbers, I think we should be rational urm
12      you know like I say I was going to have a chat with Ian
13      aside of this meeting but ((snigger/smiles)) he is
14      obviously he is elsewhere but yeah (.) fine
15  CQS : we agree with you on that
16  CDM : yeh h h h h h
17  DArc : h h h h

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The conversation extract commences with a statement by the CQS where he is communicating his frustration about the engineering design practice, “Robinsons”, who have not proactively aligned their drawing numbering system to the numbering system agreed by the main contractor (lines 1 – 3). The junior DEng responds to the conflict statement by diverting the problem towards his senior colleague, lines 4 – 5, “yeh you should bring that up with Ian it’s a bit out of my (.) ((smiles)) ha ha ha”. The use of a smile and laughter suggests the DEng is perhaps hoping to relieve the tension created by the conflict. Unfortunately, no other participants smile or laugh, suggesting that he has not gained support in the group for his situation. Lines 6 -7 is delivered by the CQS, “yeh we have got a meet telephone conversation with Ian ...” signals the issue he has that Ian has not attended the meeting in person by almost saying ‘meeting’ but correcting himself with “telephone conversation”

instead. This statement suggests that the contact is not through the norm of the regular meeting but a less preferable telephone call. The DArc supports the implicit suggestion of this statement in lines 12 – 14, "...I was going to have a chat with Ian aside of this meeting but ((sniggers/smiles)) he is obviously he is elsewhere ...". The CQS responds with an explicit response, "we agree with you on that" (line 15), which the CDM and DArc react to with "yeh" and sniggers. The DArc does not explicitly state words to the effect of 'he's not here, and he should be, and I have a problem with that'. Despite this lack of detail, the group seems to be sufficiently well aware that this statement is symptomatic of the frustration at the senior design engineer's lack of attendance, which is acknowledged by the laughter response by the CDM and the DArc (lines 16 – 17).

The non-attendance to the CIDM by a group member may qualify as a straining from the group norms (Hogg and Reid 2006). In this example, the group norm is the expectation that the designers will attend the meeting in person. The non-attendance by the senior design engineer results in frustration from constructors and a designer. Goncalo, Polman and Maslach (2010) suggest that when examining social interactions during the *forming* stage, group members get to know each other (socialisation) and establish group rules and norms. This early stage may include low productivity and a degree of social conflict as the groups move towards the *norming* stage when the group norms and relations have been established. Conversation Extract 7.7 is particularly relevant because this is the first meeting observed of this group and only the second CIDM that has taken place on this project. The humour usage here may also be a means to re-establish this group norm through ridicule in order to control the group behaviour, i.e., a warning to others (Janes and Olsen, 2000; Keyton and Beck, 2010). In this instance, the humour is perhaps a marker that there is some trouble happening with the group.

Creating humour directed at or connected to someone who is usually present at the meeting could pose problems in terms of the trust and psychological safety across the group if there is a concern that not attending the meeting might risk being spoken about negatively. The unsettling position is also reflected in the half-hearted use of humour here, which may function as a closing down of the awkward topic or as a resource to reduce the tension (Kangasharju and Nikko, 2009), face-saving (O'Donnell-Trujillo and Adams, 1983), or just as a means of relief (Meyer, 1997). It is noteworthy that despite evidence of cohesion, e.g., banter, in-jokes, and camaraderie, there are still instances of conflict within the team that are evident within the humour. However, this conflict does not grow to derail the meeting progress.

7.7 Summary

This chapter has partly addressed the fourth objective of the current research project, which is - *To extract from the meeting observations typical examples of social interaction events and to analyse*

these from the standpoint of theories of organisational behaviour. This chapter presents the intragroup conflict data and findings. Typical examples of conversation extracts have been presented and discussed in detail. The typical examples of intragroup conflict include conflict due to; late design information; designers not attending the meeting; collaborative working; a design change request, and finally, the presence of negative humour. Both verbal and physical information relevant to the conversations has been considered.

Overall, the findings suggest that social interactions may shape intragroup conflict during CIDMs. Firstly, this was observed by the conflict management strategies adopted by the participants. For example, the low or high concern for self and others drives the behaviour of participants involved with the intragroup conflict event. Conflict events appeared to de-escalate through the participants yielding (taking responsibility), problem-solving, and compromising, rather than avoiding (offering excuses), which created further conflict. The use of direct responses to answer direct questions, such as a revised date for design information, also looked to managed conflict events and reflected the constructor's preference for certainty and facts. The most regularly occurring form of intragroup conflict observed was process conflict. Few task or relationship conflict events were observed across the three case studies. No occurrences of old-school fist-pounding, yelling and screaming, and my way or the highway were witnessed. This observation supports the findings of other similar studies. Dysfunctional intragroup conflict events were also observed. These conversations contained litigious comments, unprofessional comments, and dominating leadership styles that do indicate a valid project-related problem and were unhelpful during the CIDM. This behaviour could hinder the team's social dynamics while fulfilling the primary function of the meetings, namely to coordinate and collaborate the project design. Humour and laughter were regularly observed to relieve tension during the meetings. However, this function of humour appears limited to less severe conflict events. When the conflict is more serious, the participants do not use humour. Negative aspects of humour were also observed, such as ridiculing team members for deviant behaviour (not attending the meeting). This negative social interaction could damage social cohesion by damaging the positive aspects of psychological safety and trust in the team. Finally, the physicality of the meeting room and the tools adopted by the participants have been included in the discussion and findings.

The following gaps in knowledge were identified in the chapter. Firstly, is enough task conflict present in the CIDMs to create a suitable environment for creative and innovative conversations? Next, a greater understanding is required of the implications of multi-team membership (MTM) in construction project teams, given the problems this form of team membership creates, for example, designers not attending the meetings. The findings in the chapter also question the applicability of established conflict theory relating to task, process and relationship conflict categorisation. Further examination is warranted whether individual conflict events can or should be categorised in this

way, as is a common preconception in the literature. A single event can represent more than one category, and the categorisation can vary depending on the perspective of the event. Finally, a greater understanding of the physicality of the meeting setting is required. This includes; the benefits and issues of virtual attendance, the use of laptops during meetings, and the utilisation of the 3D model to aid coordination and decision-making.

The findings from Chapter 5 – Social interaction overview, Chapter 6 – Social cohesion findings and discussion, and Chapter 7 – Intragroup conflict findings and discussion will next be drawn together and presented in Chapter 8 to consider the impact of the social interactions observed on team decision-making practice.

Chapter 8 Synthesis and discussion- Impact of social interactions on team decision-making

8.1 Introduction

The aim of the research is to investigate the impact of social interaction on decision-making in construction project design meetings. The following chapter will address the fifth objective - *To reconsider how episodes of social interaction are understood (by academics and practitioners) and the impact that they might have on group interaction during meetings while confined to those data and phenomena observed.* Chapter 5 presents an ethnographic account of the three case study projects' social interactions during the contractor-led design meetings (CIDMs) by providing an overview of the setting, the functions and structure of the meeting, the communication milieu, the group norms, and the presence of the two dominant social interaction dimensions observed in this study. The two dominant dimensions are social cohesion and intragroup conflict. Chapters 6 and 7 provide an analysis and discussion of typical social interaction behaviour selected using a thematic analysis approach. The examples of typical behaviour, presented as conversation extracts, have been analysed in detail to examine the team's behaviour during social cohesion and intragroup conflict events. The data analysis and discussion in Chapters 5, 6 and 7, and the theoretical background regarding work team decision-making presented in Chapter 3, will next be synthesised to consider the impact of the social interactions observed on team decision-making practice. The chapter includes a discussion of the impact of social interactions on team decision-making from the following perspectives; the impact of *process gain*; of *process loss*; of *social cohesion*; of *intragroup conflict*; and finally, of the *physicality* of the meetings.

8.2 The impact of *process gain* on team decision-making

Decision-making is a crucial function for a work team. According to Kerr and Tindale (2004), one of the main drivers for an organisation to use a team to complete a task is the ability of a team to make informed decisions based on a variety of perspectives and pooled knowledge compared to an individual. The process of solving problems and making decisions is a primary function of a CIDM. The ability to make effective decisions impacts the team's dynamics in completing the task and the social relations in the group. These dynamics will be evident in the social interactions and behaviour between the team members. The term *process gain* refers to the advantages of using a team (rather than an individual) to complete a task. Rajaram (2011) suggest the advantages of team decision-making include the ability of a team to pool knowledge, generate new ideas through group discussions, remember facts from a previous task, filter this information, and learn from mistakes. These are all essential aspects of CIDMs that need to be effectively managed. A range of behaviours were observed during the current study to suggest that *process gain* occurred during the

CIDMs. The first to be discussed is the generation of alternative solutions while making a team decision.

An important process of decision-making is the generation of alternative solutions before a decision is made. Tjosvold, Wong and Feng Chen (2014) consider that spending time discussing alternative solutions avoids premature consensus and stimulates critical thinking within a group. The behaviour during the current study included a variety of approaches relating to generating alternative solutions (for more information, see Chapter 5). The teams made many on the spot decisions when no alternative solutions were offered or invited. This practice appeared to be an effective use of the time during the meetings and is consistent with Boudeau's (2013) observations of similar CIDMs. As previously discussed, the duration of the meetings often felt too long to be productive. The use of on the spot decisions appeared to be appropriate if the team agreed that the solution was appropriate. The team displayed consensus-making behaviour which supports research by Kiernan, Ledwith and Lynch (2019) that consensus is reached through the team not offering objections to the decision when voiced, and the team generate no further discussion. Based on the observations of the current study, not every decision needs to generate alternative solutions. The teams appear able to make some decisions on the spot without alternatives, which appears to be an effective use of the meeting time.

A further aspect of *process gain* to be discussed relating to decision-making is the presence of positive group norms. To create an environment where all team members can interact in an agreed way, a team needs to develop group norms and rules to operate and behave. According to Hogg and Reid (2006), formal and informal norms and rules influence team communication, interactions, and behaviour (such as decision-making). The current study identifies a specific group norm that positively impacts team decision-making and the teams' general performance. The dominant group norm is the general atmosphere during the meetings (see Chapter 5 for a full description). As previously discussed, the atmosphere during the majority of CIDMs was predominantly informal. This informal classification is based on the relatively relaxed behaviour of the team members, who regularly adopt humour, banter and familiar behaviour, including the use of expletives, during the meetings (See Extracts 6.1 – 6.15). The observations suggest the informal atmosphere allows for generally open discussions when the participants can voice an opinion if they wish. A possible benefit of the informal behaviour observed is potentially creating and fostering social cohesion, which in turn may create an environment of psychological safety and trust. Frazier *et al.* (2017) highlight the benefits of creating an environment of psychological safety where participants are happy to share feelings and opinions, provide feedback, and admit mistakes without fear of negative consequences. Hira *et al.* (2012) identify that psychological safety can create an environment that allows for learning from failure, improving the team's performance over time. The researcher acknowledges that not all participants may feel an informal atmosphere is a positive

group norm. Individuals may view informal behaviour as lacking professionalism. They may consider conversations that include banter as time-wasting. However, no evidence during the current study supports this. Based on the observations of the three case studies, best practices may be achieved by the teams (and organisations) observing, formally acknowledging, and deliberately fostering positive group norms early in a team's development to establish the preferred behaviour and reap the benefit during the completion of the task. Further research is needed to appreciate the nuances of individual teams in specific settings to establish common group norms that contribute to effective working practices.

The final aspect of *process gain* to be discussed relating to decision-making is the more contemporary and evolving research movements in organisational behaviour is team demographic diversity (e.g., race, sex, age and education), linked explicitly to team performance. According to Shin *et al.* (2012), the research field of team diversity looks at how diversity influences collaboration, innovation and creativity. Research by Caruso and Woolley (2008) demonstrates the positive effect diversity can have on team performance, particularly the ability of a diverse team to generate a broader range of possible solutions to improve decision-making. The authors identify the crucial role of psychological safety in providing the necessary communication climate for a diverse team to thrive. An important and often criticised feature of the construction industry is its inherently fragmented structure. The fragmented structure results in a diversity of actors involved in the construction process and is usually regarded as problematic (see, most recently, Farmer, 2016). However, in terms of team demographic diversity, the presence of different disciplines with differing educational expertise is a positive factor (for more detail, see Chapter 5). As previously discussed, according to Eynon (2013), designers and constructors approach problems from different perspectives due to different backgrounds, cultures, and norms. These differences have the potential to create conflict, but the differences also promote creativity through diversity. Many observations were made during the current study of the potential benefits of interdisciplinary working and knowledge sharing by designers and constructors across the three case studies. The constructor input often focused on issues relating to time and buildability¹³. The individual designers represented their disciplines, focusing on design best practice, even when perhaps persuaded away from this by the constructors (for example, see Extract 7.6). This mix of priorities and perspectives provides the desired diverse environment for collaboration, which may create an innovative and sound design. The other elements of team demographic diversity, such as race, sex, and age, are outside the current research project scope. However, future research may examine these elements to understand how a wider diversity of team demographics could aid or hinder team performance in a CIDM setting.

¹³ Buildability refers to the extent the design of a building facilitates ease of the construction process.

In short, the impact of process gain on decision-making has been discussed. Best practice relating to the generation of alternative solutions before a decision is made was considered by formally acknowledging and deliberately fostering positive group norms early in a team's development to establish the preferred behaviour. Further research is needed that considers the context and culture of specific settings to recognise and encourage beneficial group norms that contribute to effective working practices. The advantage of the existing team demographic diversity based on different educational expertise is the ability of the teams to problem-solve based on different perspectives and priorities. The other elements of team demographic diversity, such as race, sex, and age, are outside the current research project scope. However, future research is required to examine these elements to understand how a wider diversity of team demographics could aid or hinder team performance in this setting.

8.3 The impact of *process loss* on team decision-making

Wu and Seidmann (2015) describe *process loss* as the disadvantages of teamwork compared to an individual completing the task. The disadvantages include issues concerning problems of completing a task and the social relations in a group. The impact of *process loss* can negatively impact a team's ability to make decisions, among other team working processes. The current study observed a variety of behaviours that could be considered *process loss*. The first to be discussed is the team demographic diversity.

Behaviour relating to team demographic diversity, as discussed by Shin *et al.* (2012) is present during the CIDMs through the differing educational expertise of the constructors and designers. This chapter has discussed the advantages of diversity in expertise in the team relating to decision-making and team performance. However, there are disadvantages created by team members failing to provide expert knowledge that is not shared by the rest of the team. For example, a key function of the CIDM is to solve design-related problems. During the early stage of the design process, the prevalent design issues are at the interfaces between the design disciplines, i.e., architectural, structural, civil engineering, and mechanical, electrical and plumbing engineering. Because the different disciplines have experienced very different educations due to their different fields of knowledge, the designers represent experts who possess knowledge only they bring to the meeting. This scenario creates both multidisciplinary and interdisciplinary conversations during problem-solving discussions. The current study included examples of highly specialist knowledge being shared by a designer (a multidisciplinary approach), as well as discussions when, for example, the architect offered a solution to a problem about the drainage, which is traditionally a civil engineering element and therefore an interdisciplinary approach was adopted. The constructors also contributed to problem-solving discussions, with predominantly comments regarding the design's buildability, health and safety, and programme (time) aspects. During the study, the observations

indicate how critical it is that each design discipline is represented at all the meetings. The representative from each discipline should not only be present but also be competent, experienced and have the required social skills to be part of group discussions to provide the expertise from their field. If, as was observed, designers fail to attend the meeting (see Extracts 7.4 and 7.7) or attend the meeting and contribute very little to the conversations, the quality and effectiveness of the team decision-making may be compromised. In particular, attendance at the meetings should perhaps be established as a group norm before the project commences. Further research is required that considers how discipline-specific expertise can be captured and utilised consistently to gain the full benefit of interdisciplinary and multidisciplinary team composition.

A critical decision-making process is generating alternative solutions before a decision is made. The behaviour during the current study included various approaches relating to decision-making, of which some of these approaches could negatively impact team decision-making. The teams made many on the spot decisions, and it has been acknowledged earlier in the chapter that this can be an effective practice if the team are in consensus that the solution is appropriate. The current study supports Kiernan, Ledwith and Lynch (2019) that consensus is reached when the team does not offer objections to the decision when voiced, and the team generates no further discussion. However, team decision-making without considering alternatives can limit the solutions and reduce a team's ability to create an innovative design. Tjosvold, Wong and Feng Chen (2014) consider that by discussing alternative solutions, a group prevents premature consensus and stimulates critical thinking. During the observations of the current study, the teams were observed considering a wide variety of alternative solutions for a wide variety of design problems (for more detail, see Chapter 5). Some design problems could result in 'minor' levels of risk to the project if a poor decision were made. On the other hand, some design problems may result in 'significant' levels of risk to the project if a poor decision was made. Both design problems that would result in significant and minor risk if a poor decision was made were debated at length. Both received no discussion, or the experts or wider group generated no alternative solutions. Furthermore, at no point during all seventeen meetings did the team formally invite the discipline expert to share their thoughts during these discussions. Contributions made during the discussions were left to whoever wanted to speak at the time, regardless of the level of risk presented by the problem being discussed. Based on the observations during the current study, the preference to generate alternative solutions to a design was ad hoc. No specific preference or pattern of behaviour emerged of discussing alternative solutions based on the risk to the project if a poor decision was made. Future research is required to understand how to recognise, distinguish (and prioritise) the difference between 'minor' and 'significant' decisions in order to balance the time given to generating alternative solutions.

A fundamental function of the CIDMs relating to decision-making is knowledge sharing by the designers and constructors to collaborate on the design effectively. During the current study, the meeting chair regularly asked the participants if they had any other issues or anything to add as part of the closing down of the meeting. But this practice did not invite further discussion of previously discussed issues (see Chapter 5.5 Group norms, for more detail). According to Gorse and Emmitt (2009), knowledge sharing needs to consider quiet, shy, or inexperienced team members to ensure they engage in group discussions. The observed behaviour of assuming all participants would participate in sharing knowledge and offering alternative solutions without a formal mechanism is perhaps an organisational, informal group norm since it was observed across all three case studies. Creating a mechanism where experts are formally asked to contribute while a conflict event is occurring may benefit projects and organisations. The observations of all seventeen meetings included the teams consistently moving into a different mood during conflict events. (For example, see Extracts 7.1, 7.2 and 7.3). The observations demonstrate how the atmosphere in the room consistently changed while a conflict event was occurring. An established group norm was observed that only the participants directly involved with the conflict spoke, and all other participants remained silent. During this scenario, it is unlikely that all experts would feel able to speak in front of the group due to the atmosphere in the room and the established group norm.

A further issue relating to the impact of *process loss* on team decision-making is the duration of the meetings. The average duration of the CIDMs observed was about two hours (with no comfort breaks). Some meetings lasted considerably longer. By the end of the meetings, the fatigue and reduction in energy were very apparent. Creating a mechanism for further discussion during the meeting might extend long meetings even further. However, the focus could perhaps be on improving the quality and value of the meeting while removing non-value adding tasks. One way of addressing this might include a change to complicated meeting agendas that repeatedly drive discussions of problems that cannot be resolved at the time (for more information, see Chapter 5). Further research is required that considers the non-value adding tasks taking place during CIDMs. By removing these tasks, more time could be available to improve the decision-making process during the meetings.

In summary, the impact of *process loss* on decision-making has been discussed. The disadvantages of the current team demographic diversity based on fragmented educational expertise and cultural differences are discussed. The current study observations highlight the need for representatives from each discipline to attend all the meetings, be competent, experienced and have the required social skills to participate in group discussions to provide the knowledge and experience required. Future research is required to understand how to recognise, distinguish (and prioritise) the difference between 'minor' and 'significant' decisions in order to balance the time given to generating alternative solutions. Further research is also needed that considers how to ensure

alternative solutions are generated during appropriate conversations, and in particular during conflict events, to improve the overall team decision-making during the CIDMs. Further understanding is also required regarding how discipline-specific expertise can be captured and utilised consistently to gain the full benefit of interdisciplinary and multidisciplinary team composition. A focus is required on improving the quality and value of the meeting while removing non-value adding tasks to create the necessary time in the meetings to expand the current decision-making process. Therefore, further research is required to identify the non-value adding tasks and processes during the CIDMs.

8.4 The impact of social cohesion on team decision-making

Beal *et al.* (2003) and Yang and Tang (2004) discuss social cohesion as a predominantly favourable and desired phenomenon relating to team performance. The observations of the CIDMs suggest that social cohesion is present, and it is observable through familiar behaviour i.e., familiar speak (see Extracts 6.1 and 6.2) and the use of expletives (see Extracts 6.3 and 6.4), humour, (see Extracts 6.5 – 6.12) banter (see Extract 6.13), and acts of solidarity, praise and support (see Extracts 6.14 and 6.15). These positive behaviours were observed to occur and to also take place without derailing the task-focused conversations or wasting time during the meetings. Social cohesion appeared to play an important role by contributing to a friendly and inclusive working environment where team members want to work as a team to complete the task. The environment is particularly crucial during CIDMs when participants representing different stakeholders are required to work together to develop the design of a project. Recent research by Feitosa *et al.* (2020) postulates that a supportive and encouraging communication climate can increase feelings of trust, which can lead to an environment of psychological safety and performance benefits for both teams and organisations. The present study supports these findings. The presence of social cohesion observed suggests an increase the levels of psychological safety, trust, and effective conflict management in the teams, which in turn may aid collaboration and the better integration of ideas. Decision-making could be positively impacted through the presence of social cohesion because team members feel able to contribute to discussions and share ideas without fear of ridicule or retribution, which might improve the quality of solutions offered and ultimately better decisions being made by the team.

The current study examined humour as a specific and significant contributor to social cohesion during the meetings. The findings illustrate the dynamic role that humour may play within meetings involving interdisciplinary members and how this can subsequently underpin ongoing tasks and decision-making. Plester and Sayers (2007) identify that humour and banter have traditionally been viewed as disruptive and hindering the core business of a meeting. However, their research supports the presence of humour and banter as enhancing organisational culture by facilitating the socialisation of work teams. Here, the construction project teams integrated humour

and banter within task and non-task focused conversations with little evidence of impairing progress. The use of specific aspects of humour—banter, in-jokes and humour directed at self and others, or the project—all might contribute to the development of social cohesion within the team and be marked as a measure of intragroup relationships and potentially the broader organisational culture. The findings support the research by Meyer (1997, 2000) which highlights the important use of humour in developing and maintaining social cohesion in project teams which aids unity and effective conflict management. During the observations, humour centred on predominantly task-focused conversations within the context of the meetings. There was little evidence of the negative consequences of this warned about by previous studies (e.g., Rogerson-Revell 2007). The observations support the work of Kangasharju and Nikko (2009) which suggests; a relationship between social cohesion and humour; humour can function to manage conflict without derailing the flow of the task-focused conversations and ultimately, humour and laughter is a resource that can improve the task performance of a team. Although humour through banter and directed at self or other, or the project, present junctions to foster social cohesion, some participants could see it as negative, mainly if those referred to are expected to attend the meeting but are not present. Overall, the presence of social cohesion may result in a positive impact on team performance.

A further impact of the presence of social cohesion, as observed during the study, is the potential increase in positive emotions. As part of a group setting, displays of positive emotions were evident alongside group members being open to sharing of unique information or knowledge, which, according to Emich (2014), is associated with an improvement in the team's overall decision-making ability. The current study highlights the possible increase in confidence felt by team members experiencing positive emotions through the presence of a positive working environment created through the psychological safety and trust created by the familiar behaviour, solidarity, praise and support, and the generally positive presence and functions of humour and banter. Furthermore, the increase in confidence which may have been created by psychological safety was observed through the increase in the team members' level of interactions in group discussions.

The pre-existence of social cohesion in a team is recognised by O'Neill, Allen and Hastings (2013) to aid conflict management. Dysfunctional intragroup conflict is generally accepted in academic literature as problematic to group performance (see de Dreu and Weingart, 2003). According to Vaux and Dority (2020) this is particularly acknowledged in the construction industry. However, de Wit, Greer and Jehn (2012) pose that if managed, conflict can be viewed as a catalyst for innovation and creativity. During the current study, designers presented incorrect design information to the group, for example see Extract 6.9. Rather than participants fearing the repercussions of the mistakes resulting in a conflict event, team members created humour, and the mistakes became the butt of the joke that may have fostered solidarity (i.e., oneness in the group) and, subsequently social cohesion, rather than creating conflict. According to Sun *et al.* (2015), the

ability of team members to disclose errors without fear reflects a high degree of perceived psychological safety in the team. Humour was also created based on the stereotypes of designers and constructors specific to the construction industry. These stereotypes are recognised by Loosemore and Tan (2000) to create intragroup conflict. However, the teams repeatedly used stereotypes to create humour. The use of humour to stop conflict escalating by relieving tension was observed many times across the case studies, but only for minor conflict events. However, Extract 7.6 demonstrates the benefits of social cohesion, specifically humour, to mitigate conflict is limited to relatively minor conflict events. When a serious conflict event occurs, the teams recognise the need for a more formal atmosphere when the use of humour and, interestingly the use of expletives, is no longer appropriate. More research is required that examines the presence of social cohesion to manage intragroup conflict to develop best practice that takes into account the contextual and cultural aspects of the setting. In sum, the use of humour as a moderator for conflict escalation is an essential area for further analysis, as the results suggest this can be a contributory factor in how teams can constructively respond to errors or problems and create collective solutions when members effectively utilise it. A future direction is to explore whether these findings are transferable to other meeting settings in the construction industry or the workplace more generally.

The presence of social cohesion in the teams during their early meetings was observed through the effective use of humour to mitigate conflict, even as early as the second meeting the team had met, (namely, Case Study A meeting #1). This presence of social cohesion behaviour suggests an existing level of social cohesion in the teams even though the teams were newly formed and, therefore, in the early *forming* stage of team development, according to Tuckman and Jensen (1977). This observation challenges the applicability of Tuckman's stages of the group development model in this context and during 'live' and authentic team behaviour. More research is required to understand if the Tuckman's model is sensitive enough to incorporate the contextual and cultural elements within a construction project setting when the team's organisations and the client expect a newly formed team to *perform* from the start of the team's life. In addition, an examination is required to consider if the cultural factors of temporary and multi-team membership (MTM) being the norm impacts on the behaviour of team members to commence effective team working before the traditionally considered stages of *forming* and *storming* have taken place. What the current study's observations suggest is that behaviour recognised as *forming*, *storming* and *norming* are all taking place simultaneously during the early meetings, in a more intertwined fashion, rather than a linear process, as Tuckman suggests. Having a greater understanding of team development can inform decision-making best practice, which is crucial during the early stages of a construction project's design process when many decisions are required to create certainty from uncertainty.

Conversely, literature suggests too much social cohesion can negatively impact a team's ability to make effective decisions due to *groupthink* (Janis, 1972). Janis identifies several flaws in a team suffering from *groupthink*, such as too much cohesiveness in the group. Janis describes *groupthink* as a psychological drive for consensus at any cost that suppresses dissent and the appraisal of alternatives in cohesive decision-making groups. Which is specifically relevant to the influence of social interactions on team decision-making. According to Jaeger (2020), one of the conditions that can foster *groupthink* is that too much stress is put on the group to make decisions. This stress can result in premature closure of decision-making, which is making a decision too quickly and failing to consider alternative solutions just to avoid a disagreement. *Groupthink* illustrates the intrinsic link between the social relations of a work team and the process of decision-making. The observations across the three case study projects provide no evidence of *groupthink*. The teams generally demonstrate effective collaboration and interdisciplinary working, which results in some generation of alternative solutions. The presence of banter suggests an atmosphere of friendly teasing that would be unlikely if the team culture was driven by a dominating need for consensus and a high level of stress. Although the teams demonstrate the presence of social cohesion, it does not appear in this study that this behaviour automatically creates the environment for *groupthink*. Further research is required to examine if *groupthink* might occur if the stress levels of the project team increase, for example, as the construction phase progresses.

To sum up, the impact of social cohesion on team decision-making has been discussed. The observations of the CIDMs suggest that social cohesion is present, and it is observable through familiar behaviour (i.e., familiar speak and the use of expletives), humour, banter, and acts of solidarity, praise and support. Decision-making may be positively impacted through the presence of social cohesion because team members feel able to contribute to discussions and share ideas without fear of ridicule or retribution, which could potentially improve the quality of solutions offered and ultimately better decisions being made by the team. The relationship between humour and team performance requires further research to understand the impact in this setting to inform best practice. An increase in positive emotions created by the presence of social cohesion potentially increases the amount of unique knowledge being shared and more team members interacting in group discussions which in turn may lead to higher quality decisions being made. The presence of social cohesion in the team behaviour may aid conflict management. However, as already noted, the presence of social cohesion in the teams during the team's early meetings challenges the applicability and reliability of Tuckman's stages of the group development model in this setting. More research is required to understand if the simplistic model demonstrates the contextual and cultural elements within a construction project setting when the team's organisations and the client expect a newly formed team to *perform* from the start of the team's life. In addition, an examination is required to consider if the cultural factors of temporary and multiteam membership (MTM) being the norm impacts on the behaviour of team members to

commence effective team working before the traditionally considered stages of *forming* and *storming* have taken place. The current study observations suggest that behaviour recognised as *forming*, *storming* and *norming* are all taking place simultaneously during the early meetings, in an intertwined, rather than linear process, as Tuckman suggests. Although the teams demonstrate the presence of social cohesion, it does not appear in this study that this behaviour automatically creates the environment for *groupthink*. Further research is required to examine if *groupthink* might occur later in the project if stress levels increase.

8.5 The impact of intragroup conflict on team decision-making

Effective team decision-making is crucial to the design process of a construction project. According to Tjell and Bosch-Sijtsema (2015), Emmitt (2016) and Knotten, Lædre and Hansen, (2017), the design of a construction project is critically important to its overall success and needs to be managed effectively. Critical to the development of the design is both the task-related and social relationships between designers and constructors during the design process. Knotten, Lædre and Hansen (2017) identify these relationships as historically fragmented but important elements necessary for successful team working. Including the ability to make good decisions. Farh, Lee and Farh (2010) pose that dysfunctional or unhealthy intragroup conflict can damage trust and psychological safety, which Sun et al. (2015) highlight is essential for collaborative teamwork, especially to create an innovative design. Edmondson and Nembhard (2009) express the view that both designers and constructors need to trust each other and feel safe to offer diverse viewpoints, share knowledge and learn from each other. It is these collaborative processes that impact the ability of the team to make good decisions. The current study identified a range of reasons why intragroup conflict is occurring. These reasons included conflict due to late design information, designers not attending the meeting, conflict during collaborative working, and conflict during a design change request conversation.

Farmer (2016) acknowledges that the UK construction industry is overly adversarial and confrontational. The current study presents examples of adversarial and confrontational behaviour across the three case studies where problematic behaviour includes examples of ridicule words (see Extract 7.3), litigious actions (see Extract 7.4) and adversarial comments (see Extract 7.5) during the meetings. The broader context of this behaviour highlights potentially genuine problems with the projects, i.e., design risk. However, the timing of the comments during a CIDM could damage the social relations of the team and reduce the social cohesion and, therefore, potentially the trust and psychological safety in the group that is critical to encourage a collaborative and positive working environment necessary for good decision-making. The use of negative humour directed at someone not at the meeting who should be (see Extract 7.7) could also be considered unhealthy conflict, which may damage the group's social relations and reduce the team's ability to work

together. A further example of potentially unhealthy conflict is controlling behaviour to force a design change (see Extract 7.6). According to Farh, Lee and Farh, (2010), controlling behaviour can cause strong negative emotions, stress and negatively impact social cohesion and the team's ability to perform a task, such as decision-making. de Wit, Greer and Jehn (2012) suggest that instead of focusing on the task, if discussions become excessively emotional, or clashes between team members occur because of high levels of relationship conflict, perhaps generated from lack of trust, decision-making will be negatively affected. Overall, although dysfunctional and unhealthy behaviour was observed, it did not occur regularly and to the extent suggested by existing literature. A positive observation was the reaction by the rest of the meeting participants during the unhealthy conflict events, which was typically to either ignore the comment (see Extract 6.7) and allow the conversation to move on or not let the comment escalate to create a serious conflict event (see Extract 7.5). More research is required that specifically explores the presence of dysfunctional and unhealthy conflict during 'live' meetings to understand its impact on team performance. Based on the observations of the current study, consideration needs to be given for best practice to avoid unhealthy comments during design coordination settings and consider which setting they could add value. This behaviour change might protect the positive collaborative working environment essential for design coordination and development conversations to occur. Further ethnographic research is also needed that questions when and where overly adversarial and confrontational behaviour is taking place on projects. Other studies of 'live' construction and design meetings agree that these problematic behaviours occur but not at the levels literature that views the construction industry as a whole might suggest.

So far, the discussion has focused on the negative impact of intragroup conflict on the team's ability to make decisions. However, de Wit, Greer and Jehn (2012) highlight that disagreements and constructive task conflict can help stimulate thinking and can lead to a richer generation of ideas by the team. Kiernan, Ledwith and Lynch (2019, p. 273) define task conflict during design meetings as "*A disagreement between team members about the task and where team members oppose the contribution of another*". Kiernan, Ledwith and Lynch (2019) observe that interdisciplinary communication collaboration does not always have to require task conflict to reach a consensus when solving a design problem. This supports the findings by Gorse and Emmitt (2007) during a similar study of 'live' construction and design meetings. The current study observed very few examples of task conflict according to this definition, the teams generally collaborated without disagreements or opposing the contributions of others. The question, therefore, is what kind of conflict and what level of conflict is the most productive to result in open discussions, creative conversations and innovative design? The observations of the current study suggest further understanding is required to propose an effective level and type of task conflict that does not simultaneously create relationship conflict and reduce the team members' satisfaction. Task conflict that results in relationship conflict for any of the participants involved will most

likely have a negatively impact the team's ability to exchange and discuss information and make good decisions.

To summarise, the impact of the intragroup conflict has been discussed. The current study identifies a range of reasons why intragroup conflict is occurring. The current study also identifies specific examples of adversarial and confrontational behaviour where problematic behaviour includes examples of ridicule words, litigious actions and adversarial comments during the meetings. Further consideration needs to be given for future best practice to ensure unhealthy comments are avoided during design coordination meetings. Consideration is required as to when litigious actions and adversarial comments should be dealt with and can therefore add value to the management of the project. Further research is also needed that questions when and where overly adversarial and confrontational behaviour are taking place on projects outside CIDMs. Other studies of 'live' construction and design meetings agree that these problematic behaviours occur but not at the levels literature that views the construction industry as a whole might suggest. The current study observed very few examples of task conflict. The teams generally collaborate without task conflict. The observations of the current study suggest further understanding is required to propose a beneficial type and level of task conflict that does not simultaneously create relationship conflict and reduce the team members' satisfaction. Task conflict that results in relationship conflict for any of the participants involved will negatively impact the team's ability to exchange and discuss information and make good decisions.

8.6 The impact of the physicality of the meetings on team decision-making

The observations of the current study have focused on the social interactions, including verbal and non-verbal exchanges and reactions between the meeting participants. The physicality of the meeting refers to the non-verbal aspects of the observations, for example, the physical setting (the meeting room), the physical presence of the participants (in-person or virtual), the use of physical artefacts (2D paper drawings and the 3D model on the monitor and the physical movements of the participants (body language). (For more information, see Chapter 5). According to Mehrbod *et al.* (2018), literature that focuses on the physicality of a meeting setting, specific to the construction industry, is scarce. Gorse and Emmitt (2007) acknowledge the importance of observing the physicality of the participants and the space during an observational study of construction meetings. Through the innovative use of a 360° panoramic camera that recorded the 'live' meetings, and allowed the recordings to be watched numerous times, the physicality of the setting was captured and is part of the analysis. This ability to repeatedly observe behaviour would not be possible from field notes alone or audio-only data collection methods. The "central" positioning of

the camera also aids the capture of the action taking place directly in front of the camera. Various aspects of the setting impact the team's ability to make decisions. The first to be discussed is the use of 2D and 3D information.

Mehrbod *et al.* (2018) emphasise the importance of *how* designers and constructors communicate with each other during design coordination meetings, including the use of 2D and 3D artefacts. During the current study, 2D information, usually in the form of A3 paper copies of larger drawings were used as tools to discuss the design. On only two occasions during the seventeen meetings observed, the 3D Building Information Model (BIM) was utilised to discuss and make detailed design decisions, even though all three case study projects had a 3D model. Both times it was shared on the meeting room monitor, and both times the designer acknowledged the model was several weeks out of date. This use of 2D rather than 3D information is acknowledged perhaps as a cultural issue or as a practicality issue based on the limitations of the 3D model at any given time and the limitations of the hardware in the meeting rooms. The limitations and impact of trying to share, often A3 paper drawings, during the meetings became apparent in various situations during the observations. For example, the number of meeting participants ranged between five and twelve. Using an A3 paper drawing as the focus of the discussion of a large group of people is not practical. More research is required that considers the barriers to fully utilising the 3D model during CIDMs. This research could pave the way for a move towards more decisions based on this superior level of information than traditional 2D paper drawings.

Further consideration of the physicality of the meetings is the use of mobile phones and particularly laptops during the meetings. The use of both devices by meeting participants was observed consistently across the CIDMs observed and considered an agreed group norm even though the devices appeared to distract the participant on occasion. Given the advancement in virtual design meeting practice driven by the COVID-19 pandemic since the meetings were observed in 2018, further consider how the meetings can utilise laptop technology is required. For example, access to the 3D BIM module and other relevant information could be made consistently accessible to all the participants during the CIDMs if all participants have access to a laptop during the meeting (either in the same location or different locations or both). This change to the traditional physicality of the meeting room may improve design coordination and design interface problem solving and decision-making conversations. Given the issues the teams experienced with designers not attending the meetings, the use of virtual meetings may increase attendance while reducing the need for designers to travel to different projects located a long distance away, which appears to be a challenge due to their multiteam membership (MTM) status. During the current study, the attitude of the constructors towards virtual attendance was negative due to the technical issues this form of attendance presented. During the COVID-19 pandemic, it is likely that constructors would have needed to change this attitude due to working restrictions, and it will be interesting to see whether

when these have been reduced, and there is an increase in face-to-face meetings will they see a return to those previous attitudes. In terms of the physicality of the meeting, the advantages of easier access to the 3D model and other relevant digital information should be considered by organisations and project teams to increase the use of virtual or hybrid meeting formats for CLDMs after the COVID restrictions have been fully relaxed.

In short, the impact of the meetings' physicality has been considered as an impact on team decision-making. Existing literature that focuses on the physicality of the meeting setting, specific to the construction industry, is scarce. During the current study, 2D information was utilised during most of the meetings observed. However, the 3D Building Information Model (BIM) is rarely utilised to discuss and make detail design decisions, even though all three case study projects had a 3D model. More research is required that considers the barriers to fully utilising the 3D model during CLDMs. In terms of the physicality of the meeting, the advantages of more accessible access to the 3D model and other relevant digital information should be considered by organisations and project teams. This step-change in using virtual or hybrid meeting formats for CLDMs could improve the ability of the teams to make better-informed decisions.

8.7 Summary

The data analysed in Chapters 5, 6 and 7, and the theoretical background regarding; the construction industry context in Chapter 2, and work team decision-making presented in Chapter 3, have been drawn together to consider the impact of the social interactions observed on team decision-making practice. The impact of social interactions on team decision-making has been discussed. The impact of a variety of issues has been discussed that may impact team decision-making, including the impact of *process gain*, the impact of *process loss*, the impact of social cohesion, the impact of intragroup conflict, and finally, the impact of the physicality of the meetings.

Chapter 9 Conclusions

9.1 Introduction

The current study's findings identify how social interactions shape the decision-making process through the communications and relationships between group members during team decision-making meetings. At a theoretical and practical level, the study adds to the understanding of social cohesion and intragroup conflict in the workplace setting through the naturalistic data collection method of video ethnography.

In this chapter, the study aim and objectives are addressed. Then, the contribution to knowledge the research provides in terms of theory and method are presented. Finally, to conclude, consideration is given to the study's limitations.

9.2 Addressing the aim and objectives

The research aimed to investigate the impact of social interaction on decision-making in construction project design meetings.

The following objectives represent the steps the research project has taken to achieve the aim.

The first objective was:

- 1. To review the relevant literature on project work teams, specifically in the construction industry, to provide a theoretical background of knowledge and theory pertinent to examining its social interactions.*

Chapter 2 addresses this objective by reviewing the relevant literature about project work teams, specifically in the construction industry. Firstly, the traditional approach to work teams was examined. Consideration was given to why this approach has changed in recent decades. The background of the construction industry as a project-based industry was reviewed and, the construction industry's unique characteristics regarding the designer-constructor interface, team membership and current understanding of social interaction behaviour were discussed.

Gaps in existing knowledge were identified regarding; the construction design process from the perspective of the processes and the actors involved; the relationship between design and construction subprocesses; behavioural approaches in understanding how and where designers and constructors communicate, including the use of 2D and 3D artefacts; intragroup conflict created by deep-rooted cultural aspects, connected explicitly to stereotypes and the “tribes” of design and construct; the impacts of temporary and interdisciplinary team membership; whether teams are

making essential project decisions based on specialist knowledge or the opinions of the team members with the dominant social skills; the social implications of multi-team membership; the social interactions during design coordination and management process, the forms, and functions of communication during CIDMs; how a team's social interactions impact task-based and non-task based discussions; the surprisingly low levels of task conflict between designers and constructors during CIDMs; the presence and potential impact of conflict during construction meetings to postulate the impact on collaboration and team decision-making; and lastly, the role of humour in construction teams.

The significance of identifying the gaps in existing knowledge was identifying the appropriate unit of analysis, namely, the contract-led design team meetings of design and build procured projects during the early design phase. By selecting CIDMs as the unit of analysis, a deep investigation of this setting has been carried out to further knowledge of the coordination and collaboration of construction project design. The data for the research has captured the designers and constructors authentic social interactions and behaviour during 'live' meetings. Case study projects have been selected of projects procured using a design and build form of contract where the main contractor is responsible for the design. The early project design phase has been the focus of the observations to represent the most complex design phase when certainty is required from uncertainty.

The second objective was:

2. *Having identified contractor-led design meetings as the most appropriate setting to observe such social interactions, to identify the dominant and recurring themes and patterns of social interaction behaviour during these meetings.*

A longitudinal, observational approach to the data collection has been adopted to capture the dynamic social relationships across time and in-situ to provide a more authentic construct of the team social relations than a quantitative cross-sectional snapshot approach. The current research project adopted a video ethnography approach to observe the meetings during the early phase of the design process. The primary data of 360° panoramic video footage and the supplementary data of field notes and meeting minutes were collected over ten months. A total of seventeen CIDMs were observed, totalling thirty-four hours.

A thematic analysis of the primary data (video) and supplementary data (field notes and meeting minutes) identified the social interaction themes and patterns of behaviour during the CIDMs, to inform the selection of typical social interaction events. From the range of themes observed, social cohesion and intragroup conflict behaviour were identified as the most recurring and dominant themes observed during the CIDMs. The significance of this finding is that the general themes were

presented as a thick description in Chapter 5 to provide a context to the study, and the two dominant themes were analysed in detail in Chapters 6 and 7, respectively. With the patterns and themes of behaviour identified, the third objective was;

3. *To review relevant literature about the themes of social interaction behaviour and team decision-making, from theories found within the field of organisational behaviour.*

Chapter 3 addressed this objective by reviewing the relevant literature regarding work team characteristics and social interaction dimensions pertinent to the research project scope.

Organisational behaviour literature was reviewed in the following areas; work team characteristics, work team dimensions, and decision-making. The review of literature identified gaps in knowledge that require further research, such as an investigation of; the dynamic relationships of work team' complex social systems, including the impact of multi-team membership (MTM); the behaviour of "real" teams in-situ, for example, by applying an ethnographic approach; interdisciplinary teams that are expected to *perform* during the early stages of the team's life; the role of humour in a natural organisational setting, including the presence of banter; the presence and impact of team social identity; the longitudinal understanding of team psychological safety and trust based on a novel and less obtrusive approach than previous research; the impact of task, process and relationship intragroup conflict on team decision-making based on an authentic, longitudinal view of behaviour and the influence of conflict management strategies on team behaviour, and final, the impact of team diversity on decision-making.

The significance of establishing a background of theory and knowledge found within the field of organisational behaviour was that the literature review provided a lens to understand, structure and analyse the data. Once the theoretical background was established, the fourth objective was;

4. *To extract from the meeting observations typical examples of social interaction events and to analyse these from the standpoint of theories of organisational behaviour.*

Chapter 5 provided an overview of the meeting observations, including verbal and non-verbal exchanges and reactions between participants that reflect the relationships in the group during task-orientated and non-task discussions. The field notes and meeting minutes were thematically structured to identify the general themes of behaviour during the meetings. The general themes were viewed through the lens of knowledge and theory from construction-specific literature (see chapter 2) and organisational behaviour literature (see Chapter 3). The literature allowed the researcher to view the data through a lens to investigate the social interactions during the meeting setting. A thick description presented an overview of the general themes, which included the design

meeting setting, the meetings' functions and structure, the communication milieu and practice, the group norms, the presence of social cohesion, and the presence of intragroup conflict.

The meeting overview identified the following areas that require further investigation; the physicality of the meeting setting, including access to digital information; the impact of Covid-19 on virtual meeting attendance; the impact of acknowledging positive behaviour on team performance; why designers are not attending the CIDMs; how to maximise the time during the CIDMs to increase the value, and remove wasteful discussions; the use of alternative solutions while making team decisions; and the impact of the different stages of team development on team behaviour. The significance of identifying these areas for further research is that they were structured and presented in Chapter 9.

Both Chapter 6 and Chapter 7 also addressed this objective. Firstly, Chapter 6 presented and discusses, in detail, typical examples of social interaction events identified during the thematic analysis. The analysis reflects theories found within the field of organisational behaviour and the knowledge and experience of the researcher. Chapter 6 discussed and presented the findings of the following sub-themes of social cohesion, namely, familiar behaviour, humour, banter, and solidarity, praise and support. Both verbal and physical information relevant to the conversations was considered.

Overall, the findings from Chapter 6 suggest that social interactions may shape social cohesion during CIDMs through the creation and presence of trust and psychological safety that are apparent from the familiar behaviour of the teams. Familiar behaviour is observable through familiar speak, the use of expletives, and the presence of banter. The existence of trust and psychological safety might allow the teams to disclose errors without fear of repercussion. The use of expletives appears to enrich group-level communication during difficult discussions as well as foster a sense of social identity. The use of humour may also encourage a sense of social identity, which helps team bonding. Humour appears to relieve tension and de-escalate potential conflict events. The inclusion of humour based on construction industry cultural stereotypes is surprising, given that these stereotypes are generally considered to harm interpersonal relations. However, the shared knowledge specific to the team the stereotypes create appears to bond the teams together through being part of an industry-wide in-joke. However, humour can also be used to ridicule, which, although it may increase social cohesion, could harm group norms long-term if negative behaviour is seen as acceptable. Finally, although instances of solidarity, praise, and support were observed, this was not frequent. It could be argued that an increased level of solidarity, praise, and support could further increase the levels of social cohesion in the teams. Overall, the observations suggest that social interactions relating to social cohesion benefit the team performance and, therefore, the

project. The teams remain focused on the task during the meetings and are not derailed by social interactions that foster social cohesion.

The following gaps in knowledge were identified during Chapter 6. They include a requirement for; a greater understanding of the functions of humour in organisational settings; an examination of the links between humour and conflict management; an investigation of the benefits and disruptive influence of banter; an understanding of why occurrences of solidarity, praise and support are rare, and the impact of increased occurrences on team performance, and an exploration into the impact of a meeting room's physical attributes on the performance of the meeting.

Chapter 7 presented the intragroup conflict data and findings. Typical examples of conversation extracts were presented and discussed in detail. The typical examples of intragroup conflict included conflict due to; late design information; designers not attending the meeting; collaborative working; a design change request, and the presence of negative humour. Both verbal and physical information relevant to the conversations was considered.

Overall, the findings from Chapter 7 suggest that social interactions may shape intragroup conflict during CIDMs. Firstly, this was observed by the conflict management strategies adopted by the participants. For example, the low or high concern for self and others drives the behaviour of participants involved with the intragroup conflict event. Conflict events were de-escalated through the participants yielding (taking responsibility), problem-solving, and compromising, rather than avoiding (offering excuses), which created further conflict. The use of direct responses to answer direct questions, such as a revised date for design information, also managed conflict events and reflected the constructor's preference for certainty and facts. The most regularly occurring form of intragroup conflict observed was process conflict. Few task or relationship conflict events were observed across the three case studies. No occurrences of old-school fist-pounding, yelling and screaming, and my way or the highway were witnessed. This observation supports the findings of other similar studies. Dysfunctional intragroup conflict events were also observed. These conversations contained litigious comments, unprofessional comments, and dominating leadership styles that may indicate a valid project-related problem and were unhelpful during the CIDM. This behaviour could hinder the team's social dynamics while fulfilling the primary function of the meetings, namely to coordinate and collaborate the project design. Humour and laughter were regularly observed to potentially relieve tension during the meetings. However, this function of humour appears limited to less severe conflict events. When the conflict is more serious, the participants do not use humour. Negative aspects of humour were also observed, such as ridiculing team members for deviant behaviour (not attending the meeting). This negative social interaction could damage social cohesion by damaging the positive aspects of psychological safety and trust in

the team. Finally, the physicality of the meeting room and the tools adopted by the participants have been included in the discussion and findings.

The following gaps in knowledge were identified during Chapter 7. Firstly, the current study supports the findings of other similar studies that only low levels of conflict occur during CIDMs. This finding warrants the question of whether enough task conflict is present to create a suitable environment for creative and innovative conversations. The conflict events discussed in Chapter 7 also highlight broader issues regarding social interactions while adopting multi-team membership (MTM) that require further research, such as lack of attendance at the meetings. The discussion and findings also question whether individual conflict events can or should be categorised as either task, process or relationship, as is a common preconception in the literature. A single event can represent more than one category, and the categorisation can vary depending on the perspective of the event. Further research is required that examines this dimension of team behaviour. Furthermore, a greater understanding of the physicality of the meeting setting is required. This includes; the benefits and issues of virtual attendance, the use of laptops during meetings, and the utilisation of the 3D model to aid coordination and decision-making.

With a detailed analysis of ‘typical’ examples of social interaction behaviour complete, the final step was objective five:

5. *To reconsider how episodes of social interaction are understood (by academics and practitioners) and the impact that they might have on group interaction during meetings while confined to those data and phenomena observed.*

Chapter 8 has drawn together the theory and knowledge presented in Chapters 2 and 3, and the discussion and findings presented in Chapters 5, 6 and 7, to provide a discussion of the impact of social interactions on theoretical team decision-making. The discussion is limited to the data and phenomena observed and does not attempt to generalize the findings or suggest best practice beyond the case studies observed. Chapter 8 included a discussion from the following perspectives; the impact of *process gain*; of *process loss*; of *social cohesion*; of *intragroup conflict*; and lastly, of the *physicality* of the meetings.

Overall, the findings from Chapter 8 suggest that, firstly, during the meetings observed, process gain may impact decision-making through the generation of alternative solutions and the existing team demographic diversity based on different educational expertise. The impact of *process loss* on decision-making includes the potential disadvantages of the current team demographic diversity based on fragmented educational expertise and cultural differences. The current study observations highlight the need for representatives from each discipline to attend all the meetings, be competent,

experienced and have the required social skills to participate in group discussions to provide the knowledge and experience required. Decision-making is also potentially positively impacted through social cohesion by team members contributing to discussions, sharing ideas without fear of ridicule or retribution, and effective conflict management. The presence of social cohesion in the teams during the team's early meetings challenges the applicability of Tuckman's stages of the group development model in this setting. The current study observations suggest that behaviour recognised as *forming*, *storming* and *norming* are all occurring simultaneously during the early meetings, in an intertwined, rather than linear process, as Tuckman suggests. The impact of the intragroup conflict on decision-making identified examples of adversarial and confrontational behaviour. Further consideration needs to be given for future best practices to ensure unhealthy comments are avoided during design coordination meetings. And finally, the impact of the meetings' physicality has been considered as potentially having an impact on team decision-making, relating to the use of digital information to make decisions.

9.3 Contributions to knowledge

The following are the contributions to knowledge provided by the current study. The contributions are divided into two areas, theory, and method.

9.3.1 Theory

The findings of this study provide a greater understanding of the theories regarding social cohesion, intragroup conflict, and team decision-making. An example of specific contribution to theory includes identifying the limitations of the previously established categorization of intragroup conflict as task, process, or relationship (see De Wit, Greener and Jehn, 2012), or alternatively, as functional or dysfunctional (see De Dreu and Weingart, 2003). The ethnographic approach of the current study and the use of the 360° panoramic camera allowed a deep analysis of the intragroup behaviour during the meetings. This approach subsequently allowed the specific culture and context, as well as the detailed conversation turn-taking during the meetings, to be repeatedly observed. The limitations of the existing theory perhaps reflect the methods used in previous research. Such as requiring participants to retrospectively account for conflict situations or consider how they would hypothetically react to different events. These approaches aggregate the conflict events as a whole. In contrast, by focusing on the granular detail of the live conflict event unfolding, it is clear that the events are more dynamic and turbulent, which likely go beyond the methodological scope of retrospective data collection.

Another specific example of a contribution to theory of the current study is the identification of the limitations of the Tuckman and Jensen (1977) stages of team development model. The

presence of social cohesion, effective conflict management, and team performance during the early stages of a team's life calls into question whether the Tuckman model is sensitive enough to incorporate the contextual and cultural elements in the setting, when organisations and teams of newly formed projects are required to *perform* from the start. The observations suggest that behaviour recognised as *forming*, *storming*, and *norming* occur simultaneously during the early meetings, in a more intertwined fashion, rather than a linear process, as Tuckman and Jensen suggests.

To utilise the current study's findings, Recommendations for future study (see Table 9.1) captures the new questions the current study identifies to provide a clear strategy for further research in a construction context and a broader team decision-making environment.

9.3.2 Method

The novel use of a 360° panoramic camera positioned to capture a new “central” perspective of activity is an original contribution to method. The camera proved essential in the current study to record the participants' verbal and non-verbal behaviour and relationships simultaneously. As a discrete technology, the camera has excellent potential for future research in organisational settings where participants are gathered around a central location. The current study identified the advantages of using the camera rather than an audio recorder (see Table 4.6) and a summary of issues encountered while using the camera (see Table 4.7).

The data analysis process is also a new method and unique to this study. The process incorporated the researcher attending the meetings in person, and recording the behaviour using the 360° panoramic camera. The repeated viewing of the video footage allowed for the creation of detailed transcriptions of ‘typical’ events (selected from many hours of data). The transcriptions were presented using the Jeffersonian Lite system, which includes not only *what* is said but *how* it is said and the relevant actions of any of the participants. The researcher then deconstructed the transcripts and utilised discursive devices as ‘clues’ to analyse the dialogue. She then combined the knowledge and theory from the theoretical lens (see Chapters 2 and 3) with her extensive knowledge and experience of working in the construction industry to analyse the data. This analysis included an appreciation of the aspects and implications of the behaviour and the wider impact of discussions and decisions made (or not made). The data analysis process could be replicated by other researchers.

9.4 Limitations of the study

- The findings of the study are confined to those data and phenomena observed and are not generalizable. They do, however, provide a template for similar studies in different contexts.
- Although overlapping speak can be included in the Jeffersonian Light presentation style, this function remains outside of the scope of this research project and is, therefore, a limitation of the study. Further analysis is needed to interpret, present and analyse the conversations during CIDMs to this degree to understand the impact of overlapping speak fully.
- The study does not include interviews of the meeting participants to gather their thoughts and feelings about the social interactions of the meetings. Interviews can take place in the future with the original participant. This process could utilise the video footage to gather the participant's reflections of the behaviour exhibited in the meetings to gain additional insight.
- Observations are limited to the early stage of design development only. Further research is required to observe social interactions during different phases of the construction process and different stages of team development.
- The female element of the study is not part of the data analysis process, even though two of the design managers observed were female. Nevertheless, this was an interesting aspect of the study that warrants further investigation.
- The extended timeframe between the data collection and the data analysis is a limitation to the approach adopted in this study. Further consideration is required to shorten the timeframe to allow similar investigations to feedback bespoke and generalizable best practices to organisations in a timely manner.

9.5 Recommendations for future study

To utilise the findings of the current study, Table 9.1 Recommendations for future study capture the new questions the current study identifies to provide a clear strategy for further research in a construction context and a broader team decision-making environment. Table 9.1 summarises the Future Research Agenda identified in Chapters 5, 6, 7 and 8.

Table 9.1: Recommendations for Future Study

Topic		Findings	
Impact of <i>process gain</i> on decision-making		See Section 8.3, above	
Current limits	Existing research about group norms lacks recognition of individual teams in specific settings	Further research	To appreciate the nuances of individual teams in different meeting settings to establish common group norms that contribute to effective working practices.
	Variability of team demographic diversity on team performance.		To examine the impact of variables such as race, sex, and age to understand how the diversity of team demographics could aid or hinder team performance during meetings.
Impact of <i>process loss</i> on decision-making		See Section 8.4, above	
Current limits	The impact of experts failing to attend meetings or contribute little was noted, but was outside the scope of the present study.	Further research	To investigate how discipline-specific expertise can be captured and utilised consistently to gain the full benefit of interdisciplinary and multidisciplinary team composition.
	Failure to differentiate or prioritise between value-adding and non-value adding activities was noted but not examined in depth.		To identify the non-value adding tasks during meetings to create more time for discussing alternative solutions (when appropriate).
The impact of social cohesion on team decision-making		See Section 8.5, above	
Current limits	Humour was identified as important in managing conflict. This was followed up in a journal article but merits further investigation.	Further research	To examine the use of humour as a moderator for conflict.
	Further research could examine the applicability of Tuckman's stages of team development model in a construction team setting.		To investigate if the Tuckman's stages of team development model are sensitive enough to incorporate the contextual and cultural elements within a project setting when the team's organisation and the client expect a newly formed team to perform from the start of the team's life.
	The impact of temporary team membership and multi-team membership on team development was noted and merits further investigation.		To examine if the cultural factors of temporary and multi-team membership (MTM) being the norm impacts on the behaviour of team members to commence effective team working before the traditionally considered stages of <i>forming</i> and <i>storming</i> have taken place.
	The simultaneous, rather than linear, presence of <i>forming</i> , <i>storming</i> and <i>norming</i> behaviour (according to Tuckman's model) during the early meetings of a team's life were noted and merit further investigation.		To examine team development in detail to examine if <i>forming</i> , <i>storming</i> and <i>norming</i> are all taking place simultaneously during the early meetings, in a more intertwined fashion, rather than a linear process, as Tuckman suggests.
	The phenomenon of <i>groupthink</i> may underlie some of the behaviour documented. However, a full investigation was outside the scope of the study.		To examine if <i>groupthink</i> occurs when the stress levels of the project team increase, for example, as the construction phase progresses.

Topic		Findings	
The impact of intragroup conflict on team decision-making		See Section 8.6, above	
Current limits	Research (see de Dreu and Weingart, 2003) exists on dysfunctional conflict. However, a full investigation of its effect during the meetings observed was outside the scope of the study.	Further research	To understand the presence and impact of dysfunctional and unhealthy conflict on team performance to formulate best practices to avoid this behaviour during collaborative meetings.
	Levels of adversarial and confrontational behaviour may occur differently through a project's lifespan. However, a longitudinal approach would be necessary to investigate this.		To investigate when and where overly adversarial and confrontational behaviour occurs on projects, given that it is rare during CIDMs.
	The question arose whether task conflict behaviour might stimulate creativity and innovation. This would merit further investigation.		To identify an effective level and type of task conflict that does not simultaneously create relationship conflict or reduce team members' satisfaction while stimulating thinking that can lead to a richer generation of ideas by the team.
The impact of the physicality of the meetings on team decision-making		See Section 8.7, above	
Current limits	It was noted that 2D artefacts are preferred to the 3D digital models during meetings. A deeper understanding of this would be useful.	Further research	To identify and examine the barriers to fully utilising the 3D model during CIDMs.
	The ability of attendees to access current, relevant, digital information during meetings was found to vary. A deeper investigation of the reasons would be useful.		To consider how the meeting participants can utilise laptop technology to access up to date information during the meetings. For example, access to the 3D BIM module.
	Differences in the impact of virtual and hybrid meeting formats on team decision-making (compared to face-to-face meetings) were noted, but not considered in depth.		To evaluate the team performance during virtual and hybrid meetings, compared to face-to-face meetings.

Appendices

Appendix A

Thematic analysis based on social interaction events - NVivo screenshot

Nodes			
Name	Files	References	
[-] Cohesion		17	279
[+] Familiar behaviour		7	25
[+] Humour		17	233
Non-task talk		5	6
[+] Solidarity praise support		9	14
[-] Conflict		17	156
Adversarial behaviour		7	11
Disagreement		15	25
Extreme talk		14	30
[+] Grievance		16	68
Lack of noticeable conflict		2	3
[+] Pre-empting conflict by the designer		8	10
Reluctance to take action		6	9
Observer events		5	6

Appendix B

Thick description NVivo thematic analysis based on field notes – NVivo screenshot

The screenshot displays the NVivo software interface. At the top, there is a toolbar with various icons for file management (Open, Memo Link, Add To Set, Create As Code, Create As Cases), exploration (Query, Visualize), coding (Code, Auto Code, Range Code, Uncode), and classification (Case Classification, File Classification). Below the toolbar, the 'Nodes' section is visible, containing a table with the following data:

Name	Files	References
Communication milieu	17	113
Functions of the meeting	17	178
Group norms	16	58
Intragroup conflict	11	43
Leadership	7	9
Main actors	16	117
Physical setting	11	44
Reflection of my practice	12	31
Social cohesion	10	31
Team socialisation	1	3

Appendix C

Informed consent document used between March and December 2018

Hello,

My name is Hazel Ponton. I am currently progressing a PhD research project at Northumbria University. The aim of the project is to understand how individuals and teams behave during design team meetings.

Thank you for taking the time to consider participating in this research project. Here are some of the key facts. If you would like to know any more, please feel free to ask me.

- The information required from you is an initial 5-minute survey and agreement that you are willing for me to observe the design team meetings, (including video and voice recording of the proceedings).
- Under the Data Protection Act 1998/Data Protection Act 2018, you have the right to:
 - withdraw your permission at any time
 - ask to access the information at any time
- All data collected as part of this research project will be handled and stored with the utmost regard to confidentiality.
- All data collected will be rendered anonymous, about individual participants and projects.
- The information/data will be published in both academic publications and as part of my PhD thesis.
- The data will be stored securely using my individual storage space on the Northumbria University server. This can only be accessed by myself using my private username and password.

If you are happy to participate in this research project, please tick the boxes below:

I have read and understand the purpose of the study.	<input type="checkbox"/>
I have been given the chance to ask questions about the study and these have been answered to my satisfaction.	<input type="checkbox"/>
I am willing to complete a survey.	<input type="checkbox"/>
I am willing to be observed during the Design Team meetings.	<input type="checkbox"/>
I am willing for my comments to be voice-recorded and video recorded.	<input type="checkbox"/>
I am willing for my images to be published, once they have been fully anonymised.	<input type="checkbox"/>
I understand that I can withdraw at any time if I change my mind and this will not affect my participation in the Design Team meetings.	<input type="checkbox"/>
I am aware that my name and details will be kept confidential, will be anonymised, and will not appear in any printed documents.	<input type="checkbox"/>

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