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An Activity Based Workspace Project: A study to explore how actual user behaviour reflects original design intention

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An Activity Based Workspace Project

A study to explore how actual user behaviour reflects
original design intention

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Abstract

Today, many organisations are implementing Activity Based Workplaces (ABW), which offer an open and transparent workspace with flexible seating configurations to enhance numerous work activities. Whilst many researchers propose the ABW facilitates interaction, collaboration, concentration, privacy and distractions, existing literature also evidences inconsistencies and contradictions as to the benefits and the potential to enhance specific behaviours. Human behaviour can be unpredictable, it is influenced by a diverse range of factors, i.e. attitude, emotion, culture, values, accordingly, users' perceptions, use and needs are often not aligned with the presuppositions and expectations of designers and leadership teams. The success of the ABW implementation is commonly assessed through satisfaction and productivity, with negligible focus on how the workspaces are being used in comparison to design intention expectations.

This study explores the events, factors and characteristics of an activity based workspace, which users consider facilitate positively or negatively upon their day to day activities. Through its objective to understand how individuals use the workspaces, as against original design intention, this study brings a new focus within workplace research. It explores, through the lens of the individual, how they adapt the workspace to best meet their requirements, compared with the conventional benchmark of how workspace impacts users. The repertory grid technique, an innovative method within workplace research, was used to enable individuals to share their tacit thoughts and meanings explicitly, enhancing the understanding of the congruency between the original design intentions and actual use.

Key findings revealed, through the exploration of preferences and needs, that participants frequently used workspaces in ways which were not assigned by the original design intention, appropriating them in accordance with their preferences and needs. Daily work activities were dynamic and predominantly aligned with a more informal way of working. Motivation to collaborate was perceived as a fundamental component of their job role and self determined, and not purely shaped through the provision of collaborative spaces. The findings advocate a need for continued detailed inquiry and a deeper understanding of ABW workplace features and characteristics, which either enable or hinder daily working activities, through contextual user behavioural feedback.

A framework is presented which introduces a more user centric approach to the ABW design implementation process, through the exploration and in-depth assessment of user perceptions and meanings of how they use and adapt to the workspace. Design decisions are simply hypotheses of desired performance parameters, therefore fundamental to the design process framework is the commitment to measuring their success.

This study also offers two original contributions to knowledge and practice. The first, through the repertory grid technique, which encompasses a robust and structured approach to elicit findings. This method acknowledges the uniqueness of individuals, delivers in-depth understanding which adds value to the design process and enhances the assessment of project success. Secondly, through a different study approach which explores how individuals' use, adapt and modify the environment to meet their personal needs, preferences and activities. The unique findings, through the understanding of

congruency between the original design intention and actual use, challenge and add to

existing workplace design knowledge and practice.

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Declaration

I declare that this thesis was written by myself, that the work contained herein is my own, unless explicitly stated otherwise in the text by reference or acknowledgement, and that this work has not been submitted for any other degree or professional qualification.

Jacqueline S Harrington

17 August 2022

1   Setting the Scene

1.1   Introduction

This thesis is an exploratory study to investigate and determine whether the original design intention of an activity based workspace (ABW) project, within a multi-national professional services organisation, was achieved. Through a qualitative approach, using both the analysis of organisational documents and repertory grid interviews, this research aims to decipher how participants are using specific workspaces, within the their normal working environment, and to assess how these behaviours compare or differ from the original designed intention.

This first chapter locates the researcher, explains the background and purpose of the study; introduces the participating organisation; establishes the research aims, objectives, questions; highlights the potential contribution to extant research and provides an overview to the structure of this thesis.

1.2   Locating the Research and Researcher

This professional doctorate study is situated within a professional practice context. where the assessment of user needs and perceptions within an activity based workplace are fundamental to workplace design, although they are rarely mentioned in design literature (Kelly et al., 1992).

My motivation in pursuing this research is my interest in organisational and environmental psychology, which began whilst working as Vice President of Human Resources for a global technology organisation during an era when mergers and acquisitions were prevalent, especially within USA headquartered offices, and the subsequent need to manage cultural and organisational change became the norm.

To further enhance my experience of behavioural change within organisations, and whilst undertaking both a British Psychological Society qualification and MSc in Business Psychology, I collaborated, as an independent consultant, on a number of workplace design projects, with specific focus on desired behavioural change through employee engagement. Workplace design, in its simplest form, is the transformation of a working environment, using creative approaches through the dimensions of space, using different seating and desk configurations, working surfaces, materials, as well as ensuring environmental conditions such as heating, lighting, cooling are adequate for the comfort and safety of employees to deliver organisational objectives. The workplace design process has many interlinking phases, however, the three (3) fundamental components which are the stimulus for this research are: 1) design brief and project objectives, 2) characteristics of layout and workspace and 3) appraisal of perceived project success.

Reflecting on over 20 years of projects, I was conscious that many of the projects did not fully reach their potential. I frequently speculated as to what was actually informing the project approach and how it influenced and affected the desired adjustments to employee perceptions and behaviours. These new ABW environments are ultimately behavioural change projects, which research reports have less than a 30% success rate (Burnes, 2011; Burnes and Jackson, 2011). This percentage is questionable, however, as there is no definition of failure, which makes it difficult to acknowledge the accuracy of this statement (Jones et al., 2019). Despite a number of workplace design projects incorporating change management programmes, involving user engagement for a more collaborative design, projects still have the propensity to be unsuccessful in certain areas. User engagement, often designated 'participatory design', an approach in architectural and planning research, links all relevant stakeholders impacted by the

change into the process to deliver a proposal that meets the needs of everyone. Although research on employee engagement within ABW change projects is negligible, employee involvement in workplace design decisions can result in an office which "truly meets the needs of the workers" (Gerdenitsch et al., 2017, p291; Van der Voordt, 2004). Unfortunately, the majority of open plan office and activity based workplace research identifies many negative impacts to the asserted benefits, which are contradictory to the premise that a more open workplace delivers successful projects which meet both individual and organisational needs.

Designers assert that their designs will instinctively deliver desired behaviours, i.e improved interaction and collaboration however, these deterministic assumptions fail to appreciate the complexity of the roles, perceptions and needs of the individual users.

This professional doctorate challenges this stimulus and response perspective, which determines that the environment shapes behaviour and as a result user reactions can be anticipated. As workplace design impacts both physical and psychological responses to the functionality, aesthetics and symbolic characteristics of the workspace, this study acknowledges through its user centric focus, that individuals are active agents rather than static users, a postulate which is not always the customary focus of workplace design and research. The association between physical working environments (PWE) and individual use and preference, has rarely been researched. The majority of literature has focussed on spatial impacts, satisfaction, performance, productivity, health and well-being (Engelen et al., 2019; Candido et al., 2016; Kim et al., 2016; De Been and Beijer, 2014; Appel-Meulenbroek et al., 2011; De Croon et al, 2005; van der Voordt, 2004).

This study aims to address these gaps by gaining a greater insight into how users experience and interact with the environment, to better inform the workplace design

implementation process as to use and preferences of specifically designed activity workspaces.

1.3 Background to the Study

There has been a significant change over the years in terms of how organisations perceive its employees and the workplace. Now the employee is considered not just an input, a 'cog in a machine', but an asset, with organisations focusing on retaining and attracting these assets. The building and workspace is now seen as having a major role in achieving this, with continual reference to successful organisations with attractive and innovative workspaces. There has also been a fundamental move towards space demands and efficiencies, as we can now work more flexibly, out of less space and that space can be less conventional (Wohlers and Hertel, 2017; Brunia et al., 2016).

This changing nature of work has organisational leadership realising that the physical working environment can and needs to support both their strategic objectives and the needs of employees (Duffy, 1997). These objectives range from a real estate cost efficiency perspective, improving an organisation's brand and image, supporting contemporary knowledge work, enhancing employee satisfaction and productivity, to providing a flexible working environment to support the latest changes in ways of working (Kim et al., 2016; De Been and Beijer, 2014).

New technological advances are also impacting organisational operations, with flexibility enabling information and knowledge to be accessed and developed at any time, in any space (Harris, 2015; Blok et al., 2011), consequently, the working environment is, and needs, to continually evolve (Morrison and Macky, 2017; Parker et al., 2017). Now more cognitively challenging (Wegman et al., 2018), knowledge workers have to adapt to the increased complexity and intensity of 'the new ways of

working'; which is now an internal part of enhanced interdisciplinary interaction and collaboration (Kim, et al., 2016; Seddigh, 2015; Hua, et al. 2010). Knowledge workers are also becoming more astute, recognising their value and are demanding more flexible working and pressurising employers for a workspace that works for them (Dewulf and Van Meel, 2002). To support employees' requests for increased flexibility and choice, organisational strategies need to reflect connectivity and agility, ultimately meeting employee expectations of a more active office perspective (Brunia et al., 2016; Harris, 2015).

1.4   Purpose of the Study

The study findings will contribute to further developing knowledge of flexible working within activity based worksplaces and inform practice, through the investigation of how individuals use workspaces and adapt them to fit their preferences and needs. The study demonstrates how the actual use of the activity based workplace correlates or varies with the specific original intended designed behaviour of the participating organisation's ABW design. Through a review of how individuals use defined workspaces and through association with their daily work routines, the aim is to understand individual and personal reasons and perceptions, as to why they choose to use a specific workspace for daily activities and tasks.

Current studies generally demonstrate cause and effect consequences of how the PWE impact users through positive, negative and neutral impacts, without determining how specific experience and behaviours develop in the context of daily activities. This study aims to addresses this gap, by developing a more in-depth appreciation of how new workplace environments, i.e. activity based working, can further support employees, by identifying the way in which individuals are utilising and adapting to the

more flexible ways of working in unconventional, and often idiosyncratic workspaces, and reflecting on how to optimise understanding of these behaviours.

This study will draw parallels with relevant workplace empirical research and reflect on inter-relationships, specifically how organisational culture and individual differences can further inform our understanding of the complexities of behaviour within the working environment (Wohlers and Hertel, 2017; McElroy and Morrow, 2010).

1.5   The Research Aim, Objectives and Questions

Current industry practice demonstrates that corporate real estate professionals are recognising the impact of the PWE to support and complement employee needs and performance, with many organisations implementing new ways of working through workplace design transformations.   There is rich empirical research and industry specific case studies, highlighting the benefits of these new ABW approaches, however, they are most often through environmental studies and satisfaction, productivity and well-being surveys.

ABW project objectives do not appear to be thoroughly explored, the design intention not fully reflected in performance terms, and the assessment of success most often evidenced purely by employee satisfaction or dissatisfaction through quantitative questionnaires.   Therefore, there is little appreciation of, or focus on, how the new workspaces are being used versus what behaviours the project objectives intended, which has the potential to better inform practice and improve project success.

The study's overall research aim is to determine the correlation between the actual use of individual workspaces and the intended aim of its design.   The following research questions guide this thesis and its research approach and design.

RQ1: How are the participants using the activity based workspaces ?

RQ2: What are the factors and characteristics which encourage participants to use a specific space ?

RQ3: How does the actual use reflect the original design intention ?

1.6   Participating Organisation

The participating organisation is a multinational professional services network, employing over 270,000 employees in 157 countries, with an employee base of predominantly knowledge workers.   Their aim is to be recognised as 'the leading professional services firm', through innovation, responsibility and the attraction of outstanding employees.

The exploratory study reviewed two regional office relocations, both located within a major UK city.   The interviews took place approximately 18 months after occupation.

The motivation for transforming to an ABW approach was two-fold, unquestionably the organisation wished to develop a great working environment for their employees and clients. Additionally, it was important to look beyond the space and implement initiatives which would impact positively both the business and individuals.

The philosophy was to develop a space which captured the values of the organisation, highlighting a 'One Firm' experience which would embrace the breaking down of status and departmental barriers (Kingma, 2019).   Other requirements included designing a space which would promote openness, offer choice to support all aspects of work activities, and place collaboration, knowledge sharing, relationship building and sense of belonging at the heart of the relocated business.

The key feature of the new ways of working was transformational change, through the relationship between culture and strategy encouraging interactive, open and collaborative behaviours through a flexible, efficient and innovative environment, offering choice for their employees. The benefits shared with all staff were:

- Enhanced engagement and stronger communities

- Less barriers across Lines of Service (LoS) and between grades

- Fun and enjoyable workplace

- Flexible workplace offering choice

- Exploiting technology to improve collaboration and communication

- Quality destination for client

Correlating with the ongoing trend within the UK of moving towards activity based workspaces, the participating organisation's relocations encompassed transitioning from the more traditional style of office environment, with its pre-conceived ideas of what an office should look like, more often than not a rather static and fixed environment with single use space (each person having heir own fixed desk), to a 'one space' philosophy encouraging new behaviours through an integrated and flexible modular environment, see Figure 1.1.

Figure 1.1: Traditional Office to 'One Space' Workplace
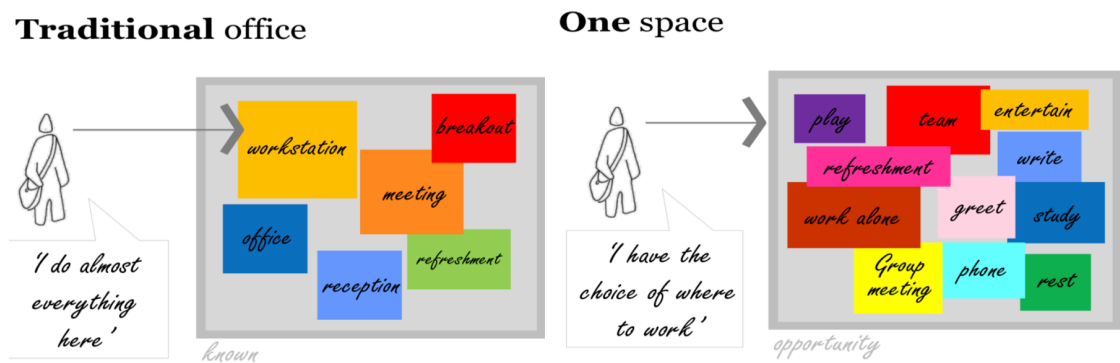
The 'one space' workplace would incorporate flexible working principles, non traditional and contemporary work settings with 'state of art' technology, to facilitate the transformation from the previous traditional office setting to the new ways of working. Due to regulatory requirements, there would also be the need for dedicated and secure workspaces, which although more cellular in nature would still be incorporated within the open layout.

The progression from having your own single workstation, with its 'sit at your desk' mentality, to the introduction of an assortment of spaces, which office designers customarily identify as collaboration spaces, breakout areas, meeting venues and quiet zones, was seen as fundamental to the achievement of the strategic goals and future vision for the organisation. The space would be user focussed and user driven which would demand not only a different way of working, but an adaptive organisational culture and a different mindset for employees.

The organisation's determination to design a coherent mix of workspaces, was augmented by a commitment to a well defined workplace design implementation process encompassing: briefing, staff communication and engagement programme, user surveys, and an understanding of the impact of change management and behavioural change. Employee commitment to transformational projects is key to its success, (Dewulf and van Meel, 2004). The embodiment of the new "one firm" concept was demonstrated by ensuring the office relocation was more than just an office move, initiating user engagement throughout the entire project. Early workplace research acknowledges that user participation can be a major influence in workplace satisfaction (Nielsen and Randall, 2013; Knight and Haslam, 2010; Meijer et al., 2009; Vink et al.,

2006; Dewulf and van Meel, 2004), however, it requires mutual trust, respect and empowerment to make decisions to facilitate success (Lahtinen et al., 2015).

Inspirational sponsors championed the project, steering groups were established from a cross section of the firm's employees, as it was not viable to involve all employees in the process. The Steering Committee developed a vision and brief, in conjunction with the leadership team and appointed designers, and participated in all stages of the design decision making process: encompassing 'evolving the concept', 'understanding the mix' and 'exploring the look and feel' of the overall environment. Project management, change management and communications programme ran seamlessly together, guided by the design team. Following every design stage there was structured interaction with staff with feedback from these sessions reviewed at the following stages, which facilitated communication, understanding and trust between the users and the designers, and strengthened the co-design mentality (Sanders and Stappers, 2008). Workshops facilitated decision points, using floor plans and cards, which identified different settings, spaces and behaviours required to meet the specific goals of the project. An appreciation of workplace environment and behavioural change requirements, an awareness of individual assumptions, perspectives, needs and expectations of each team member, and the differing needs of every member of staff, was created through reflection of current environment and work activities, together with imagination of the new workplace philosophy (Rolfö, et al., 2017). Many iterations of the floor layout and workspace locations, together with understanding the mix of work settings required to fit the needs of the business, were reviewed before the final decisions on look, i.e. furniture style, colour and textures were considered.

Distinctive colours, artefacts and materials were strategically used throughout the design to embody the organisational culture, values and brand. The design also incorporated theme walls and graphics, which referenced the culture and history of the cities in which the locations were sited, reflecting its close connections to the local community. Images of the workspaces from the final design, together with descriptions of the design concept and aligned with design intended behaviours, can be found in Appendix 1.

In line with empirical research, an online post project evaluation survey was conducted 12 months after occupation, to understand how the new space was being used, and to establish if the aspirations of both brief and benefits were achieved. 47% of the staff responded and the results compared both the project objectives and pre-occupancy responses. Leadership consensus was that the brief had been met, employees were realising the benefits of moving to the new location and adapting to the new ways of working. Pre-occupancy surveys, interaction throughout every stage of the project and understanding the various behavioural changes needed to adapt to the new working environment, were considered key factors to the success of the project. Employees emphasised the following positive key features: ability to connect to network anywhere in the building, the design layout supporting "one firm' working, greater interaction, and the environment reflecting the organisations reputation and brand. More detailed results from the One Year On Annual Review are discussed in Section 5.5.

1.7 Overview of Study Chapters

1.7.1 1: Introduction

Chapter 1 introduces the study, situates the research and researcher, identifies and defines the nature of the inquiry, aims, objectives and questions of the research and

emphasises the influence that this research can have on further informing ABW implementation best practice for organisations, leadership teams, workplace designers and consultants.

1.7.2   2: Theoretical Context and Literature Review

Chapter 2 is divided into 6 sections drawing on relevant empirical literature, industry conference papers, and design/manufacturer publications which emphasise the practical nature of this professional doctorate thesis. The literature sources also consciously includes a number of older references which are intended to reflect the similarities of the impact of the workplace on employees throughout the evolution of the office.   Section 2.2 reviews the evolution of the office which underpins the link between the physical working environment and its impact on employee behaviour. Classical management theories, that have evolved and contributed to the transition from a control and command perspective to more flexible and informal ways of working, are also discussed.   The review identifies the early workplace researchers and how a number of their concepts and philosophies can be seen to resonate as pertinent statements today. Section 2.3 outlines the ABW approach, whilst Section 2.4 discusses related contemporary literature through three (3) perspectives, the physical working envrionment, the user and the organisation, highlighting implications and contradictions of the perceived benefits, i.e. improved interaction, communication, enhancing employee empowerment and autonomy and facilitating organisational change. Section 2.5 introduces the workplace design implementation process and determines a rationale for it to become an integral component of all ABW design projects. Section 2.6 draws conclusions through a comparison of historical workplace designs with today's contemporary layouts, discusses the need for more user centric research and highlights

the benefits of embracing a workplace design implementation with clearly defined goals with measurable criteria to facilitate a more appropriate expression of success.

1.7.3   3: Research Approach and Design

Chapter 3 describes the overall research approach, positions the study through ontology, epistemology and axiology; provides an extensive outline of the design of the study detailing its qualitative nature;   explains the rationale for the choice of methods, the repertory grid interview technique; and demonstrates how personal construct theory underpins the process.   It also describes the pilot study, highlighting the feedback and reflections used to enhance the main study. Finally, it discusses ethical considerations, trustworthiness and reflexivity.

1.7.4   4: Data Analysis Strategy

Chapter 4 outlines the demographics of the study and explains the systematic qualitative data analysis approach for the repertory grids. It describes the data analysis and coding process of the individual grids, which produced simple relationships showing least alike and most alike workspaces, and the amalgamation of all grids from the study which drew out six (6) categories.

1.7.5   5: Findings

Chapter 5 draws together the repertory grid and document analysis data to facilitate exploration of the data, with the findings presented and aligned to the research questions and aims of the study.   The findings generated from the repertory grid interviews revealed contrasting views through the bi-polar constructs, resulting a more in-depth understanding of user preferences and experiences of the ABW workspaces.   The

summary of the "ABW One Year On" documentation was compared to the repertory grid findings.

1.7.6   6: Discussion

Within chapter 6, the analysis and findings are revisited in relation to the research questions. The discussion emphasises the differences and interdependencies influencing the divergent responses, perceptions and user outcomes within the ABW implementation. Specific features and attributes, either beneficial or less functional in supporting user activities and tasks, are identified and contrasted with the original design intention and workplace design literature.

1.7.7   7: Conclusions and Original Contributions

Chapter 7, concludes the thesis with a summary of the key conclusions, discusses original contributions of the study, limitations, practical implications and future recommendations and contributions to practice.

The key findings revealed, through the exploration of preferences and needs, that workspaces were appropriated in ways not assigned by original design intention. Informal, dynamic and spontaneous were perceived as the predominant ways of working, enhanced by the ease of access and assessibility to workspaces. Self determination and role characteristics were acknowledged as the influence for collaboration rather than design workspace configuration.   Integrating a transformational change programme incorporating cultural change was considered pivotal to the success of the project.

A framework which introduces a more user centric approach, through the exploration of user perceptions and meanings of how they use and adapt to the workspace, is presented

as an enhancement to the workplace design implementation process. Additionally, the framework proposes that design decisions be expressed in the form of design hypotheses, which can and should, be measured.

The study advocates the need for continued detailed inquiry and a deeper understanding of ABW workplace features and characteristics, which either enable or hinder daily working activities, through contextual user behavioural feedback and project assessment.

2 Theoretical Context and Literature Review

2.1 Introduction

Over many decades the physical working environment has been viewed as a major influencer of employee behaviour and organisational goals. The activity based workspace is shaped and influenced by workplace designers and consultants, who deliver a rhetoric, claiming the automatic achievement of improved efficiency, interaction, collaboration and creativity through their design. Individuals, however, often perceive and experience their working environment differently from these design intentions and strategies, resulting in an environment which is perceived not to be seen as encouraging or enhancing the desired new workplace practices and behaviours. This not only reflects a lack of understanding of the needs of the users, it overlooks the different ways in which they actually prefer to use the spaces to fulfil their roles and it is the reason why this study locates the user at the nucleus of its analysis.

The sections within this chapter aim to to review the relationship between the user and the working environment through existing literature from various inter-disciplinary fields of knowledge, which are intrinsically linked with the development of the activity based workspace approach. These disciplines include organisational science, specifically management/organisational theory, individual typologies, environmental and business psychology and workplace design.

Section 2.2 will reflect on the historical links between management theories and workplace design, emphasising how they have shaped the development of the office environment and more significantly, how Taylorism theories and determinism are still an influence within present day designs, such as activity based workplaces. As an early researcher stated "Understanding todays' offices … calls for an understanding of their

past" (Sundstrom, 1986, pxiii). Section 2.3 outlines the ABW approach, Section 2.4 discusses related contemporary literature through three (3) perspectives, the physical working envrionment, the user and the organisation. Section 2.5 introduces the workplace design implementation process and determines a rationale for it to become an integral component of all ABW design projects. Section 2.6 draws conclusions from the chapter and reflects on the similarities between the early concepts of workplace design and the ABW of today.

2.2   Evolution of the Workplace

In this section, identifying key contextual features, both theoretical and historical, which have influenced the evolution of the physical working environment (PWE), will position the relationship between the physical workplace and its influence on employee behaviour.

2.2.1 Taylor's Scientific Management

The most cited classical organisational theory approach is scientific management, proposed by Frederick Taylor. It emerged in the early 1900s, focused on productivity and efficiency, underpinned the Taylorist beliefs of authority and control (Parker and Lewis, 1995) and had an immense influence on the culture of the office. Developed from factory line concepts (Daniel, 2015) careful attention was given to the workspace layout and desk design. Establishing the early development of the first open plan environment, general staff were located in rows of standardised desks arranged in the central open area with cellular offices situated around the periphery of the floor for the supervisory staff. Privacy and distractions were of no concern, as the focus of the design was the overall workflow to ensure smooth transition between all the relevant departmental processes.

Taylor, a mechanical engineer, claimed "that efficient production demanded objective analysis of work activities into their smallest components, in order to develop standard procedures that would minimise effort and maximise efficiency" (Sundstrom, 1986, p.19). The work was repetitive and restrictive with employees working in very close proximity to each other, and although it increased productivity, employees were extremely dissatisfied as there was little opportunity for individuality or autonomy over how they might like to work (Uddina and Hossain, 2015). Taylorism was criticised for dehumanising work, i.e everything was controlled by management, employees were not trusted and for many years it was considered to suppress the introduction of new ways of working (Duffy, 1997).

The influence of the Taylorist philosophy was demonstrated by the Larkin Building in New York, which housed a mail order company, where more than one thousand employees were located in one large workspace. The layout was configured to enhance overall workflow and increase smooth transition of documentation from different departments. Glass partitions, low partitions and open corridors separated the different departmental functions, desks were standardised and personal storage discouraged (Haigh, 2012), with the positioning of the windows either above or below eye height to control distractions.

The scientific management principles were clearly evident in the layout and design of the Larkin building, see Figure 2.1, with the openness providing exceptional visibility from the lower floor and from balconies on which managers would supervise, underlining the strong hierarchical structure.

Figure 2.1: The Larkin Building

[https://franklloydwright.org/frank-lloyd-wrights-larkin-and-johnson-wax-workspaces Accessed: 10 April 2020]

Taylor's concepts of supervision, efficient processes and dehumanisation impacted the way in which work environments were designed, however, Wagner-Tsukamoto (2008) considered that Taylor had a simplistic, mechanistic and empirically incorrect image of human nature, a perspective which was supported by the development of new theories which continued to influence workplace design. Taylor's view was initially validated by new theories which continued to influence workplace design, with the outcome of studies termed the Hawthorne Studies, pivotal in the move from a mechanistic and deterministic perspective to a more humanistic one.

The aim of the Hawthorne studies was to investigate whether certain physical features of the factory impacted productivity. Researching the link between illuminance and work rate, the Western Electric Company in the USA, attempted to find the optimal working environment which would create maximum productivity levels from the employees (Donald, 2001). Three experiments were conducted, the most cited involved two (2) groups, experimental and non experimental, both were informed they were research participants, however, only the experimental group had an environmental change - additional lighting. Contrary to expectations, both groups delivered improved performance demonstrating that employees were motivated by observation and documentation of work output, and not purely financial reward which had previous been

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considered. This outcome failed to verify the relationship between changes to physical characteristics of the environment and productivity (Davis et al., 2011) and suggested behavioural changes were linked to the personal motivations and needs of the employees, although it is clear the link between the PWE and human behaviour is complex. The results of these studies, commonly described as the 'Hawthorne Effect', influenced future researchers to consider attitudes, groups and interpersonal relationships in future investigations (Sundstrom, 1986).

The office space layout continued to revolve around enclosed offices and large open areas with desks with no separation until the 1960s, when the focus moved towards a less hierarchical structure (Haigh, 2012).

2.2.2 Bürolandschaft and Social Values

Progress towards equality was another major impact on the development of the office and ways of working. Bürolandschaft or office landscaping was conceptualised by German brothers, and reflected a less hierarchical structure, with the focus moving away from purely workflow as in earlier designs. There were no executive offices for management, enabling employees and managers to interact and socialise easier.

The German 'office landscape', influenced by the socialist values of 1950s, was specifically designed to improve communications and efficiency through an open plan approach, which differed from the Taylorism office layout, with the use of plants and screens as separation between groups of desks to reflect the needs of the teams. The layout (See Figure 2.2) which introduced new flexible furniture configurations, were perceived to be more interesting due to the quality of the furnishings and increased ease of movement.

Figure 2.2: Example of an Office Landscape Design

(Duffy, 1992, p35).

In reality, notwithstanding the attempts to depart from the hierarchy of scientific management theories through an atmosphere of social equality, the perceived freedom within the office was negated by the rules which dictated the way in which the office should be used. Through time, employees become discontent with the lack of privacy, noise and distractions (Hedge, 1982), all of which contradicted the premise that employees attitudes and emotions were now a key consideration in the workplace (Sundstrom, 1986).   Interestingly, designers were also becoming restless with the apparent uniformity and prescribed rules of office designs, stressing that offices should be reflective of the unique characteristics of the organisation (Duffy, 1974).

2.2.3 Human Relations Theory

Accentuating the importance and value of the employee, human relations theory moved away from the scientific theory concept of simply being a 'cog', to focusing more on communication and social interaction, enabling employees to collaborate and develop relationships with colleagues (Rose, 1988).   Fundamentally, the focus shifted from environmental characteristics to process, reflecting a clear design shift from 'workflow'

to 'communication' (Duffy, 1974) which required a more open plan environment, with wide spaces for ease of flow and specifically designed spaces for the encouragement of informal meetings and impromptu conversation (Duffy, 1992; Sundstrom, 1986). Differing from the open plan of early workspace design, which was "confined, controlled and regulated, the open plan was displayed in an inconsistent pattern rather than linear format to facilitate flexibility and movement around the office" (Donald, 2001, p290). Although the layout appeared random, detailed analytics had been conducted on interactions between both teams and individuals to support the design, which is critical for the creation of highly developed workspace landscapes (Duffy, 1992).

The importance and value of the employee shaped the new human relations theory, which remained in vogue until the early 1960's. This introduced a transition from a deterministic model, where results of actions are seen as inevitable - nothing else can happen, to a concept that stressed the importance of the link between individuals and the impact of the environment through selected social psychological processes (Sundstrom, 1986). Psychological theories, specifically, personal construct, personality and motivation become significant, as individuals create personal meanings to evaluate the world around them and perceive and experience the world (Oseland, 2009). These new personal characteristic theories further elaborate on the assumptions made in the Taylorism and Hawthorne experiments, that self interest, attitudes and group interaction affected the environment-human relationship.

2.2.4 Technological Advancements

By the early 1980s, it was the dynamic changes in work processes and development in technology, specifically mobility, which were influencing the design of the workplace,

adaptability was the key and highlighted the need for organisations to ensure that their culture and facilities supported these changes.

In the early 1990s, the ways of working were continually changing, not only through improved IT, but less hierarchy and a greater emphasis on teams and communication, therefore, office designs needed to reflect these needs (Duffy, 1997). Highlighting autonomy and interaction as key components which would support the new working trends, Duffy (1997) identified four metaphors, which defined alternative work patterns and workspaces. 1) Hive for individual process task, 2) Cell for concentrated study, 3) Den for interactive group work and 4) Club to encourage transactional knowledge work. His 'new office' concept was, that rather than occupy the same space each day, it may be more productive to move to spaces with specific types of furniture and layout which should be more conducive to supporting the required work activity (Duffy, 1997).

The traditional office with cellular offices and blocks of multiple desks was continually adapted to address these changing needs of both the organisation and the employees, initially providing more open plan, break out and enclosed space for multiple and more efficient use, progressing to a cluster of workspaces to encourage interaction yet allow autonomy and privacy (Davis et al., 2011).

Today, workplaces have further benefitted from the advantages of wireless and internet communications. No longer a need to locate to a space to access fixed power, employees choose a workspace based entirely on where it best suits them and what needs to be achieved at any point in time (Harris, 1997). New aesthetic designs started to emerge, introducing a sense of informality and often fun (De Paoli and Ropo, 2017; Baldry and Hallier, 2010), incorporate both technical and physical features within the open workplaces to leverage organisational identity, values and branding which is

considered a key factor for employee satisfaction, recruitment and retention (De Paoli et al., 2017, 2013; Bodin Danielsson et al., 2013; De Croon et al., 2005). Representative of this new thinking is the office created by the Google organisation featuring its diverse and unusual settings. An illustration of the design is shown in Figure 2.3.

Figure 2.3: Global headquarters - Google

[https://brigittesbrandblog.wordpress.com/ 2018/11/06/google-and-its-best-company- culture/ Accessed 10 April 2020]

2.2.5   Activity Based Workplaces

Activity-based workplaces are often considered a relatively new concept, however, the evolution of the office suggests its philosophy is reflected in many of the early formats.

ABW history is rarely discussed in empirical literature, and although there are a number of differing accounts, the consensus is that the Dutch workplace strategist Erik Veldhoen (Veldhoen and Co.) introduced the term 'activity based working' in 1995 after a visit to Scandinavia, to review experiments which were taking place in relation to the flexibility of free seating/non territorial office concepts. On his return to Holland, Veldhoen developed the concept further, with a focus on activity rather than flexibility and designed a new PWE for a Netherlands insurance company, Interpolis, which would incorporate total flexibility and freedom for its employees.   Interpolis bought into the ideology of giving employees choice and autonomy and incorporated the activity based

working design by eliminating fixed desks and introducing a non-territorial, flexible working environment.   The design of this envrionment informed the new ways of working which ultimately transformed the culture of the organisation.

The philosophy of today's ABW is autonomy and choice.   The central premise of its layout is openness, achieved through the absence of internal boundaries, such as walls and partitions, creating an overall awareness of the everyday happenings within the office.   The lack of boundaries establish clear visibility and/or line of sight to other individuals reflecting transparency, a metaphor used to highlight a less hierarchical structure and encourage greater team work (Parker, 2016), elements which have the potential to significantly impact the pattern, shape and frequency of interaction and prompt spontaneous collaboration (Morrison and Macky, 2017; Wohlers and Hertel, 2017; Kabo et al., 2014; Sailer and McCulloch, 2012; Sailer and Penn, 2009; Rashid et al., 2006). Defined zones are located throughout the open environment designed to support specific activities, i.e. solo work, collaborative work, concentration tasks, knowledge transfer and personal needs.

The rise of the activity based workplace has continued through the decades, with organisations experimenting with alternative designs to challenge existing working practices, increasing interaction and collaboration through a more user centric atmosphere of flexibility and autonomy. However, as with earlier theories and concepts, ABWs are not always deemed as successful as they are portrayed by the design intention. Empirical evidence on improved collaboration through the new open and flexible configuration is not very strong, with contradictory evidence contending that collaboration is negatively impacted.

2.3 The ABW Approach

ABW embraces new ways of working, promoting flexibility and choice as fundamental principles. Intrinsic to the concept is the need to provide autonomy, interaction and privacy spaces (Appel-Meulenbroek et al., 2015) to improve work and personal satisfaction, performance, health and wellness (Haapakangas et al., 2018a; Kim et al., 2016; De Been et al., 2015; Bodin Danielsson and Bodin, 2008). The open and transparent layout, with variety of workspaces: quiet spaces, collaboration zones, breakout areas and meeting rooms, is designed to encourage autonomous interactions, and support the many divergent knowledge worker activities, i.e. collaboration, concentration, interaction, creativity, knowledge sharing, privacy and contemplation (Babapour Chafi and Rolfö, 2019; Engelen et al., 2019; Harris, 2015) and individual personal needs.

With no defined model, the ABW workspace characteristics vary from business to business, however, there is an expectation of an atmosphere of openness (De Been and Beijer, 2014) to support interaction through serendipitous contact, balanced with more enclosed or defined areas for individual concentrated work and meetings (Wohlers and Hertel, 2017). Every organisation is unique and ABW is a strategy to create an optimal workplace to fit the needs and culture of the organisation (Zerella et al., 2017; Kallio et al., 2015).

The choice of workspace is determined by the nature of the work task or activity, which may involve changing work locations on numerous occasions throughout the day (Rolfö et al., 2018, Babapour et al., 2018). There are no dedicated desks, which literature terms a 'non-territorial' aspect of the design concept (Engelen et al., 2019; Rolfö et al., 2018; Brunia et al., 2016; Appel-Meulenbroek, 2009), creating a first come, first served

scenario, presenting an opportunity for autonomy through individual choice of workspace to support needs and preferences (van den Berg et al., 2020).

Having no rights to a desk implies that staff are only temporary guests, which necessitate a 'clear desk policy' whereby individuals must clear their belongings from a workspace whenever they leave (Babapour Chafi and Rolfö, 2019; Knight and Haslam, 2010). ABW also includes essential centralised amenity facilities such as coffee areas, stairs, printing and photocopying stations (service support stations) and mobile technology (Harris, 2019), perceived to stimulate serendipitous encounters (Fayard and Weeks, 2007). Location of these spaces, features and characteristics need to be carefully planned as distraction and noise could have a significant impact on other workplace activities. The benefits from chance encounters at these specifically designated points is difficult to assess, especially as many collaborations are between employees with existing relationships, which contrasts with the formation of a new collaboration and the development of knowledge sharing and creation through a spontaneous chance meeting (Kabo et al., 2014; Oseland et al., 2011).

In summary, ABW environments encompass recognised organisational and societal norms, incorporate the concept sharing of physical workspaces - there are often fewer spaces than employees (Babapour Chafi and Rolfö, 2019), and require new technological elements to facilitate flexibility and support self regulation (Engelen et al., 2019) often referred to by real estate professionals and workplace designers as 'people, place and technology'.

2.4 Contemporary ABW Research

Motivations to introduce an ABW environment are numerous and diverse, among the most prevalent is: aiming to promote improved interaction, collaboration and

knowledge sharing (van Koetsveld and Kamperman, 2011; De Croon et al., 2005; van der Voordt, 2004) by providing spaces for colleagues to work together as well as opportunities to connect with members of differing departments (Brunia et al., 2016; de Been and Beijer, 2014; van der Voordt, 2004). Financial benefits are also frequently discussed due to the reduced office space costs which are realised through the flexibility of the space (Bergsten et al., 2021; Rolfö and Babapour Chafi, 2017; Kim et al., 2016; De Been and Beijer, 2014; Baldry and Barnes, 2012). ABWs also aspire to attract and retain knowledge workers and staff (De Been et al., 2015) by increasing employee satisfaction through a perception of autonomy (Bäcklander et al., 2019; Vos and van der Voordt, 2001), and personal control over the choice of individual and collaborative workspaces (Wohlers and Hertel, 2017; Kim et. al., 2016; Appel-Muelenbroek et. al., 2011).

Comprehensive empirical research on the ABW is rare (Wohlers et al., 2017), generally the impact of the physical working environment has been evidenced through open plan environments, which although do correlate with an open and transparent workspace, do not encompass the ABWs principles of flexibility and choice. The implications of workplace design are also researched from a divergent range of academic disciplines, including but not exhaustively, psychology, architecture, real estate, design, health, building engineering, ergonomics, management and human resources, each with its own vocabulary, theories and preferred research methods (Donald, 2001). Diversity creates differing terms for flexible working environments within the literature, for example, ABW, non territorial office, hot-desking, flexible offices, A-FO, agile working, creative space offices (Brunia et al., 2016; Kim et al., 2016; Lahtinen et al., 2015; De Paoli et al., 2013). Different classifications are studied, e.g. employee type and industry sector, and the focus such as productivity, job and employee satisfaction, health, and wellness

which generate ambiguous and often contradictory comparisons and benefits. A study investigating the relationship between interior office space and employee health and well-being, defined interior space as "comprising individual workstations or desks and their surroundings, or the whole inner space of the office building, as opposed to the architectural outer shell and technical installation" (Colenberg et al., 2020, p1). As a consequence of the uncertainty as to which office type the data referred to (open plan, cellular or a combination, allocated workstations or flexible use) contrasting results were evidenced (Colenberg et al., 2020). Each disciplinary field has its preferred research and collection method with many utilising questionnaires rather than more robust "hard data from physical and physiological recordings" which is a further complication (Appel-Meulenbroek et al, 2018, p1). Studies using questionnaires to explore the employee satisfaction and productivity do not reveal potential underlying factors which affect an individual's response, e.g. dissatisfaction could be due to resistance to change, or other organisational related factors i.e. quality of projects or career prospects (Riratanaphong and van der Voordt, 2012). Research continues to endorse the complications and lack of clarity created by the diversity of topics and methods impacting their studies and propose that future research should elaborate on the features of workspace being explored and suggest the development of a collective vocabulary, increase methodological strength and work toward holistic models (Engelen et al., 2019).

Claims of ABW implementation success are also often cited as more expectations and aspirations than corroborated by evidence (Waber et al., 2014), principally due to case studies and commercial literature being the medium used to present the findings. Accumulation of these inconsistencies, therefore, prove problematic when attempting to

compare and contrast research findings which notably impacts on the credibility of using evidence based research in workplace design (Sailer et al., 2008).

The variety and diversity of the motivations for the adoption of an ABW environment, together with the ambiguity, contradictions and limitations within current literature, accentuate the complexity of how collective behaviours emerge from a combination of factors relating to the physical environment, individual users and the organisation (van Koetsveld and Kamperman, 2011) rather than purely an outcome determined by one association. To gain further appreciation of the these inter-relationships researchers have developed models to identify and understand the elaborate relationships between the physical features, users, organisational influences (Kämpf-Dern and Konkol, 2017; Wohlers and Hertel, 2017; McCoy and Evans, 2002; Sundstrom 1986).

To explore these unique dynamic associations this study's theoretical context and literature review, will discuss existing workplace design and ABW literature using a framework of three (3) perspectives; 1) the physical environment, 2) the user and 3) the organisation. Through the lens of the participating organisation's principal objectives for the ABW project; Section 2.4.1 will explore interaction and collaboration through the physical concept of openness, visibility and proximity; Section 2.4.2 will focus on user autonomy, choice and self determination, and Section 2.4.3 will discuss the significance of culture, artefacts and functionality through an organisational perspective.

2.4.1   The Physical Environment Perspective

The central premise of the ABW layout is openness, achieved through the absence of internal boundaries, such as walls and partitions, creating an overall awareness of the everyday happenings within the office. The lack of boundaries establish clear visibility and/or line of sight to other individuals reflecting transparency, a metaphor used to

portray a less hierarchical structure and encourage greater team work (Parker 2016), elements which have the potential to significantly impact the pattern, shape and frequency of interaction and prompt spontaneous collaboration (Morrison and Macky, 2017; Wohlers and Hertel, 2017; Kabo et al., 2014; Sailer and McCulloch, 2012; Sailer and Penn, 2009; Rashid et al., 2006; Wohlers and Hertel, 2017). Openness within the ABW envrionment therefore has the potential to stimulate the flow of interactions and encourage the sharing of knowledge and ideas (Salovaara, 2015). Whilst agreeing that an open environment supports collaboration, sociologists suggest that the removal of the barriers is the predictor for the interaction as it creates a feeling of closeness (Ward, 2017) which facilitates in the erasing of social barriers. These differing interpretations emphasise the continuing issue of ambiguity created through research by different disciplines (Bernstein and Turban, 2018).

The influence of expected benefits of the ABWs openness and visibility characteristics is constantly challenged through scant empirical evidence to correlate claims and limited evidence proving the associations (Kallio et al., 2015; Greene and Myerson, 2011; Sailer, 2011).

The disadvantages of visibility in open environments in respect of privacy, distractions and noise have also been well evidenced (Berstein and Turban, 2018; Morrison and Macky, 2017).

Privacy's relationship in workspace is complex, defined as "an interpersonal boundary process" (Altman, 1975, p6), an approach where individuals feel the need to reduce or control incoming stimuli, and limit outgoing information (Ashkanasy et al., 2014). The need for privacy comprises both internal and external aspects, visual and acoustic isolation and a sense of control over access to oneself (Sundstrom et al., 1980), with

employees achieving their optimal level through individual needs (Altman, 1975), or by employing various tactics in an attempt to resist interaction (Bernstein and Turban, 2018; Van Marrewijk and Van den Ende, 2018).

Privacy has consistently been cited as a major source of employee dissatisfaction (Haapakangas et al., 2018a; Morrison and Macky, 2017; Rolfö et al., 2017; Brunia et al., 2016; De Been and Beijer, 2014; Bodin Danielsson and Bodin, 2009; Vischer, 2008; De Croon et al, 2005; Becker et al., 1983; Sundstrom et al., 1980) reduced task performance and productivity (Kim et al., 2016; Jahncke and Halin, 2012; Jahncke et al., 2011), distractions (Becker et al., 1983) as well as potentially harmful to their well-being, causing emotional exhaustion (Laurence et al., 2013), feelings of vulnerability (Warrick et al., 2016) and increased stress (Herbig et al., 2016; Bodin Danielsson and Bodin, 2009; Leather et al., 2003; Sundstrom, et al., 1994). The impact of withdrawing oneself from an environment and to control privacy also decreases communication and considered to inhibit collaboration (Kim et al., 2016; De Been and Beijer, 2014; Waber et al., 2014).

Other consequences of lack of privacy are distractions and interruptions (Wohlers and Hertel, 2017), which punctuate performance through its negative effects on concentration and decision making (Seddigh, et al., 2014; Haynes, 2007) which ultimately may have the potential to invoke conflict (Bodin Danielsson et al., 2015; Ayoko and Härtel, 2003).

Concerns of privacy, distractions and interruptions are not a new phenomena, issues with open plan offices have been researched since early Taylorism, where the open plan office introduced the Hawthorne effect of being too exposed and observed. Loss of privacy, confidentiality, interruptions and distractions, have continually been cited as

causing dissatisfaction, loss of productivity and stress (Appel-Meulenbroek et al., 2020, 2011; Hoendervanger et al., 2018). From a psychological viewpoint, however, research suggests that visibility improves the interpretation of behavioural cues which have the potential to mitigate and reduce interruptions and distractions. (Becker and Sims, 2001; Backhouse and Drew, 1992).

ABWs flexibility and choice principles could decrease or negate the issues of privacy, distractions and interruptions by choosing to access a quiet space. Although, whilst evidence suggests that providing quiet spaces for concentration is critical for employee satisfaction (Brunia et al, 2016), other studies claim that most individuals often use strategies to routinely stay in one workspace, or use the same desk, and do not switch frequently, as changing appears to be contrary to their normal habits and preferences (Hoendervanger et al., 2016). Identifying the contrasting dynamics which impact privacy, emphasises why findings are regularly inconsistent and continues to raise the question as to whether ABW open space is a causal factor in increased distractions (De Been and Beijer, 2014; Seddigh et al., 2014).

Another concept, which determines interaction, collaboration and knowledge sharing, with links to visibility, and well documented in workplace research is proximity (Boschma, 2005). The hypothesis is that people who are in close proximity, i.e. geographical distance from each other, tend to collaborate more as the distance between them makes it easier to communicate (Irving et al., 2019; Davids and Frenken, 2018; Kabo, 2017; Heringa et al., 2014; Kabo et al., 2014; Mattes, 2012; Sailer and McCulloh, 2012). Environmental psychology and spatial research expand on this geographical link, claiming that face to face interaction is enhanced by the ABW through its open and transparent visibility, circulation routes, the proximity between the users (Kabo, 2017;

Coradi et al., 2015; Kabo et al., 2014; Stryker et al., 2012; Hua et al., 2010; Sailer and Penn, 2009; Peponis et al., 2007) and the positioning of the service areas i.e. coffee and printing stations (Fayard and Weeks, 2007). These spaces and features can, however, also have a detrimental effect through social and cognitive intrusions, especially as the workplace is designed to be dynamic (Seddigh et al., 2015; Van Meel, 2019)

Placing a strong association on geographical proximity, to some extent ignores other dimensions of proximity. (Paci et al., 2014). Proximity is not simply a spatial phenomenon, other alternative forms, i.e. social and cognitive are especially relevant within the realm of knowledge working, and more specifically within the ABW environment, where activities often involve the achievement of goals through collaboration, problem solving and the sharing of knowledge within communities of practice are relevant to the behaviours of interaction and collaboration (Boschma, 2005).

Social proximity, sharing of interpersonal relationships in both a professional and private context, is strengthened by friendship, trust (Broekel and Boschma, 2012), similar beliefs and can be viewed through past collaborations (Hardeman et al., 2015). Cognitive proximity refers to the extent to which actors share a similar professional knowledge base (Broekel, 2015; Broekel and Boschma, 2012; Nootboom, 1999) which then ultimately determines the similar way in which they perceive, comprehend, evaluate and understand the world (Boschma, 2005; Nooteboom, 1999). When there is significant similarity between the knowledge domains, and social relations are based on trust, individuals are more able to create interactions and collaborations (Broekel, 2015; Krafft et al., 2014). Understanding how each proximity dimension distinctly influences behaviour, and the dynamics of the relationship between two or more proximities can

alleviate ambiguity within interactions and encourage collaboration and innovation (Mattes, 2012; Balland, 2012), strengthens the argument that improved interaction and collaboration through proximity is more than the consequence of the cause and effect of geographical proximity.

This section demonstrates that individuals are impacted by the consequences of workplace design and emphasises how that may manifest issues in a number of ways, e.g. dissatisfaction with the new environment resulting in a lack of desire to adopt new workplace design concepts (Haapakangas et al., 2018b).

2.4.2   The individual Perspective

The ABW is a complex and dynamic entity, and to fully attribute the benefits and suitability of each ABW workspace, we need to fully understand how the users construct their perceptions, define their needs and make decisions within the context of their activities.   The ABW principles stress that people are free to make their own choices, dependant upon individual specific needs and preferences. If determining users as active agents, we need to understand how they respond to the environment, and their resultant actions by developing an understanding of how and what they think (Canter, 1977). Individuals are participants rather than subjects of an environment, it envelops and engulfs to the extent where no-one can be perceived as isolated from it, accordingly it is the entire configuration which determines user responses. (Ittelson, 1973).

This study challenges the common premise that the envrionment shapes and determines behaviour as it overlooks the role of the user and the reality that although users may, to a certain extent, be constrained by the shape of the PWE, they frequently adapt and deviate from the designed cause and effect intentions.   Self determination through autonomy, that is the empowerment to control and influence their day to day working

choices (Rolfö et. al., 2018; Wohlers and Hertel, 2017) has the potential to facilitate and improve an employee's performance, satisfaction and engagement (Deci et al., 2017; Mulville et al., 2016) and psychological well-being (Kim et al., 2016; Jones and Fletcher, 2003; Ryan and Deci, 2000), and therefore needs to be considered as an influencer within the ABW environment.

The ABW concept of non assigned sharing workspaces is designed to encourage the breaking down of barriers between individuals and groups, as well as instilling the freedom and flexibility of choice (Wohlers and Hertel, 2017; Parker, 2016; Harris, 2015). The variety of workspaces enables users to choose where and how they wish to conduct their activities (Eismann et al., 2022; Appel-Meulenbroek et al., 2011) facilitating the alignment of their activity with specific workspace, promoting a sense of autonomy over their needs and preferences (Rolfö et al., 2017).

Although this sense of choice and autonomy is reported as increasing employee satisfaction (Wohlers and Hertel, 2017; Boden Danielson and Bodin, 2008), dissatisfaction and loss of productivity are also expressed. Time required to find alternative workspaces and, the need to adhere to clear desk policies, one of a number of protocols used to intimate expectations, codes of conduct, and etiquettes within the ABW (Skogland, 2017; Kim et al., 2016; Appel-Meulenbroek et al., 2011) prompt negative responses. These perceived issues manifest in a reluctance to switch workspaces which users consider contrary to their normal habits and preferences (Hoendervanger et al., 2016), and through self determination choose to remain in one workspace throughout the day.

The way in which individuals interact with the physical spaces and with others, are influenced by many variables (Hoendervanger et al., 2018; Seddigh et al., 2016; Appel-

Meulenbroek et al., 2011; Oseland, 2009; age (Pullen, 2014), gender, job status, intellectual ability, (Haslam et al., 2017; Haynes et al., 2017) profession and organisational tenure (Bodin Danielsson and Bodin, 2008; Furnham et al., 2009). Whilst responses to ABW workspaces through users' actions, experiences, thoughts, and emotions are reflected through individual personality and personal psychological needs (Vischer, 2005; van der Voordt, 2004; Barrick and Ryan, 2003).

Research on personality traits in relation to user perceptions has been explored by a number of researchers (Wohlers and Hertel, 2017; Seddigh et. al., 2016; van der Voordt, 2004). Whilst the main focus within this study is identifying how individual users perceive, choose and experience the individual ABW workspaces and does not specifically investigate individual differences, it is relevant to my research in that individual characteristics, roles and preferences shape the way in which individuals respond to the PWE.

Empirical research stresses the significance of recognising personality and individual differences in workplace behaviour, asserting that an individuals's unique personality, motivation, perceptions, expectations and experiences have a direct correlation with how they behave and perform in the workplace (Mäkikangas et al., 2013; Oseland, 2013; Penney et al., 2011). With more focus on the psychological effects of personality on individual preferences and user behaviour, working environments need to be aligned with different psychological needs i.e. autonomy, structure and privacy (Hoendervanger et al., 2018, p3).

Personality is a complicated concept and cannot be summarised by one dedicated definition. Psychologists generally agree that personality is "fundamentally a matter of human individuality" (Haslam et al., 2017, p5); organisational behaviourists as

encompassing a relatively stable set of psychological attributes, stable feelings, thoughts and behavioural patterns, that distinguish us from another (Herr et al., 2021; Griffin et al., 2017) and enable us to decode how a person may act and feel in different circumstances. Emotions and moods are often included by researchers as differences within an individual's personality (Montag and Panksepp, 2017), however psychologists maintain these are "fleeting states" and too "short-lived" to be considered stable enough to impact personality (Haslam et al., 2017, p6). Figure 2.4 illustrates the distinct aspects of individual differences and their relationship within Personality

Figure 2.4: Classification of individual differences

(Source: An Introduction to Personality, Individual Difference and Intelligence,
Haslam et al., 2017)

These differing features reflect the essence of who we are and fundamental to the understanding of "Who am I? and being "me" at the centre of experience" (Markus and Kitayama, 2010, p421). Therefore it seems appropriate to hypothesise that different personalities embrace different needs and preferences especially when considering ABW workspaces.

Systematic methods distinguish between differences and identity traits which reflect the pattern of how an individual thinks, feels and acts (Haslam et al., 2017; Salgado, 2003 as cited in Seddigh et al., 2016), which have been linked to improved job performance (Hogan and Holland, 2003 as cited in Seddigh et al., 2016; Barrick and Mount, 1993), user satisfaction (Hills and Levy, 2014; Oseland, 2009) and organisational culture fit (Gardner et al., 2012).

Many theories and frameworks have been developed, integrated and elaborated upon to decipher and discuss personality. However, the most common typology and validated model used today in many fields of research and disciplines is the five factors, 'The Big 5' (McCrae and Costa, 1987). The five factors: extroversion, agreeableness, conscientiousness, emotional stability and imagination (openness to experience), describe and compare ourselves to others along a high low continuum (Cooper, 2020; De Raad and Mlacic, 2015). In relation to user preferences and personal needs, studies show that certain characteristics or a combination of characteristics influence choice of specific workspaces e.g. interaction, privacy, collaboration and creativity and performance (Oseland, 2013). For example, introverts require more privacy and often prefer to work alone (Cain, 2012), whereas extroverts are more sociable and seek opportunities for interaction (Oseland, 2009; Barrick and Mount, 1993) which suggests a preference for a more stimulating environment (Eysenck, 1981). Further examples of how the 5 traits are perceived to manifest within individuals and how they may impact preferred interaction and work activities are shown in Figure 2.5.

Figure 2.5: Examples of characteristics/behaviours of the Big 5 traits

Extroversion: Extroverts are warm, assertive, gregarious and sociable;
                            prefer face to face interactions in stimulating
                            environments

High Agreeableness:	Implies an individual is trusting, co-operative and courteous
	Favours structured interactions to gain agreement
High Conscientiousness:	Seen as hard working, determined and self disciplined
	Favours more formal organised and scheduled interactions
Low Emotional stability:	Individuals are described as having high levels of anxiety, anger and impulsiveness
	Favours quiet environments and formal meetings which are scheduled
High imagination:	Inspires curiosity, emotional sensitivity and easy-going
	Prefers stimulating environments and face to face activities which involve collaboration and brainstorming

Trait associations are subtle, for example, the extraversion and introversion contrast suggests that extroverts are outgoing, socially confident and have a prevalence for excitement. However, behaviour is contextual and often reflects the expected norms as opposed to evidenced by our personality tendencies.

Underlining the complexity of these relationships, a funded study reported that individuals adapt and use workspaces to fit their individual preferences, which may not correlate with the designed activity intention of the workspace. High conscientious individuals often prefer breakout spaces for socialising and generating ideas, in contrast to a rather more relaxed social environment or co-working club for those displaying less conscientiousness. High openness (creative types) preferred face to face meetings, anywhere except formal meeting rooms, they also indicated that they were even more creative in an outdoor envrionment. Extroverts were more creative in informal meeting and breakout spaces, especially where there was an external view. Quiet/huddle spaces, hotel/bars were the choices for sharing information by extroverts, although they felt

more productive and creative in meetings rooms. Formal meeting rooms were preferred for sharing information and decision making by two-thirds of the respondents, although conference suites were not a popular choice for interaction (Oseland, 2013).

Positive, negative and contradictory outcomes can be expected from personality traits within an open environment, and although it has been shown as being an important influencer within the study of workplace behaviour, many other factors, e.g. locus of control and self efficacy are equally associated in the shaping of individual reactions and responses, and as a consequence affect the level of adoption of ABW behaviours (Oseland, 2009).   Introverted individuals with low emotional stability may become anxious; conversely their job satisfaction may be favourable as a consequence of feeling supported by colleagues (Seddigh et. al., 2016)

Again there are contradictory results and opinions regarding the influence of personality within workplace research, reinforcing further the dynamic between the physical envrionment, user and organisation, and presents an opportunity for future research to capture more understanding of the ABW and individual difference associations (De Been et al., 2016; Kristof-Brown and Billsberry, 2013).

Discussing personality, Allport (1937) asserted that individuals dynamically organise their psycho-physical systems thereby shaping their behaviours and thoughts, creating unique individual characteristics. This interpretation of personality from Allport was adapted from his original thoughts which implied that the process of organisation determined "a unique adjustment to the environment" (p48). His rationale for the alteration was the belief that behaviour is both expressive and adaptive, growing and constantly reshaping, a notion which is critical to future ABW research and responding to this study's research questions.

2.4.3   The Organisational perspective

The design of the ABW is often orchestrated to reflect the identity of an organisation and to portray a desired image and branding, with potential to convey a positive and competitive image for employees, clients and competitors.   Accomplishment is demonstrated through employees showcasing the new ABW to clients and visitors (Appel-Meulenbroek, 2016) with benefits perceived to be further strengthened through the winning of prestigious annual design awards regulated by professional bodies, i.e. British Council of Offices and CoreNet.

Designers create workspaces to adapt and shape organisational identity and to influence desired behaviours, although these are only realised through the reflection of appropriate and expected behaviours which are often not realised (Näsänen and Vanharanta, 2017; Kjolle and Blakstad, 2014).   Design concepts, often regarded as exemplar templates of ABWs, are frequently transferred from one organisation to another without consideration to its organisational identity and culture.   Indeed, the participating organisation's workplace designs are often used as a future blueprint, irrespective of the differences in purpose and culture. Recreating workspaces in this fashion has the potential to be ineffective in portraying the symbolic meanings required to reinforce distinct corporate cultures, an issue which the designers should be cognisant.

ABWs are also seen as a catalyst for the introduction of organisational and cultural change through the aspiration for a less hierarchical, more collaborative, and user focused culture based on flexibility and trust (Rolfö, 2018; Skogland, 2017; Wohlers and Hertel, 2017; De Paoli et. al. 2013). In light of these interrelated dimensions the success of an ABW project and how it is perceived, is dependent upon a shift in

organsiational culture to align with the ABW new ways of working, specifically the objective of empowering individual users.

As a physical manifestation of organisational culture, the ABW design communicates messages and exhibits meaning through the visible representation of layout and physical which attempt to shape and influence the preferred behaviour conventions (Cooper et al., 2001). Human interactions, however, are often contrary to the presuppositions and expectations of designers and leadership teams (Näsänen and Vanharanta, 2017). Environments are never neutral, continually sending out cues, meanings and intentions, communicated through the formation of the space, the characteristics of the structures and furniture, the furnishings and textures and the colours, lighting and views (Steg et al., 2012). These functional and workspace aesthetic dimensions play a key role in facilitating our understanding of how they affect and shape the behaviour and psychological outcomes of the individual users. Although not within the scope of this study in respect of the research questions, a third dimension, 'symbolism', (Vilnai-Yavetz et al., 2005; Rafaeli and Vilnai-Yavetz, 2004) is deemed to comprise two aspects which highlight the relationship of space to status and identity and is considered key to the development of organisational culture, with the potential to influence an employee's sense of belonging, satisfaction, and organisational identity.

Artefacts are complex, they encompass materials, buildings, furniture, textures, colour light, symbols, names, images, logos, catchwords which make sense to all the stakeholders of an organisation and impact and support everything that they do. Artefacts are interconnected to each other and to users and although they do not directly impact behaviour, designers use them to convey messages about how the workspace should be used (Grenness, 2015; Varlander, 2012). This practice assumes individuals

respond similarly to workspaces, suggesting the deterministic view that design shapes behaviour, rather than being an intricate blend between the workspace, the agency of the user and organisational influences (Vischer, 2005). Understanding how and why the artefacts impart meanings in a particular real life context, together with the part they play in the achievement of users' working activities and objectives should be given greater importance when determining the success of the behavioural change.

The design of the ABW is not limited to providing clues through physical artefacts, it extends to their usefulness, 'instrumentality', in influencing the users' perceived actions, which can have both a positive and negative impact on activities. These actions are described as 'affordances' and similar to artefacts in that they are omnipresent (Gibson, 2014). Drawing on the theory of affordances (Gibson, 2014), the environment provides or imparts an abundance of opportunities for action to its inhabitants. Through a correlation between the object and the user, these opportunities are both obvious and those which the individual perceives and determines are of potential use (Norman, 2013), e.g. a chair can be for sitting on or used as a ladder i.e. by standing on it. Users therefore adapt their assumptions about each specific work-setting when moving from workspace to workspace. Although, interaction and collaboration within ABWs are considered to be influenced by the instrumentality of the layout of the space, i.e. transparency and visibility (Appel-Meulenbrook, 2016; Sailer, 2011; Appel-Meulenbrook, 2010) and artefacts and natural materials (De Paoli et al., 2017), there is little empirical evidence to prove these relationships. This study aims to contribute to the need for more exploration into the interconnections between the physical working environment and cultural artefacts (Dul et al., 2011; Sailer, 2011) by investigating 'how and why' they create meaning and influence behaviours and preferences.

The aesthetics of the architecture and the visual design of the ABW i.e. colour, furniture and materials (McCoy and Evans, 2002) also influence how we think and feel. Prompted by our personal senses, hearing, sight, touch smell and taste, and through empathy and intuition (Taylor and Ladkin, 2009; Ramirez 2005) we determine our understanding of and the meaning of objects. This link between aesthetics and mental process then influences feelings which coincide with "verbal expressions such as 'wow" (Palmer et al., 2013, p79), an expression often associated with new ABWs. To afford these psychological reactions, colour is commonly used in design to transform state of mind, mood and emotions, as well as affect perception and perspective (Deng et al., 2010). With their potential to create diverse views on mood and environmental atmosphere, colours can also be divisive, generating a variety of emotions among individuals. Used empathetically, expression of aesthetics can be positively linked to improved productivity, concentration, and employee satisfaction (Vilnai-Yavetz et al., 2005) and portray powerful associations between employees and organisational brand, culture and commitment (McElroy and Morrow, 2010).

The controversies and contradictions between the positive and negative impacts of the workspace, challenge the scientific evidence which support ABW philosophies (Waber et al., 2014) and contribute to the view "that it seems that fashion and faith drive most decisions about new work environments for knowledge workers" (Davenport et al., 2002, p25) rather than an in-depth appreciation of what actually influences behaviour, improves performance and has strategic impact (Bilginoglu and Yozgat, 2017). These incongruences also accentuate how ABW strategies can challenge existing organisational culture, limiting effective transformational change and consequently impacting ABW project success.

Acknowledging the extensive body of workplace research one would presume that it is used to inform today's workplace designs. In practice this occurs infrequently, with the foundations of most ABW designs relying on designer experience and intuition (Sailer et al., 2015, 2008). There is seemingly scant criteria to support design decisions nor any demonstrable evidence to inform and substantiate the suggested links between the built environment and human behaviour. Today's workspaces are predominantly produced through designer instinct and personal project experience, supplemented by limited use of sales media, to deliver choices and solutions with minimal input from the client and users. The challenges of evidence based research within workplace design are evident, especially as the fields of architecture and design encompasses "artistic inspiration, intuition, learning by doing and practical experience" (Sailer et al., 2008, p119/11). Contradictory results of empirical evidence within workplace research (Sailer et al., 2008), intangible consequences (Ruostela et al., 2014) such as interaction, collaboration and knowledge sharing, and the significant differences between design intention and real world experiences also contribute to the lack of support (Skogland and Hansen, 2017; Ruostela et al., 2014). Nevertheless, it is difficult to see how design decisions can be justified and supported without an evidence base, especially as there are a multitude of design alternatives to opt for.

Although current designs are delivering satisfactory outcomes and often winning property industry design awards, clients are now demanding proof that the design will deliver workplace project goals and fulfil assurances that the design will completely fulfil the brief. Clients are increasingly questioning 'normative' design solutions, i.e. those regarded as 'best practice' and manifested in decision-making characterised by statements such as "I have seen it done before", "think it will work", "I have always wanted to try it" or "my colleague told me about it" (Martin 2014, p165). A practice

referred to as "belonging to the realm of convention" or "rules of thumb" (Groat and Wang, 2002, p78).

The challenge is how to translate empirical evidence into practice. Designers deem academic research complex through its myriad of differing meanings and contradictory evidence and conflicting results from similar spatial layouts (De Paoli et al., 2017), preferring to use previous knowledge, experience and information contained in manufacturers' trade literature and product specifications. This thinking by designers is, to some extent, understandable as the literature also contradicts intended and predicted outcomes for the ABW workspace (Morrison and Macky, 2017; Stryker et al., 2012; Elsbach and Pratt, 2007).

"Understanding the way in which office design interventions affect everyday users and thus shape organisational behaviour, should be high on the agenda for architects, designers and consultants alike" (Sailer et al., 2010, p199). Yet many designers consider their craft as intuitively creative and hide their decisions and solutions under a cloak of mystery, expecting clients to approve their designs without explanation and with complete act of faith in the expert. Designers and clients need to build up a body of knowledge, wide and robust enough to form a basis for prediction of value and success of workplace projects (Duffy et al., 2011). Evidence would act as an indicator for the client as to the validity and reliability of the proposed design choices and solutions (Brandt et al., 2010), impart a process of continuous improvement in quality (Hamilton, 2017) and, with continued research and evaluation provide learnings for future projects.

This study aims to enhance the appreciation of how and why individuals use workspaces in their real world environment and as a consequence, build learning from

current and previous projects to inform practice, establishing an environment which fits the need of both clients and users (Hay et al., 2017)

2.4.4 Key Researchers

The theoretical context and literature review has emphasised how the workplace envrionment, shaped initially through management theories, has continued to develop through the the decades. This evolution is evidenced by extensive workplace design research, initially through early adopters, i.e. Sundstrom, Becker, Duffy, Bodin Danielsson, Appel-Meulenbroek, then by an abundance of new researchers continuing the debate as to the impact of the working envrionment on the individual.

Figure 2.6 illustrates key researchers, categorised through the perspective of this study's research interests, which emphasises development of the topic over time.

Figure 2.6: Key workplace design researchers

Categorisation	Researchers
Behaviours	
Interactions Communication Collaboration	Bernstein and Turban, 2018 Haapakangas et al., 2018 Morrison and Macky, 2017 Wohlers and Hertel, 2017 De Been et al., 2015 De Been and Beijer, 2014 Sailer and McCulloch, 2012 van Koetsveld and Kamperman, 2011 Sailer and Penn, 2009 De Croon et al, 2005 Duffy 1997
Physical	
Openness Visibility	Morrison and Macky, 2017 Wohlers and Hertel, 2017 Appel-Meulenbroek 2016, 2011 De Been and Beijer, 2014 Sailer and McCulloh, 2012 Becker and Sims, 2001 Sailer, 2011

Categorisation	Researchers
Privacy Noise Distractions	Appel-Meulenbroek et al., 2020, 2011 Bernstein and Turban, 2018 Haapakangas et al., 2018 Hoendervanger et al., 2018 Rolfö et al., 2018 Rolfö, 2018 Wohlers and Hertel, 2017 Ekstrand and Damman, 2016 Kim et al., 2016 Seddigh et. al., 2016 Bodin Danielsson, et al., 2015, 2009 De Been et al., 2015 De Been and Beijer, 2014 Kim and de Dear, 2013 Bodin Danielsson and Bodin, 2009 De Croon et al, 2005 Becker et al., 1983 Sundstrom et al., 1980
Proximity	Irving et al., 2019 Kabo, 2017 Coradi et al., 2015 Kabo et al., 2014 Waber et al., 2014 Sailer and McCulloh, 2012 Stryker et al., 2012 Boschma, 2005
Individual	
Individual differences Personality	Hoendervanger et al., 2018 Wohlers and Hertel, 2017 Kim et al., 2016 Seddigh et al., 2016 Oseland, 2013, 2009 van der Voordt, 2004
Agency Autonomy Switching behaviour	Babapour Chafi and Rolfö, 2019 Babapour et al., 2018 Göçer et al., 2018 Haapakangas et al., 2018 Skogland, 2017 Wohlers and Hertel, 2017 Hoendervanger et al., 2016 Kim et al., 2016 Appel-Meulenbroek et al., 2015, 2011 Bodin Danielsson and Bodin, 2008 Duffy, 1997

Categorisation	Researchers
Organisational	
Artefacts Symbolism Aesthetics	Colenberg et al., 2020 Gonzalez-Suhr et al., 2019 Rolfö et al., 2018 Skogland and Hansen, 2017 Brunia et al., 2016 Bodin Danielsson, 2015 De Been et al., 2015 De Been and Beijer, 2014 Gibson, 2014 Bodin Danielsson et al., 2013 Vilnai-Yavetz et al., 2005 Rafaeli and Vilnai-Yavetz, 2004
Workplace design process	
Implementation process	Colenberg et al., 2020 Rolfö et al., 2018 Gerdenitsch et al., 2017 Skogland, 2017 Brunia et al., 2016 Ekstrand and Hansen, 2016 Appel-Meulenbroek et al., 2015, 2011 van Koetsveld and Kamperman, 2011 McElroy and Morrow, 2010
ABW change management	Bergsten et al., 2021 Rolfö, 2018 Gerdenitsch et al., 2017 Kämpf-Dern and Konkol, 2017 Brunia et al., 2016 Lahtinen et al., 2015
User participation Employee engagement	Babapur Chafi and Rolfö 2018 Rolfö et al., 2018, 2017 Gerdenitsch et al., 2017 Lahtinen et al., 2015 Vink et al., 2006
Evidence based design Post occupancy assessment Measurement criteria	Hamilton, 2017 Vasquez and Restrepo, 2017 Göçer et al., 2015 van der Voordt et al., 2012 Duffy et al., 2011 Leaman et al., 2010 Duffy, 1997

2.5   Workplace Design Implementation Process

"Documentation of design intent and a commitment to measurement is a fundamental precept of an evidence-based design process" (Hamilton, 2017, P61).

 Inevitably the introduction of new ways of working necessitate a change in behaviour, (Appel-Meulenbroek et al., 2015).   Despite the many contradictions within workplace research, the concept that spatial and physical environments can be a catalyst for facilitating change remains (Inalhan and Finch, 2012; Vischer, 2012; McElroy and Morrow, 2010; Duffy, 1997).

Yet, there is a dichotomy of opinions regarding transitioning to an ABW.   ABW transformations are synonymous with any workplace change, however despite the growing trend of organisations implementing flexible working, there is scant empirical literature regarding how or why they were successful, or the process for implementation assessment (Brunia et al., 2016; Finch, 2012).   Evidence from ABW literature asserts that the workplace design process can influence perceived user performance and satisfaction, however, there is little support from an empirical perspective (Brunia et al., 2016).

A systematic and structured design process (Brunia et al., 2016) encapsulates the complete timeline of the project, incorporating 3 key stages, 1) briefing stage: identifying the physical and functional features of the ABW (Rolfö, 2018) setting goals and assessing their suitability to meet project objectives and employee needs; 2) developing the concept: framing the change initiative through employee communication and participation interventions (Rolfö et al., 2018; Skogland, 2017; Ekstrand and Hansen, 2016; Appel-Meulenbroek et al., 2011) and 3) project assessment and learnings.

Stage 1: The Brief - conceptual stage

The first and most critical stage in any design project guides a project through an understanding of a client's requirements (RIBA 2020, 2013; Ann et al., 2006). Continuous and iterative, it identifies organisational culture, values and visions, objectives and prerequisites of the client; establishes and agrees specifications; end user needs (Ann et al., 2007) and demonstrates how it supports the new assumed behaviours and activities of the new workplace design (RIBA, 2020, 2013; Blyth and Worthington, 2010; Preiser and Vischer, 2005). Project objectives and business goals should be translated into measurable design criteria, and assessment of evidence determined for the required and desired behavioural change, which will underpin the assessment stage and evidence project success.

Notwithstanding the significance of this process to ensure that project requirements are explicit and demonstrate how they would support the new assumed behaviours and activities of the the workplace design, it continually lacks rigour (RIBA 2020, 2013). Best practice is seldom utilised, the process contributing to successful change is overridden due to complacency or personal experiences, and the design moves quickly into furniture solutions for behavioural change with little evidence to support the choice. Lack of communication and understanding between stakeholders is also a significant issue (Barrett et al, 1999), designers often presuppose the brief, use abstract jargon and universal terms, especially ABW principles such as collaboration, interaction, openness and visibility without clear explanation or definition of precise meaning. Perceptions of reality are open to interpretation and therefore have a tendency to distort the translation, further highlighting the need to understand in depth, organisational culture, values and users needs (Van der Linden et al., 2016, Ann et al., 2007). Today, the briefing focus is

predominantly on environmental and sustainability factors, space allocation, branding and furniture solutions. With no clear definition of ABW project goals and objectives, 'soft data' descriptions of activities and user interpretations (Heintz and Overgaard, 2007) and a lack of measurable criteria to assess their outcomes, establishing evidence to underpin the success of required and desired behavioural change is unachievable.

Stage 2: Developing the concept: employee engagement

Ideally at the conceptual briefing stage of the project and with sponsorship from top management, a project steering group, i.e. a cross section of employee representatives, is assembled to work with the designers. Strengthening not only the relationship between designer and the client, but creating an interactive and participatory process jointly driven by the designers and end users.

Traditionally the only link employees had with the design decision was superficial (van Koetsveld and Kamperman, 2011) which advanced towards a more co-design approach (Valand, 2011), where designers generated ideas to be evaluated, adapted and agreed with negligible input from the current users.

A participatory process presents real benefits and incorporating the process into ABW projects is gaining credibility from both the stakeholders and workplace designers. Users become active co-designers through joint discussions and explanations of day to day needs and experience, defining appropriate and effective workspaces for desired behaviours with proportional protocols. This change of design attitude acknowledges that users are 'the experts' in respect of their working practices and experiences, and involvement in the co-creation of the workplace design enables their expression of needs and perspectives to be fully explored, through the complexity of problem solving and sense-making. Not only does it develop a more subjective way of thinking,

encompassing user values, attitudes and preferences (Rolfö et al., 2017), it defines functional needs and psychological, social, cultural and cognitive prerequisites (Sanders and Stappers, 2008). Through mutual trust and empowerment (Lahtinen et al., 2015; Gustavsen, 2011) design games and materials can be used to acquire, tacit and explicit knowledge (van der Voordt et al., 2012), further developing a clear understanding of how individuals behave and perform in the day to day activities. This change of mindset demonstrates a transition from designing through products to designing for a purpose, a snapshot of the differences between the traditional and emerging designs are shown in Figure 2.7.

Figure 2.7: Design practices: a snapshot in time (Sanders and Stappers, 2008)

Traditional Design Focus: the designing of 'products'	Emerging Design Focus: designing for a 'purpose'
Visual communication design Interior space design Product design Information design Architecture Planning	Design for: Experiencing Emotion Interaction Sustainability Transforming

A communication programme is a fundamental and crucial component of this stage to manage change. Consistent and unambiguous communications, through a variety of mediums, i.e. email updates, newsletters, face to face and town hall sessions, visuals, walk throughs, create awareness, gauge initial reactions, and realise employee expectations (Babapour Chafi and Rolfö, 2019; Rolfö et. al., 2017). Negative reactions are a reality of any change process (Morgan and Anthony, 2008; Laframboise et al., 2003) and should not raise concern. Resistance, is a common reaction to the unknown, causing feelings of fear and stress (Heckmann et al., 2016). Whilst assessments determine a lack of satisfaction as the cause, resistance manifests in many different

ways, and often is simply a lack of understanding of the change process and the uncertainty of its impacts. Creating more awareness and providing additional explanatory data to promote user understanding will facilitate in the ABW being embraced and utilised in the most beneficial way.

Design is a complex discipline and participation adds a further complication by the addition of more stakeholders. Some consider that employee engagement should apply to all users, as everyone will be affected by the change (Rolfö, 2018; Tagliaro and Ciaramella, 2016) especially transitioning to a new ABW environment, yet there is no empirical evidence which indicates that this would deliver a more acceptable design (Rolfö, 2018). From my experience, individual preferences become very apparent with each person displaying distinctly different perspectives, needs, and expectations (Rolfö et al., 2017), and therefore, it is not possible to meet the desires of everyone and stay true to the brief. A participatory process comprising a cross section of user representatives, with a comprehensive communication programme is a compromise which delivers.

Stage 3: Post Occupancy Assessment and future learning

The post occupancy assessment (POA) stage is two (2) fold: firstly to assess whether the new ABW is displaying the behaviours, both the goals and design features intended, and secondly to provide a feedback mechanism to support reflection of the results.

Historically, this stage is expressed as a post occupancy evaluation (POE) within the design/construction industry, and although methodology can vary widely in scope, it generally focuses more narrowly on two topics, 1) is the building responding as intended both functionally and environmentally? and 2) are the users satisfied? (Vasquez and Restrepo, 2017; Baird and Dykes, 2012)

Conducting an evaluation after completion of a workplace design project has the ability to identify potential challenges in the design, resolve any immediate issues, monitor trends and developments as well as highlight lessons learned in order to support future projects (van der Voordt et al., 2012; Duffy, 1997). The process should evaluate the design intent against performance, assessing the extent to which each workspace is being utilised. If the proposed required functioning and behaviour are mis-matched with the intended designed space, enhanced organisational performance and competitiveness may be diminished (Göçer et al., 2015; Pati and Pati, 2013; Zimmerman and Martin, 2001).

With an abundance of POE literature detailing a variety of approaches and methods and highlighting benefits (Vasquez and Restrepo, 2017; Watson et al., 2016; Baird, 2011), and designers implying that design concepts will change behaviours and attitude, it is critical that project performance indicators and objectives are evaluated, yet, comprehensive POEs in practice are rare. User satisfaction, is however, commonly assessed through questionnaires/surveys using Likert scales on a continuum of agree/ disagree, with representative questions such as 'do you feel that your new workspace has improved your ability to work more efficiently/interact more effectively with your colleagues?'. Although insightful and used as a 'feel good factor' to highlight the success of the ABW implementation, this methodology cannot produce adequate performance measures (Deuble and de Dear, 2014: Leaman et al., 2010), due to its inability to give consideration to the many potential mediating and confounding variables which impact behaviour (Hamilton, 2017) and consequently empirical results. The lack of meaningful post occupancy assessment poses the question, does the designer actually have sufficient data to validate how, and to what extent, their design shapes behaviour? This study aims to develop a more in-depth understanding of the

complexities of how and why users adopt and adapt their use of workspaces, through psycho-social contexts, personal preferences and affordances and artefacts to further enhance, support and inform future research and practice.

Clients believe that the learnings from a POE can make a crucial impact in improving business performance through workplace design; many designers agree, appreciating the potential. Yet, there is lack of clarity as to who should conduct the assessment, who should be given feedback and how will it be used in the future. Learning involves risk, it can expose inadequacies, problems and failures which on a positive note allows for improvement, but conversely may result in a fault finding exercise (Bordass and Leaman, 2005; Preiser, 2003) which could potentially become litigious, especially if the flaws are of a serious nature. More fundamentally, however, by the time occupation eventually occurs, the design team are engaged with other day to day priorities, or moved on to their next client and, as a consequence miss out on the opportunity to benefit from the reflective learnings.

Understanding the contributing factors of workplace design success has extensive benefits. Acknowledgement of positive and negative project feedback gives a clear indication of validation for design concepts, highlights areas for improvement and change, as well as substantiating investment cost (Zeisel, 2006). Organisations and designers, therefore, need to take the opportunity to reflect and learn from the feedback and the ABW implementation experience, and use it as a guide to make immediate refinements and alterations, which consequently will be instrumental in advancing knowledge for future ABW projects (Roberts, 2001).

2.6 Conclusion

Chapter 2 reviewed the evolution of the office, exploring the principle management theories and organisational strategies which influenced the design of the workplace from early Taylorism to the present day models of open and flexible working and explored the diverse body of literature related to workplace design and its influence on user behaviour.

Reflecting on the early concept of scientific management in terms of today's office environments, workplace design appears not to have evolved as uniquely as designers claim. Hierarchy, evidenced by private offices, is still prevalent in many organisations with senior managers still considering a visible reflection of status as an imperative (Turner and Myerson, 1998). The issues which today's new open, flexible and transparent design generate, appear to mirror, to some extent, the Taylorism concept of failing to take into account human and social elements which, as current literature highlights, has potential to impart a dehumanising feeling, impacting both the employee and the organisation (Taskin et al., 2019). There are also similar objectives to the Taylorism principles in respect of enhancing efficiencies through desk utilisation, resulting in office cost reduction and improving space efficiency and productivity. Notional walls and doors specifically designed to feature glass, to encourage openness and transparency, and considered a catalyst for interaction and collaboration among employees, can be deemed to be demonstrated through the principles of human relations theory (Sailer and McCulloch, 2012). Whilst the 'new office' concept introduced by Duffy (1997), with a variety of open, flexible and mobile workspaces, and a mix of furniture solutions, offering employees choice for collaboration, interaction, privacy and creativity to facilitate individual and organisational goals and objectives (De Paoli et al.,

2017), exhibit remarkably similar characteristics to the principles of the new ABW approach.

The comparisons drawn above demonstrate the inter-relationships between management theory, design of workplace environments and employee behaviour. Through the decades, we saw design specifications transition from the initial control and command environment which was process focused, to open landscaped offices promoting more informality and contact, to space typologies and furniture solutions facilitating the need for both privacy and interaction (Duffy, 1997). The debate continues as to the whether the scientific management approach is still prevalent in today's practice of open and transparent workspaces (Dent and Bozeman, 2014).

Exploring the association between the historical context and evolution of the workplace has provided an opportunity to view the impact workplace design has on the organisation and the individual through the decades. It accentuates how apparently visionary some of the earlier working style narratives were, how many of the central theories and reasonings are still prevalent today, and indeed recognised in today's workplace designs.

Notwithstanding, that designers contend their ABW layouts are forward thinking, systematic and user centred, their propositions continue to suggest that the environment will deliver predictable behavioural change, despite empirical literature reporting behaviours which are contrary to pre-determined outcomes. Users react, use and adapt the workspaces through individual meaning, interpretation, and perception of an environment's artefacts and aesthetics, together with their preferences and needs which challenge the simple cause and effect association.

The lack of empirical evidence regarding the positive effects of the ABW is to some extent not surprising, as ABW strategies combined with workplace change is complex. Adapting to 'new ways of working', as with many types of change, affects individuals differently, ultimately impacting the timing of outcomes and results (Wohlers and Hertel, 2017; Babapour et al., 2018). It is important to acknowledge the consequences which may arise, and endeavour to interpret the positive and negative findings from workplace literature, in order to explore and embrace the opportunity of promoting a successful and evidence based workplace design.

Design decisions are essentially hypotheses of desired performance parameters, therefore, fundamental to the design process framework is the commitment to measuring their success. A comprehensive workplace design implementation process would provide the opportunity to understand how users behave and respond as active agents within the environment. Incorporating evidence based decisions within the design would impart a process of continuous improvement, which would have significant influence in delivering more predicable and appropriate ABW designs in the future. "Without a feedback loop, every building is, to some extent, a prototype – spaces and systems put together in new ways, with potentially unpredictable outcomes" (Zimmerman and Martin, 2001, p169).

3   Research Approach and Design

3.1   Introduction

This chapter explores and rationalises the development and choice of the research approach and design in relation to the research objectives. Section 3.2 will outline the aims and objectives which are fundamental to the direction of this study and influence the ways in which the research questions can be answered (Creswell and Creswell, 2018). Section 3.3 explores the research approach and discusses three philosophical considerations, i.e. ontology, epistemology and axiology in order to reveal the researcher's personal position, which is intrinsic to supporting the study's trustworthiness. Section 3.4 highlights the methodology choice; the research design encompassing the methods of data collection and data analysis are discussed in Section 3.5. Section 3.6 provides a summary of the research strategy in table format. Sections 3.7 and 3.8 describe the development and implementation process of the pilot and main studies incorporating reflections and lessons learned. Sections 3.9 - 3.11 identifies how the participants and participating organisation were recruited and the composition of the participants. Ethical considerations, trustworthiness and reflexivity are appraised in Sections 3.12 and 3.13. The chapter is then summarised in Section 3.14.

3.2   Research Aims

The purpose of this study is to explore, within the context of an activity based workplace project, the actual use versus the original intended design use of a broad range of workspaces (workplace settings) to enable a better understanding of the success of an ABW project with the potential to develop a deeper understanding of how individuals perceive and use the workspaces creating an opportunity to enhance both the workplace design briefing and assessment processes. The study uses a major

multinational knowledge-intensive organisation, and compares and contrasts findings with the aims and objectives of the project, whilst reflecting current literature on workplace, organisational behaviour and psychology.

Exploratory in nature, the study has three mutually dependent research questions::

1)   How are the participants using the activity based workspaces ?

2)   What are the factors, characteristics which encourage them to use a specific space rather than other options ?

3)   How does this differ from the original design intention and strategic objectives ?

The way in which an employee conducts activities within the workplace reflects the users perceptions as to choice preferences of alternative workspaces.   The approach for this Professional Doctorate Research has been to ensure the focus is on the participants' individual descriptions and experiences within the workplace, supporting the view that personal interpretation of experience is a more significant influential factor than the use itself (Kelly, 1955).

No previous empirical workplace research had considered user perceptions whilst this study was being conducted. This study, therefore, can generate knowledge to augment current workplace research, create new measures of how individuals react and adapt to the ABW, which may have the potential to influence the development of a new tool or framework to enhance workplace design best practice.

3.3   Research Approach

Moon and Blackman (2014) contend that a researcher's background is meaningful in their choice of research approach decisions. With a background in human relations and psychology, my professional knowledge and skills have been grounded in capturing

human experiences and intrinsic features of what it is to be human, within a natural environment. My interest, in understanding how and why users prefer specific workspaces, was initiated by my work with workplace consultants during physical working environment designed projects, which highlighted a number of concerns regarding the usefulness of specifically design workspaces. It is with this frame of reference, together with the aims of the study, that the research approach is founded and is supported by the assertion that these experiences and beliefs give significance to the choice of research approach (Creswell and Creswell, 2018).

The five (5) theoretical elements which underpinned and guided the way in which this study was conducted are shown in Figure 3.1, and will be discussed in the following sections.

Figure 3.1: Research Approach and Design of Study
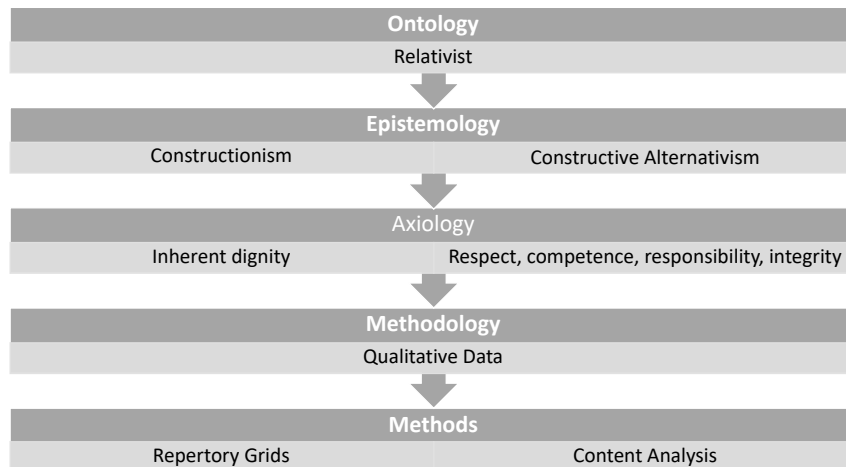
3.3.1 Ontology

Ontology studies existence and explores assumptions about the perception of reality, which is fundamental to how a researcher constructs meaning from the data (Creswell, 2013). It shapes questions about what actually exists, do things exist independently of

our mind, or do we construct the world from our thoughts? There are opposing positions which are generally presented within research, realist and relativist ontologies (Creswell, 2013; Denzin and Lincoln, 2018). The realist stance proposes that reality is objective and it is a single entity where quantitative methodologies are often used to deliver objective measures which are deemed to eliminate, or at least reduce, researcher bias. Whereas relativists consider reality to be subjective, with the possibility of multiple realities (Denzin and Lincoln, 2018) constructed through interaction and influences by numerous contexts, e.g. personal and historical. The relativist stance encompasses an interpretivist perspective, which acknowledges the researcher's position in relation to reality and values, and is more associated with qualitative data collection methods, i.e interviews and observation.

My personal orientations are reflected in this study through personal and business experiences. I have always considered that our reality is socially constructed, we are active agents, with the ability to construct our reality, and power to think and change, rather than being passive individuals.

The relativist position aligns with the aims of this study, that is, to understand the different and subjective views and perceptions of the participants. This has the potential to elicit diverse interpretations of experience from the participants and as a consequence, creates multiple realities.

3.3.2 Epistemology

Whilst the perception of reality is linked to ontology, epistemology asks the questions 'how do we know what we claim to know?' (Denzin and Lincoln, 2018; Crotty, 1998), 'how do we create knowledge' (Moon and Blackman, 2014). Again there are a number of standpoints within epistemology, often the two main opposing views are objectivism

and subjectivism. Objectivism links to the realist ontology, assumes only observable and measurable phenomena can be considered credible knowledge and is commonly used to predict and control. The ideology of subjectivism is that that knowledge is expressed through the lens of language, gender, social class, race, and ethnicity (Denzin and Lincoln, 2018) and knowledge is shaped through an individual's reflection, interpretations and needs. Crotty's (1998) definition of epistemology builds on the above two (2) ways of creating knowledge with the addition of constructionism, which infers that meaning is constructed through interaction between the individual and their world, rather than discovered.

As the ontological belief for this study reflects that realities exist as individual subjective mental constructions, it can, therefore, be inferred that this has an influence on our epistemological choice. The aim of this study is to 1) understand how users construct their reality through their use of the workspaces and 2) understand the users' specific preferences, perceptions and beliefs as to what influences their choices, assists us in determining that this study would most appropriately be informed by a constructionism epistemology.

3.3.2.1 Constructionism and Constructive Alternativism

The philosophy of constructionism is that knowledge is constructed by humans, partly through social interactions rather than an insight into some objective reality (Crotty, 1998).

'Constructive Alternativism' is an adaptation to the constructionism epistemology, which originated from the philosophical stance which underpins Kelly's (1955) personal construct theory and, is more predominant and specifically relevant within this study due to its links with the repertory grid data gathering method. Kelly (1955) proposes

that the world is open to interpretation, there is no one fixed reality, but a number of alternative ways of construing our experiences and dealing with how we make sense of our perceptions, feelings and thoughts (Butt and Burr, 2004) and guide how we anticipate events.

> "We assume that all of our present interpretations of the universe are subject
> to revision or replacement. [...] There are always some alternative constructions
> available to choose among in dealing with the world" (Kelly, 1991, p11).

The constructive alternativism philosophy is considered particularly appropriate for this study as it endeavours to empower individuals to create personal meanings which supports the goals of this study, to understand how participants use and adapt the workspaces, and ultimately contribute to workplace design knowledge. Constructive alternativism is closely associated with both the ontological and epistemological orientations chosen for this study, there is no one reality and knowledge is constructed through interactions with humans and objects, which also supports the researcher's personal orientations. (Crotty 1998).

3.3.3 Axiology

Axiology is a philosophy which studies values, however different ontological and epistemological stances have differing views of how axiology impacts their research. A realist's aim is to instil objectivity by removing researcher bias, whereas the perspective of the relativist considers that research cannot be neutral, researcher values and bias cannot be totally eliminated, they shape how we define and conduct our research.

My consultancy experience and original motivation for this study, 'to emphasise the need to understand how individuals use and adapt to an ABW', may be inferred as embracing an element of personal bias. However, researcher bias has been taken into

account throughout the entire study and neutralised through the repertory grid technique of eliciting experiences and meanings through personal constructs. Workplace design practitioners and consultants also consider the need to better understand user experiences and meaning, demonstrated by a number of requests to explore the findings of this study when complete. From a constructionist viewpoint, we must embrace transparency as we determine reality to be constructed, knowledge subjective, and meaning cannot be independent from personal values which could be seen as interfering with neutrality. I have endeavoured throughout this study to practice transparency, through the detailed narrative of the research process, my reflexivity at various stages of the study and openness as to the motivation of this research.

This study highlights my values, specifically that each individual has inherent dignity, a belief which contributed to shaping my research. Interacting with each individual to understand their personal and idiosyncratic perspective, empowers the user to express their experiences in their own words, rather than attaining this knowledge through a more mechanistic and prescriptive approach. This research, therefore, presents another voice to the practice of workplace design through elicited narratives from the users. My personal values and ethics are also shaped through respect, competence, responsibility and integrity which reflect the core values of The British Psychological Society.

3.4   Methodology: A Qualitative Data Approach

A qualitative approach is defined as a means for exploring with the intention of inquiry to gain and develop an understanding of human experience a phenomenon or an issue (Creswell, 2013; Cooper and Schindler, 2006) through observation and / or interaction with study participants (Denzin and Lincoln, 2008) in their natural environment, ensuring behaviour and events are explored in context (Denzin and Lincoln, 2018). It

acknowledges the interactions between diverse views and voice, enabling the researcher to explore how individuals give meaning to their lives and how they interpret reality through their own experiences, with the potential to realise rich accounts of an individual's thought processes and perceptions (Creswell, 2013).

The adoption of an approach associated with qualitative data was guided by the aims of this study which examines the ABW from the user's perspective through the reflection of their own individual frames of reference. Qualitative data supports this study's research aim to explore in-depth the phenomenon through discovery (Goertz and Mahoney, 2012; Miles and Huberman, 1994), rather than predicting outcomes as seen from a quantitative approach. A quantitative methodology would have been an alternative, and is consistent with a large proportion of empirical workplace research, however, it was deemed not appropriate for this particular study due to its objective nature, focus on numbers, frequently highlighting degree of relationship strength, which can reduce the wealth of meaning of the data. The strength, therefore, of using qualitative data is its facilitation to gain robust insights from actions and experiences which occur in real world contexts (Denzin and Lincoln, 2018). It also preserves intended meaning about real life realities, through individual perceptions and experiences in a rich and contextualised way, providing exemplars of key situations and issues which have the potential to enhance knowledge which is crucial within the research (Creswell, 2013).

3.5   Research Design

Research design is the process of "collecting, analysing, interpreting and reporting data in research studies" (Creswell and Plano Clark, 2007, p.58). It is the structure of the

research which integrates all the associated elements together, although there is no single agreed research design structure (Creswell, 2013; Akhtar, 2016).

As discussed, the strategy for this research study is to utilise a qualitative data methodology to develop an understanding of how individuals experience and perceive things, specifically how and why individuals use a variety of diverse workspaces within an ABW and what specific factors and characteristics influence the use and experience. The elicitation of the participants' perceptions, and experiences of how and why they used specific workspaces was gathered through a structured interview process, facilitating the understanding of their personal stories through a strategy of listening. (Bolderston, 2012).

3.5.1 Data Collection

The aims of this study determine that it is essential that the data captures how the users make sense of the ABW environment. Through the philosophy of constructive alternativism (Section 3.3.2.1), each individual creates a way in which they construe and interpret their experiences, therefore, the discovery of this tacit and implicit knowledge is imperative.

Understanding and transferring this tacit knowledge is fundamental to this study which resulted in the repertory grid technique being chosen as the data collection method. Its strength lies in exploring the alternative ways in which the same event can be independently interpreted, with the individual deemed the creator of meaning (Banister et al., 2011), through the generation of similarities and differences within specific workspaces. This study makes the assumption that gaining an appreciation of the

uniqueness of individuals in their interpretations will enhance the understanding of how and why specific workspaces are preferred and most often used.

Repertory Grid technique (RGT) has been the method of choice in many business related, user and consumer experience research and has produced influential and objective results. Baxter et al. (2014) found RGT to be a highly versatile and useful tool in providing insights in product development, whilst Kawaf and Tagg (2017) used RGT to advance theoretical understanding within the context of online shopping experiences and found that the essence of experience is its fluid, highly individualistic nature.

A number of alternative qualitative data methods were evaluated as potential methods for this study. Semi structured interviews are referenced in research as powerful in accessing the understanding of attitudes and preferences and considered the most practical and effective vehicle for collecting data (Kvale and Brinkmann, 2014). However, they do not always elicit underlying multiples of reality (Rogers and Ryals, 2007) which is a fundamental underpinning of this study. There are many reasons cited for this, participants may be concerned about confidentiality (Bell, 2013), believe they should give an answer they think is expected rather than what their real view is, or they may just find it difficult to articulate their response. The interpretation of the data can also be problematic, with the researcher making assumptions about the participants' responses and intended meanings (Qu and Dumay 2011; Jankowicz, 2004). Questionnaires and observations are frequently used in workplace design research, they have many advantages, however, they would not be suitable methods for this study. Questionnaires are designed with a pre-determined structure, are liable to misinterpretation, insensitive to specific feelings and thoughts and do not allow conversation to develop, therefore participants are unable to express their views from

the context of their own reality. As knowledge work is largely invisible, with no fixed tasks, it would be difficult to assess use and preference of choice through observation, especially as this method does not enable the discovery of thinking and decision making, critical to answer the study's research questions.

Although initially used within a clinical field until the 1960's (Easterby-Smith et al., 1996), repertory grids are now applied in a variety of research studies and are considered to produce stable results (Caputi et al., 2011; Winter, 2003). The diversity of research fields and applications, e.g. product development (Goffin and Koners, 2011), tourism (Pike, 2012), management and IT/IS (Tan and Hunter, 2002; Easterby-Smith et al., 1996), education (Caputi et al., 2011), engineering (Mahmud and Ridgman, 2014), consumer research (Lemke et al., 2011; Marsden and Littler, 2000), performance management research (Song and Gale, 2008) demonstrates its flexibility as an applicable technique.

The Repertory Grid Interview was, therefore, chosen as the most effective interview method, as it is considered both valuable for exploring subjective information, which is often difficult to express (Burr et al., 2014) and appropriate for eliciting user experience as it emphasises an individual's constructs, reflecting perceived differences providing a richer set of data. The practice of face to face elicitation is also considered to alleviate interviewer bias (Goffin et al., 2012, 2006), with the process of gathering personal experiences imparting transparency of the process to the interviewees (Curtis et al., 2008), which as a consequence produces more relevant results for the participants (Langan-Fox and Tan, 1997). The repertory grid interview is a style of questioning which enables reflection and the exploration and capture of individual distinct frames of

reference, acknowledging the participants' expertise, rather than forcing a response to specific questions which is underpinned by Kelly's (1955) Personal Construct Theory.

Both personal construct theory and repertory grids are favoured as most suitable for exploring user perceptions and experiences, as their primary focus is on an individual's personal view of the world and have the potential to encourage individuals to make tacit thoughts and meanings explicit.

Utilising the lesser known data collection method of repertory grid technique within this study, broadens the current approach of ABW research. By exploring perceptions and experience through the lens of personal construct theory (Kelly, 1955) reveals a contrasting view of ABW from the perspective of how users perceive and adapt the workspaces to accommodate their needs, rather than the impact of the ABW on the user. Personal construct theory's underlying theoretical assumptions, which acknowledge the uniqueness of individuals, value the competence and knowledge of experts and offers a different emphasis to the predominant workplace design project debate, will be explored in Section 3.5.4.

3.5.2   Written Documents

Written documents provide insight, as well as a rich source of inside knowledge into the context of the phenomenon being explored. To enrich the understanding of the ABW project within this study, relevant organisational and workplace design documents were acquired. These included project objectives; design concepts, workspace specifications and layouts; implementation and change process, communication programme, employee participation workshops; post project annual review survey summaries. Although not systematically analysed, a review highlighted both the transparency of the process and a structured perspective of the courses of action, giving an objective account of the

workplace design project (Denscombe, 2017). To realise a deeper appreciation for the physical characteristics of the workspaces within the two locations, photographs were taken of the workspaces whilst in use. In order not to suggest or pre-empt the use of a specific workspace, a second set of photographs were taken whilst the workspaces were empty, which were used as the elements within the actual interview process.

The documents also provided an insight into the aims and objectives of the research topic (Bowen, 2009) which were used to reflect upon RQ3, how does the actual use reflect the original design intention of the ABW project?, and provided support and evidence for the analysis and conclusions (Denscombe, 2017).

These organisational texts illuminated how the project was conducted and were extremely useful, as many of the key decision makers and stakeholders were no longer working within the organisation when this study was undertaken (Forster, 1994).

All documents and data reviewed were official and permanent records of the workplace design project and therefore deemed a credible source of evidence within this research study project (Denscombe, 2017).

3.5.3 Data Analysis

Content analysis was used in this study. Analysis of individual grids can be conducted in a variety of ways and a number of stages, combining simple eye ball inspection of grids at the initial stage of elicitation, with more complex analysis. Frequency counts are also used which provide additional information regarding the constructs. This recommended process for analysis of grids was adopted as it is considered the most effective method for RGT, enabling individual grids to be examined in depth in a multitude of ways, as well as facilitating the aggregation of a number of grids

(Jankowicz, 2004). More detailed explanation of the data analysis strategy in contained in Chapter 4.

3.5.4   Personal Construct Theory

Personal construct theory is an in-depth theory of human perceptions and actions using a humanistic approach to inquiry and is recognised by many researchers as a primary theory of personal psychology (Banister et al., 2011; Fransella, 2005). The fundamental question for Kelly (1955) was: how does a person, consciously or unconsciously, construe (interpret) the world (Fransella, 1988) with significant emphasis on real life issues studied within the originating environment?

The aim of personal construct theory is to acknowledge individuals as free agents with a unique view of the world. It develops appreciation through the exploration of how they make sense of their world through their thoughts, feelings and beliefs (Cooper, 2020), emphasising the individual as the creator of meaning (Banister et al., 2011).

Central to personal construct theory is 'constructive alternativism' an adaptation to the constructionism epistemology, which Kelly (1955) proposes conveys that the world is open to interpretation, there is no one fixed reality, but a number of alternative ways of construing our experiences and dealing with how we make sense of our perceptions, feelings and thoughts (Butt and Burr, 2004) and guide how we anticipate events.

Through Kelly's aspiration to develop a rigorous theory for use within the psychology community, he utilised the metaphor of a "person as a scientist" to explain how a person makes sense of their own world and acknowledges their ability to revise their personal systems. As individuals attempt to understand, predict and control their progress in the world, he correlates these actions to those of a scientist who observes, questions, hypothesises, reasons and predicts, in order to develop their own personal theory of the

world (Kelly, 1955). Personal constructs can be individual (Brewerton and Millward, 2001) or widely shared and determine how important they are in construing personal life (Winter and Reed, 2016). We can invent as many alternatives as we allow ourselves, the number is not limited (Hardison and Neimeyer, 2012) and by adapting and retaining these constructs as experiences, they provide frameworks for future actions and influence our interpretations, a process referred to as an experience cycle (Kelly, 1955).

Kelly's (1955) theory reflects that both experience and behaviour are significant, stresses that there are no right or wrong reactions or responses, just purely an indication of how an individual wishes to interpret and respond to a situation.

Initially we make sense of the world through our own personal lens and applying past and present theories (construction corollary) and hypotheses which Kelly (1955) compares to eyeglasses, which influences what and how we see information and experiences. We then simplify the process by discriminating and differentiating between objects, people and things, then create constructs (perceptions) to give meaning to personal experiences and feelings which are bi-polar (dichotomy corollary). The central assumption of the theory suggests that; reality and what we make of it, is built up of contrasts rather than absolutes, in other words things can be alike yet dissimilar (Kelly, 1955).

Jankowicz (2004) interprets this by proposing that "we do not know what something really is if we do not understand the alternative" (p11). A person can only know what one pole of the construct is by understanding its relation to the other (Fransella et al, 2004). The bi-polar construct incorporates an emergent or similarity pole and implicit

or contrast pole, which reflect an individual's specific representation of contrast rather than an assumed lexicographic opposite.

Figure 3.2 illustrates three (3) examples of bi-polar constructs which individuals have used to make sense of their world through distinctions. Is it pleasant and rude? or pleasant and exciting ? or pleasant and boring?, the alternatives are endless.

Figure 3.2: Bi-polar constructs: emergent and contrast pole example
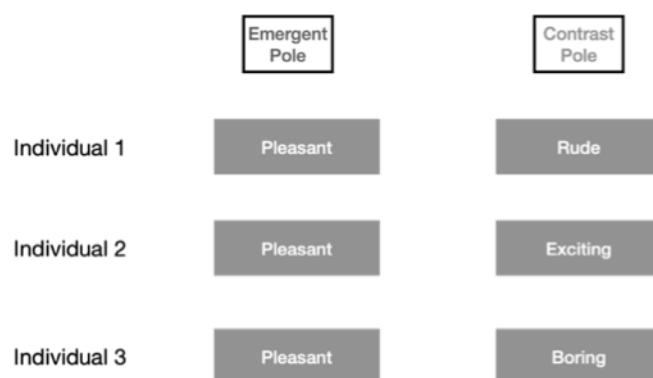
One individual's construct does not necessarily match with others, and it is for this reason that personal construct theory and the repertory grid technique enhances the gathering of a wide variety of constructs (Kuru, 2015).

Jankowicz (2004) stresses it is easy to converse with someone and assume you understand them, but unless we do so on their own terms, that is understanding their personal constructs, then we are just overlaying our own thinking of the world to make it easier to comprehend reality, and what we make of it is built up of contrasts rather than absolutes.

The foundation of Kelly's (1955) theory and underlining his view of motivation is the fundamental postulate expressing that:

Fundamental Postulate: "A person's processes are psychologically channelized by the way in which he anticipates events"

This specific language makes the concept appear complex, however each word precisely underpins the nature of the theory. We use our scientist approach to understand, relate to and interpret our version of reality of our environment which we then use for future interaction predictions. This basic belief subsequently leads to a number of corollaries (Winter and Reed, 2016; Jankowicz, 2004; Kelly, 2003). Details of all eleven corollaries relating to the fundamental postulate, together with examples of how these shape us as individuals can be found in Appendix 2.

Most relevant to this study are three (3) corollaries; construction, individuality and dichotomy. They also reflect this study's beliefs and are discussed in more detail below.

Construction Corollary: "A person anticipates events by construing their replications"

We anticipate future events by attempting to detect patterns to our interpretations, then use our archive of experiences to try and make sense of the world, rather than just perceive and interpret an event or construct something.

Dichotomy Corollary: "A person's construction system is composed of a finite number of dichotomous constructs"

Correlating this, with exploring how participants use the workspaces and which factors and characteristics influence these choices, it is important to understand the bi-polarity of a construct as this is how an individual makes distinctions e.g. to appreciate the meaning of formal we need its opposite, e.g. informal or relaxed.

Individuality Corollary: "Persons differ from each other in their constructions of events"

We have different experiences and abilities and therefore construe events in a variety of different ways. The individuality corollary reflects a further assumption of this study, that we are personally unique, especially in the way that we construe events (Brewerton and Millward, 2001).

Hassenzahl and Rainer (2000) suggest that "interpreting the map of design space based on what we as designers (or authors) know about or how we perceive the inhabitants of this space, we neglect the qualitative value of the personal constructs obtained" (p440), giving substance to the belief that these key corollaries are influential in the study of workplace design and related research.

3.5.5   Repertory Grid Technique

3.5.5.1 Introduction

The Repertory Grid, augments Kelly's personal construct theory (Tan and Hunter, 2002) and as a tool, is used to elicit constructs which represent the way in which individuals interpret their world and inform decision making regarding a topic, underlining the fundamental postulate's aim of exploring sense-making strategies and future anticipations (Hardison and Neimeyer, 2012). Similar to Kelly's (1955) analogy of eyeglasses, the grid is described by Butt and Burr (2004) as a "psychic X-ray" (p124), imparting a method of reconstructing reality through representation of an individual's construct system and how they relate to other things based on similarity and differences.

Jankowicz (2004) describes the repertory grid technique as a structured interview which delivers data not influenced or distorted by the interviewers' own perspective. The process has a standardised format, with the topic normally established by the researcher,

this does not diminish the active role of the participant as the concept of personal construct theory and repertory grids attributes the control of responses and meanings to the participants (Giles, 2002).

3.5.5.2 Repertory Grid Process

The application of the repertory grid interview in this research study was to explore an individual's meanings associated to their use of the ABW workspaces in their day to day working environment.   This technique is frequently used in consumer research (Marsden and Littler, 2000) and in both buyer and product user experiences with successful outcomes reported.   This correlates closely to the aims of this study, that is, the exploration of how an individual uses specific workspaces and the understanding of what factors and characteristics encourage their use.   This section will illustrate the principles of the repertory grid process with images, explain the specialised language and summarise the rationale for the choice of the method.

Central to the repertory grid interview process is the repertory grid (See Figure 3.3 for example of a blank repertory grid) which incorporates the following components:

Elements :   The constituent parts of the topic which is being explored - it can be people, objects, events or experiences

Constructs: Bi-polar constructs or concepts gathered from the participants which represent how they make sense of and differentiate between the elements

Ratings: How elements are described by the constructs, indicated by a number assigned by the participant.

Figure 3.3: Example of Blank Repertory Grid

	1					Elements						5	
Emergent Pole	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**Contrast Pole**
Contstruct 1													Construct 1 - opposite
Contstruct 2													Construct 2 - opposite
Contstruct 3													Construct 2 - opposite
Contstruct 4													Construct 4 - opposite
Contstruct 5													Construct 5 - opposite
Contstruct 6													Construct 6 - opposite
Contstruct 7													Construct 7 - opposite

Ratings Scale

The following four (4) steps describes the interview process:

Step 1 - The interview commences with the naming of elements, the focus of the topic. These may be provided by the researcher or generated by the participant. The chosen approach is determined by the requirements of the research, e.g. within this study the different individual workspaces were the topic of interest and therefore were automatically adopted as the elements. The elements are then represented by cards, numbered or given a letter to differentiate one from another, which are then used during the interview to facilitate the discussion.

Step 2 - Constructs are then elicited of which there are 2 main approaches detailed in the repertory grid literature, triadic (3 elements) and dyadic (2 elements). Within this study triadic elicitation, the most commonly used in research, was adopted as it is considered to gather a greater variety of constructs which are more complex in their meaning (Jankowicz, 2004).

Participants then randomly select 3 elements (namely a triad) and asked a question in order to produce a comparison. The question can be modified to reflect the specific aims of the research topic. Figure 3.4 illustrates an example of triad questioning using elements from this study.

Figure 3.4: Example of random triad and elicitation questioning

"Which two of these are the same in some way, and different from the third"

The two similar elements are then placed together, with the different element slightly apart, a second question is then asked.
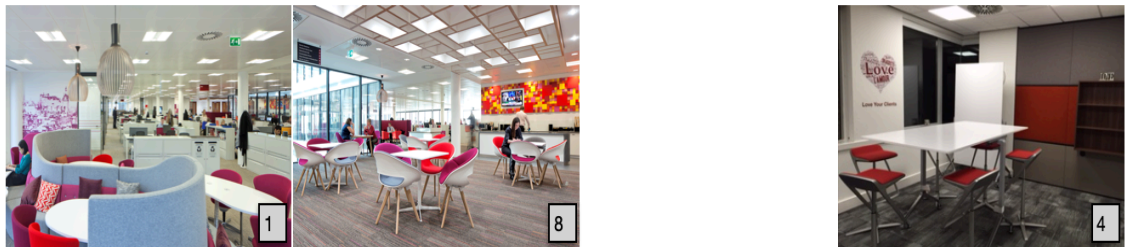
"What do the two have in common, as opposed to the third?

This style of questioning is aimed at discovering what differentiates the three elements, and most commonly the responses highlight what the element is, how it is experienced and what the differences are (Jankowicz, 2004).

Further questioning, in the form of 'laddering', which is a process to clarify the constructs provided, and also used to ensure the construct is precise and meaningful to the participant.

The construct data for the two similar elements are then written onto the grid on the left hand side (the emergent pole), the difference data on the right hand side (the contrast pole) as illustrated in Figure 3.3.

Step 3 - Rating the three elements against the construct is the next step for this first triad construct. Participants are asked to assign a value of 1 - 5, 1 indicating that the element is similar to the description on the emergent pole (left hand side) of the grid, ranging to 5 which expresses that the element is unlike the similar pole and is represented more closely by the contrast pole (right hand side).

The participant is then asked to rate all the remaining elements against the first construct, which would be nine (9) using our example in Figure 3.3.

Step 4 - The process of randomly choosing triads, questioning and rating against elements continues by repeating steps 2 - 4. The objective is to elicit as many different and unique constructs as possible from each participant.

The repertory grid technique facilitates both qualitative and quantitative approach, which is seen as advantageous by some authors as the data analysis focuses on the meaning of the constructs, prompting discussions and numbers which evidence facts. In this study, the use of the qualitative approach is considered structured enough to gather rich and uniquely personal data, which can be analysed together and with a capacity to enhance "comparability and consequently the validity of the analysis" (Curtis et al., 2008, p39).

Personal construct theory and the repertory grid technique stress the uniqueness of each individual's own set of constructs which are the foundation of their map of reality within a specific context (Esterby-Smith and Thorpe, 1996). The intrinsic contrast of the researcher's and participants' views form the basis of bias within research. The current practice within physical workspace design project research relies heavily on questionnaires and semi-structured interviews, both of which are focussed mainly on quantitative data and include questions relevant to the researcher, rather than what the

participant may wish to explore.   As the aim of this study is to capture how participants use the specific workspaces and explore the factors and characteristics which encourage their use, adopting the repertory grid method, which provides the opportunity to position the participants as experts on their own experiences and frames of references, will enhance the elicitation of more personal and meaningful data.

The repertory grid technique is the chosen interview technique for this study, as a consequence of the reported effectiveness of the repertory grid in exploring and evoking subjective experiences, enabling participants to express their responses in their own meaningful words (Jankowicz, 2004) and encouraging the emergence of implicit thought not always accessed through other methods. Understanding how users make sense of their experiences in their real world environment will enhance the appreciation of the actual workspace use from the individual's own viewpoint rather than from the researcher's "domain of interest" (Curtis et al., 2008, p38; Cassell and Symon, 2004) which is pivotal to this study (Gammack and Stephens, 1994).

The repertory grid does, however, have it limitations. Participants need to have experience and knowledge concerning the topic and subsequently the elements, and have the ability to compare and contrast giving tangible examples on numerous occasions (Alexander et al., 2010). This cognitive methodology can be demanding as elements, constructs and ratings are simultaneously reviewed which can be perceived as slow and rather repetitive.   The format of the interview is unfamiliar and although considered as interesting and fun by the participants within this study, the concept can initially be difficult to grasp.   The repertory grid technique explores the topic in the present, 'a moment in time', which does not lend itself to considering other possibilities for the future (Davis et al., 2006). The participants are 'the experts' in the field and as

knowledge workers are cognitively stretched on a daily basis, a default number of constructs to be elicited need to be set to ensure that the interview is not viewed as onerous in this study. To ensure accuracy, precise understanding of the intended meaning and, to avoid bias in the analysis, the researcher reviewed the constructs with the participants at the end of each interview.

The repertory grid application and the implementation of the interview process will be discussed in more depth within Section 3.8 The Main Study: Repertory Grid Interviews.

3.6   Research Strategy Summary

A summary of the research strategy with reference to methods, sources, aims, and analysis is displayed in Appendix 3.

3.7   Pilot Study

3.7.1   Introduction

Considered a fundamental of the research process (Leon et al., 2011) a pilot study was conducted to strengthen validity of the interview method, pre-test the adaptations to the standard interview process, identify any potential procedural problems and verify allocated timescales were practical and feasible (Kim, 2011).

The adaptation to the repertory grid procedure was in relation to the elements which were determined by the researcher in relation to the research question, and within this study were the workspaces situated within the two (2) locations. These elements are normally described and illustrated through text, however, as discussed in the literature review, there are many definitions and interpretations of workspaces and workplace behaviours, therefore it was considered more relevant to use an actual photograph of the workspace to alleviate any misunderstandings. As this adaptation is unconventional

and the repertory grid technique unique to workplace research, the results of the pilot identified potential concerns and issues and subsequently informed the main study (Jariath et al., 2000).

Although pilot studies are rarely used in qualitative research and attract limited attention in research literature (Kim, 2011), on reflection the researcher considers conducting a pilot within this research to be an essential part of its research design (Malmqvist et al., 2019; Kim, 2011), particularly as an appraisal of the interview process has the potential to enhance the principles of rigour, e.g. credibility and dependability of the study (Pratt and Yezierski, 2018).

The pilot study applied the precise procedures planned for the main study with the intention to explore participants use and preferences of specific workspaces.

3.7.2 Pilot Study Process

Repertory grid pilot study interviews were conducted with 4 participants, 2 workplace designers and 2 staff members of the study organisation, within a seven (7) day period, all were familiar with the participating organisation's workspaces.

The interview followed the Jankowicz's (2004) standard format for repertory grid, a synopsis of the pilot process is illustrated below, more in-depth process and explanations are discussed in Section 3.8 the Main Study. Participant information sheets and consent forms were sent to the four (4) interviewees prior to the interview process, with signed forms and demographics collected before commencement of the interview. All interviews were scheduled for 1 hour.

3.7.3 Pilot Feedback and Reflections

During the pilot study, a number of procedural complications were highlighted which impacted specific phases within the process.

Step 3 - the random choice of triads (three cards) to elicit constructs resulted in duplicate sets of elements being selected, which caused frustration to both the participants and researcher, as it lengthened the interview process as new triads were continually being drawn. It also impacted the flow of the interview.   To mitigate this issue and to ensure that all twelve workspaces were included in the elicitation of constructs, the first four (4) triads were pre-determined by the researcher (triad 1 - 1,2,3, triad 2 - 4,5,6, triad 3 - 7,8,9 and triad 4 - 10,11,12), and presented to all the participants of the main study, additional triads were then selected at random by the participant.

Step 7 - the construct to element ratings on the grid caused issues in two distinct ways. Firstly continually allocating ratings after each construct had been elicited was felt to interrupt the participant's flow of thought. Whilst the participants recognised the rationale behind the systematic process, and on reflection found the ratings beneficial, they would have preferred rating against other constructs after completion of the full elicitation process. Adjustment was made during the pilot with one participant which resulted in more in-depth and connected interactions and categorisations within the constructs, as they felt better able to gather their thoughts regarding their use of workspaces, without the constant interruption of having to compare and contrast the elements. The second issue was confusion as to which square within the grid should be completed, often without thinking the interviewee started the ratings at the beginning of the row (left hand side on the matrix), instead of within the triad number being allocated. This was simply fixed by the placing a dot beneath the specific triad elements

chosen for each construct, which resolved the misplacing of the numbers, consequently decreasing the actual time required to complete the ratings.

Allocation of interview timing - the requirement to restrict the interview to 50 minutes did have an impact on the number of constructs which could be elicited, especially when further explanations and definitions were required from the interviewee to ensure constructs were true and meaningful. Within the pilot study, all participants were happy to overrun the time limit, however, adaptations were required for the main study as overrunning was non-negotiable. The decision was therefore made to use the laddering technique at 3 predetermined stages, 1 - when immediately necessary, 2 - after 4 triads, and 3 - at the end of the interview to ensure the data captured was a true representation of the participants' thoughts and meanings.

Acknowledging the ambiguities and timing issues, the adaptations proposed above were incorporated into the main study in order that these issues did not impact the main study research (Malmqvist et al., 2019).

All pilot study participants found the process intriguing, with a number stressing the eliciting of personal constructs in the triad format prompted them to think more rigorously about similarities and differences and emphasised, in more depth, the specific reasons of why and how they used the individual workspaces.

3.8 Main Study

3.8.1 Pre-interview Actions and Formalities

Each interviewee received a participant information sheet (Appendix 4) prior to the interview date which outlined the purpose of the research, the proposed nature of their participation, the researcher's responsibilities and confidentiality, their right to withdraw

or refuse to be included, additional information and the researcher's and research supervisor's contact details.

Scheduled via the office manager, the interviewees were given the opportunity to choose an one (1) hour time slot within an agreed 5 day itinerary in order to accommodate their business needs. This provided time prior to the 45 minute formal structured repertory grid interview to discuss their understanding of the research study and for agreement to and signature of the participant consent form (Appendix 5). It also facilitated the establishing of early rapport. Interviews were conducted each day over a 5 day period in each location.

The two workspace settings allocated for the research interviews were distinctly different. Location one: a Partner's Office (Figure 3.5) which has transparency from all sides through the agency of glass partitions. Location two: a workspace with an original design intention of collaborative activity (Figure 3.6). Both rooms were located within the main workspace and within close proximity to the centre of the floor layout and near to the coffee area. The setting choices were perceived by the study organisation as supporting privacy and confidentiality for the interviewee whilst encapsulating the open and transparent culture of the business.

Figure 3.5: Interview Room, Partners Office - Location 1

Figure 3.6: Interview Room, Collaborative Space - Location 2

Participants in both locations assessed their specific interview workspace as being appropriate and supportive in their ability to participate fully within the study.

3.8.2 Interview Information Sheet and Process Aide Memoire

To establish a consistent presentation of information and interview process, two documents were prepared and used during the interviews.

A repertory grid interview information sheet (Appendix 6), which incorporated a statement of the research aims, a brief description of the repertory grid interview process, affirmation of confidentiality and anonymity and a final check to establish the participant was still happy to continue.

A researchers 'aide memoire' of the process (Appendix 7), summarising the key stages and critical procedural steps was adapted from the 10 step basic procedure described by Jankowicz (2004) and Fransella et al. (2004).

3.8.3 The Structured Repertory Grid Interview

The objective of the structured repertory grid interview was to explore and elicit through their own language by way of personal constructs how the participants used the individual workspaces and what factors and/or characteristics encouraged then to use a

specific space. The process underpins personal construct theory, introduced in Section 3.5.4, "if we wish to know what the other person thinks, ask them" (Kelly, 1955, p322).

The interview process consisted of four main components (Jankowicz, 2004) as detailed in Section 3.5.5 Repertory Grid Technique.

Stage 1 The topic

The topic was discussed during the pre-interview phase, it was also detailed in the information sheet and reflects the issue being researched.

Stage 2 The elements

Twelve workspaces represented by photographs, were presented to the participants.

Stage 3 The constructs

Bi-polar constructs were elicited through participants systematically comparing and contrasting elements

Stage 4 The rating

Participants linked the constructs to the elements using a 1 - 5 scale, allowing them to situate the elements in relation to the different constructs (Jankowicz, 2004; Marsden and Littler, 2000).

3.8.3.1 The Elements: Individual Workspaces

The elements, the prompts presented for discussion, were pre-selected, rather than defined by the participants, as the individual workspaces within the ABW are integral to the research, and were considered exemplars by the organisation and the workplace designer. Researcher generated elements have the potential to introduce bias (Adams-Webber, 1998), to eliminate this possibility the workspaces were agreed as being representative of their normal day to day use by each of the participants at the start of the interview. Participants were also asked if there were any other workspaces which

they felt should be included within the elements, which eliminates the risk of omitting elements which may be important to the participant (Jankowicz, 2004). None were highlighted. The advantage of using supplied elements is that it presents each participant with the same workspaces, and although many will describe different uses and preferences, a common list supports the analysis of the grids and enhances the comparison of constructs and meanings between all participants (Jankowicz, 2004).

3.8.3.1.1 The Elements: As An Interpretation of Photo Elicitation

Elements are normally illustrated by words, and within this research, descriptions such as collaborative, alternative, offices, private space could have been used, however as workplace research has suggested, they have numerous meanings and interpretations. As the research aim was to explore how individuals used the workspaces within their own working environment, the repertory grid technique was adapted to incorporate an interpretation of photo elicitation, inserting a photograph into a research interview (Harper, 2002). Photographs of the workspaces in situ, were digitally colour printed onto A5 cards (Appendix 8) and incorporated into the repertory grid interview. Each photograph was individually numbered and these numbers consequently represented the twelve elements used within the grid.

Using photographs of the workspaces, to represent the elements within the repertory grid method, can enhance the elicitation of rich data as visuals are considered to stimulate interest and encourage greater discussion (Chang and Mak, 2018). Incorporating photographs into repertory grid methodology is common practice within consumer perception research, most specifically within tourism and the food industry (Chang and Mak, 2018; Pike and Kosti, 2016; Mak et. al., 2013) and has produced successful results.

Reflecting the aims of this study, using an exact replica of the workplace in the form of a photograph to illustrate the specific elements, has the potential to empower the participant to view the workspace as they envisage and use it within their day to day environment, augmenting reality rather than being limited by the designers' original intended representation through words (Banks, 2007), which creates more opportunity for personal interpretation (Lapenta, 2011).   Photographs also have the potential of triggering memories and connecting past and present events.

"The photograph by its very nature is 'of' the past. Yet it is also of the present. It preserves a fragment of the past that is transported in apparent entirety to the present – the "there-then" becomes the "here-now" (Edwards 1992, p7)

Parker 2009, also contends photography in research has impact, suggesting that it "reflects and evokes feelings, signification, and multiple voices that offer understandings and critiques that go beyond the confines of representation through language" (p1123).

3.8.3.2 The Constructs

The eliciting of constructs is critical to the success of the repertory grid interview as the responses are key to understanding the personal meanings and perceptions of the users. To enhance consistency of the elicitation process within the two locations and the replicability of this research in the future, a defined elicitation process was created.

The constructs were elicited using the triad method, a combination of three (3) elements.

The first four constructs in each interview used the same elements (workspaces), ensuring that each element appeared in a triad at least once.   Thereafter participants chose the element triads randomly. Details of the triad combinations selected, split by similarity and difference contrast are shown in Appendix 9.

Research indicates that the number of constructs elicited from individuals varies significantly (Fransella et al., 2004), with seven (7) to ten (10) producing the most salient responses (Reger and Huff, 1993). Due to the time constraints within this study, seven (7) constructs were determined as the desired number to deliver meaningful results.

3.8.3.2.1 Elicitation of Constructs

The elicitation of constructs was gathered through the process of triading. Each participant was presented with three (3) photographs (elements) simultaneously and asked two (2) questions with the request to respond according to how they use the specific workspaces and the factors and characteristics which encourage their use. This wording was to focus the participant on the specific topic of the research, enable bipolar constructs to be generated (similarities and differences) which ultimately will support the investigation and analysis of RQ1 and RQ2.

The questions were read from a prepared card to ensure instructions for each construct, and for each participant, were consistent, and to aid the reduction of potential researcher bias.

Question 1:   "In terms of thinking about how you use the space and the factors and characteristics which encourage use"

"Which two (2) of these are the same in some way and different from the third?"

The two similar elements (photographs) were then placed side by side and the contrast underneath, interviewees were then asked:

Question 2: "In terms of thinking about how you use the space and the factors and characteristics which encourage use."

"What do these two have in common which is different from the third?"

Occasionally the differences were not expressed in depth by the participant, so to encourage more elaboration, supplementary questions were asked.   For example, one participant stated:

Example - Participant 19

Expressed "*comfortable*" as a similarity of elements 1 and 2

Researcher   what is the opposite of 'comfortable' for you ?

Participant   *"formal"*

Often clarity was required on the participants' responses. A technique of 'laddering' (Jankowicz, 2004) was used to further expand on the meaning to decrease the potential ambiguity and bias (Hunter and Beck, 2000). Often there was a tendency to use all encompassing words, i.e. collaboration and intimacy which have a multitude of meanings for different individuals and in different contexts. When a word of this style was used in the elicitation of constructs, supplementary questions were asked by the researcher.   Below are two examples from the study which illustrate how laddering elicited more in-depth and personal meaning of the participants' expressions.

Example 1 - different definitions of intimacy and intimate

Participant 8

Researcher   What does intimacy mean to you?

Participant   *"Sitting close together, often shoulders touching"*

Researcher   And how does that encourage you to use this specific workspace

Participant   *"it implies a commitment to working together which is key in getting things done"*

Participant 14

Researcher	What does more intimate mean to you ?
Participant	*"Close proximity of sitting together in a booth"*
Researcher	How does that encourage you to use this specific workspace?
Participant	*"It gives a feeling of us all working together"*

Example 2 - definition of collaboration

Participant 24

Researcher	What does collaboration mean to you when using these specific workspaces?
Participant	*"Brainstorming in small groups"*
Researcher	Can you explain 'brainstorming' in a little more detail?
Participant	"Generating ideas to solve defined problems"
Researcher	What factors or characteristics within this workspace encourage you to use this specific workspace for collaboration?
Participant	*"Relaxed informal space with some privacy and soft furnishings"*

These responses and many others from the study support the concept that bipolar constructs are not necessarily lexicographic opposites (i.e. comfortable — uncomfortable) and highlight the value of using supplementary questions through a laddering technique to gather in-depth and meaningful constructs, which significantly inform the analysis of the data and strengthens the choice of methodology. The eliciting of clearly expressed constructs with unambiguous similarities and contrasts is critical to the achievement of authentic understanding (Marsden and Littler, 2000).

The constructs for the elicited triad were then recorded on the grid, the similar response on the emergent pole (left side) and the difference on the contrast pole (right side). The

individual's personal constructs were then read back to them by the researcher to confirm that the constructs recorded were captured correctly and were meaningful to them. Once agreed, the elicitation process was repeated for the other three pre-determined triads, after which participants chose random triads of elements, a process which continued until the bi-polar constructs ceased to produce different and meaningful data from previously elicited.

3.8.3.3 Ratings

The final phase required participants to rate each construct against each element (workspace) on the grid using a 5 point scale. The researcher introduced the rating scale and the notion that the bi-polar constructs need to be reflected upon from the two ends of the rating scale ranging from 1 to 5 (Fransella et al., 2004). A score of 1 indicates the element had a high correlation to the construct illustrated on the similarity/emergent pole (left hand column), while a score of 5 indicated an association with the difference/ contrast pole (right hand column). Elements can have the same rating and those rated between 2 - 4 are assessed as somewhere between the 2 extremes. Figure 3.7 shows an illustration of three constructs with ratings extracted from a completed repertory grid from this study.

Figure 3.7: Repertory grid extract with ratings

| | | | | | Elements | | | | | | | | |
| | 1 | | | | | | | | | 5 | | | |
Emergent Pole	1	2	3	4	5	6	7	8	9	10	11	12	Contrast Pole
Great catch up spaces, groups of people, easy to pop in	1	5	1	1	4	5	2	1	2	2	3	1	Formal, rigid, need to book, client meetings
Formal, business life, focussed work or planned meeting	5	2	4	5	1	1	4	5	2	5	4	5	Informal, great space to get away from desk, meet up with colleagues
Groups, team meetings, interviewing, collaboration, sharing ideas	1	2	4	2	4	3	1	2	4	4	3	1	1:1 quick catchup, AV+computer links, checking out projects

Before the participants left the interview, they were asked if there was any other information they wished to share in relation to their use of workspaces, experiences within the ABW and the repertory interview process itself. All responses were noted and included as additional data in the analysis.

Notes were taken throughout the interview documenting the split of element triads i.e. similar and difference numbers and laddering clarifications for each construct, for both reference and contextualisation during analysis stage. These notes assist in the capacity to convey 'credulous listening', a fundamental component of the grid technique which supports the elaboration of an individual's meanings (Jones, 1998). Taking comprehensive notes and reflecting back participants' constructs accurately are crucial to the success of the elicitation and subsequent analysis. Jankowicz (2004) considers recall to be adequate for initial stage of analysis, nevertheless best practice demands a more substantial application.

All interviews were completed within the allocated time and drew to a close with a review of the consent form to ensure all questions were answered and interviewees were still willing to have their data included in the study.

3.9   Recruitment of Participants

The participants were recruited from the two locations within the participating organisation, both of which had recently undertaken an ABW transformation. All employees based in these locations, or used them on a regular basis, were eligible to participate to ensure the data collected was from knowledgeable experts on the research theme (Silverman 2013). There were no restrictions, i.e. length of service, time in location, age or role within the organisation.

Whilst there are no formal sampling guidelines, Mason's (2010) research study on "Sample Size and Saturation in PhD Studies using Qualitative Interviews" concludes that appropriate sample sizes range from; 15 as the least smallest (Guest et al., 2006) to 25 being adequate for small projects (Charmaz, 2006); most study samples lie under 50. Therefore, as is typical within qualitative research the sample size for this research was small, a total of 32 employees.

The take up of the request to participate and the detailed and intensive work required, short timescales and tight deadlines, dictated and influenced the final sample size for this study, which is often a complication within real world qualitative studies (Robson, 2011).

3.10   Recruitment of Participating Organisation

The researcher's past and current client relationships were the source for the study organisation. As identified in a purposive sampling approach, central to selection were:

- an interest and belief in the research topic

- a relevant physical workplace design project

- a willingness to commit to agreed timescales

- unrestricted access to office environments

- access to all staff

Two (2) physical workspace projects were identified using the pre-requisite criteria. A requirement for relatively small locations accommodating no more than 250 people, supported the indicative number of interviews and, which could realistically be conducted within the agreed timeframe. The newly designed workspace must have been completed and occupied for at least 14 months but less than 36 months. These timings accommodate the life span suggested when conducting an industry standard

post occupancy evaluation (POE). The latter timing of 36 months is considered the cut off point where the new design would cease to have any significant impact on employee behaviours and projected new working practices.

3.10.1. Organisational Characteristics and Recruitment Criteria

Both physical workspace locations are regional offices of a professional services organisation employing predominantly knowledge workers. The firm operates ABW principles, flexible and agile working practices, which allows the choice of workspaces that best suit the way in which individuals or groups consider is most appropriate for a variety of daily tasks. Similar floor layouts, workspace specifications, workplace culture and knowledge workers as participants, were requisite for conducting the study in two different locations, to ensure consistent comparison.

3.10.2 Sensitivity of Research Project within Real World Environments

Research, related to workplace design and within business environments, is challenging and intrinsically socially, politically and ideologically situated in the real world context, which has the potential to bring an aura of apprehension to the personalities involved in the study (Savin-Baden and Major, 2013). Although the intention is to inform and not to assess or evaluate, the results can still be regarded as a mechanism for highlighting inadequacies and attributing blame, often with the potential to cause conflict which may impact relationships between the organisation and designer. Findings can also be misinterpreted, misused, or completely ignored.

Conscious of the impacts these issues may have on the success of the study, the researcher approached the participating organisation and designer to discuss the sensitivities. A consensus was formalised, stressing the purpose for this research was to enhance learning from the differing viewpoints, to shape understanding of the design

practices and the physical working environment, with the goal of informing future projects both within the organisation and industry best practice through a joint collaborative voice.

3.10.3 Proprietary Data and Confidentiality

Issues of proprietary data, confidentiality, security clearances, permissions and access to office environments with compliance and regulatory issues were a high priority for the researcher, the study organisation and workplace designer.   All parties agreed that a legally binding 'confidentiality agreement' should be prepared and signed by all parties. The agreement will remain in force for at least 5 years after the Professional Doctorate Thesis has been submitted.   An abbreviated version is illustrated in Appendix 10.

3.11   Participants

All participants were employees of the participating organisation, either located in the office or, frequent users. Recruitment was via an email (Appendix 11) sent from the Sponsoring Partner of the organisation, encouraging staff to support the project and indicating that results would have the potential to impact the ongoing development of the organisation's global workplace design development.

Location 1, 14 members of staff volunteered to be involved in the research as a result of the email, an additional three (3) signed up after viewing the interview process through the transparency of the meeting room which had fully glazed walls and windows. The remaining 15 participants came forward from location 2.

Although no specific participant criteria were identified, the request was made for volunteers to be drawn from different grades and lines of service in an endeavour to embrace a representative cross section of the different types of tasks and job roles being

undertaken throughout the workspace.   Demographic data was collected on gender, role and line of service (LoS).

3.12   Ethics

All standard ethical procedures were observed within this professional doctorate research study. A brief outline and purpose of the research was emailed to staff from the sponsor of the participating organisation together with a request for volunteers. Informed consent of participants was through a signed declaration form at the commencement of the interviews, confidentiality of personal and proprietary information was achieved through secure USB format or repository weblink transfer and encrypted key secure cloud storage accessible only by the researcher, and anonymity achieved through allocation of participant numbers. My ethical conduct was also determined by the best practice guidelines of the British Psychological Society which is my professional body.

3.13   Trustworthiness and Reflexivity

There is no collective view as to the way in which qualitative research should be assessed (Tong et al., 2007) partly due to the different ways in which it is conducted, so there is little clarity or specific direction as to what criteria is relevant (Cohen and Crabtree, 2008). Most often discussed are trustworthiness and authenticity (Miles and Huberman, 1994; Lincoln and Guba, 1985) which are determined through four criteria to review credibility, dependability, confirmability and transferability (Guba and Lincoln, 1994).   Viney and Nagy (2012), proponents of personal construct theory regard qualitative research as "a rigorous art of interpreting the meanings of others" (location 1434) and support the concept of using descriptive terms to explain the features which facilitate the determination of research quality. This study will therefore,

adopt credibility, dependability, confirmability and transferability to guide the discussion and to further enhance the quality of this study a fifth criteria, reflexivity has also been included. The rationale for this additional criteria reflects the acknowledgement that although the repertory grid method places the participant at the centre of the research, there is still potential for the researcher, who often is an expert on the topic also, to inadvertently affect the interviews and analysis. This section will, therefore, explain all five (5) criteria and summarise the steps taken within this study to fulfil them.

3.13.1 Credibility

Credibility - are the research findings believable and trustworthy? This criteria considers whether the topic of the study has been presented congruently and assesses if the participants' responses are interpreted accurately, to reflect a true representation of their perceptions, feelings and realities.

Researchers often cite long lasting-engagement e.g. acknowledging participants' beliefs and values, and building trust (Lincoln and Guba, 1985). This study relied upon the highly structured process of the repertory grid technique to ensure credibility, through its capacity to reduce researcher bias and its ability to allow participants to express their perceptions, needs and experiences according to their personal constructs and how they view the world. A perspective which is supported by Viney and Nagy's (2012) belief that credibility is "the extent to which findings represent the beliefs/feelings and values of the participants" (p 56).

3.13.2 Dependability

Dependability - the extent to which the research can be replicated by others in similar situations. In this study, dependability has been addressed by the extensive description

and explanation of the research technique and process for both data collection and data analysis, which should enable other researchers and industry experts to gather and analyse data in a similar fashion. The pilot scheme disclosed issues which can occur when conducting repertory grid interviews, and details of how these remedies were incorporated into the main study were described. Dependability was also augmented through the data collection process, where all constructs were presented back to the individual participants to ensure all constructs elicited were an exact representation of their responses and views.

3.13.3 Confirmability

Confirmability - is there a clear link between what I am measuring and what I intended to measure? Confirmability was established by inviting a subject expert on workplace strategy and design, to review the data analysis coding and results, which facilitated the development of a reasoned and coherent format which supported the link to and interpretation of the findings. To counter the effects of subjectivity, despite the repertory grid being deemed as a method which reduces researcher bias, the laddering technique within the interview was used to elicit more abstract values (Marsden and Littler, 2000) to ensure the participants' specific definitions, personal views and opinions were clearly understood, alleviating the propensity for preconceived interpretations and notions of the researcher to affect the data. Confirmability can also be evidenced within Chapter 5, Findings, where detailed discussions and inferences were supported by individual participant quotes from the repertory grid interviews, conversations and post occupancy annual review data and their relationship to existing literature.

3.13.4 Transferability

Transferability - the degree to which the findings may be transferred to another context or setting (Viney and Nagy, 2012; Lincoln and Guba, 1985). The aim of qualitative research is to reveal rich meaningful data from human experiences, this is normally achieved through small number of participants or locations, which often does not lend itself to generalisation (Creswell, 2013). A number of approaches were used to meet and enhance transferability criteria in this study. Firstly, the participants were representative of the topic being researched in this study. They were all employees of the participating organisation covering all lines of service, male and female, using the phenomena being explored on a daily basis and therefore could be deemed as knowledgeable and potential experts. Secondly, two locations from the participating organisations were included which is considered to be useful in qualitative research to determine and improve generalisation. Finally, as transferability is determined by the reader rather than the researcher, context within the study's research topic from both a practical and theoretical perspective was incorporated into the descriptions of and behaviours and experiences, to strengthen meanings.

3.13.5 Reflexivity

Reflection, learning from our experiences (Moon, 2006) and reflexivity, the questioning of how our attitudes, values and habits affect our thoughts and actions, are fundamental to my role both as a psychology practitioner and a human resource consultant. They are key components of continually developing as a professional, establishing awareness of my behaviour and understanding how I am perceived by others.

It could be assumed that incorporating reflexivity into this professional doctorate research would be an easy transition for me, however, as a relatively inexperienced

researcher, assimilating the concepts into this new scenario was rather daunting, particularly transitioning from writing from the perspective of others to then attempt to explain my personal choices and decisions, and how they influenced and shaped the research strategy and outcomes.   Jankowski et al., (2017) reflect on this enigma, questioning whether reflexivity is actually understood, particularly when the greater part of the research is written objectively and dispassionately.

Keeping learning and reflexive notes are routine in my professional life. Throughout this study it was important to continue this practice to enhance the quality and transparency of the research (Palaganas et al., 2017; Alvesson and Skoldberg, 2009). Many of the accounts are short notes and personal reflections narrating the highs and lows of my eight (8) year research journey, whilst others are slightly more detailed, focused on how my actions, thoughts and attitudes manifested that particular day or event and what, if any, affect did it have on the research process and the individual participants.

My research is aimed at exploring how individuals used and adapted the activity based workplace, the latest 'new ways of working' trend within many organisations.   My interest was fuelled through my professional role in managing workplace design transformational programmes which made use of both my human resources and psychology expertise. The majority of these projects were deemed to be extremely successful, and in reality they did deliver positively on many of the objectives and from an employee satisfaction perspective, which the organisations considered sufficient. I struggled with this approach, my background and experience have always instilled in me the need to ensure that key objectives are defined in order that any change can be assessed accurately. This lack of rigour deviated from my personal beliefs and values

that assessment was critical to learning and development, from both an individual and organisation perspective. This subsequently led me to being motivated to attempt to influence a more structured and user focussed approach to workplace design projects. I assumed that research investigating project success from a different angle would be challenged due to the potential of it being sensed as a criticism of both the organisation and designer.

Extract: Journey by train to meeting with participating organisation:

"I know this is a great opportunity and it would really inform best practice however, I am rather hesitant to meet the workplace consultant and real estate director"

"Why am I doubting my abilities ?"

"They have been managing these projects for many years, why would they listen to an outsider."

"Where is this lack of confidence coming from?"

"My professional history ?

"As VP of HR it took a great deal of persuading for me to accept that external consultants would be committed to both the process and the outcome and have the organisation's best interest at heart."

"I am questioning, to some extent, the views of the experts, the designers, the workplace consultants that the intended design of the specific workspaces will automatically encourage and promote the desired behaviour in a deterministic fashion - there is little or no free will "

The relationship between the workspaces and desired behaviours is much more complex, I know this from experience. Acknowledging my own background and

attitudes, I believed if I could influence the way in which workplace design is approached from a users perspective it could enhance the process. This was a critical point in choosing the methodology for the study. I needed to ensure that the approach reflected my world view, that the foundation of human behaviour is through a variety of choices, interpreting events and experiences and creating our own reality (Fransella and Dalton, 2000), rather than the perspective that there is one true reality which is measured objectively - all whilst still being relatable to both the project stakeholders and meeting the aims of the study. Using the repertory grid technique as the data collection method supported Kelly's (1955) view, that individuals take an active role in how they collect and interpret events and experiences and contributed to the study's aim of demonstrating that although we all live in the same world, we as individuals, interpret and experience it differently.

The process also ensured that the aims of the study, i.e. understanding from an individual's perspective in their own words and acknowledging them as active agents,. It also determined the power relations dynamics within the interview, by establishing my role as purely the researcher seeking in depth personal constructs, rather than my professional role as a psychologist and change management consultant, thus enabling the power to be predominantly in the participants' hands.

Throughout the process of coding I continually questioned myself.

"Am I being true to the actual personal constructs when allocating them to the categories"

There were many different perspectives regarding the workspaces and although I initially thought a logical system would develop using the project objectives as

categories, it was not until the third session of recoding that I felt it I could genuinely reflect on them being aligned to and represented to the sentiments of the participants.

"I am starting with the premise that the project objectives will be a good starting point for coding, many of the constructs are logically fitting in, yet there are others which express the behaviours and feelings of the participants, which are key to my beliefs and the study aims"

My professional life has always revolved around rational and logical, always the right way doing things, being in control.

"I need to relax, and acknowledge that the data will determine the realities they need to reflect".

"I am becoming more and more acquainted with the data - the categories are more related to knowledge working and correlate with some of the key workplace literature concepts rather than reflecting the defined project objectives".

"A third party expert to challenge and / or endorse my thoughts on the coding and categories, would be good feedback"

" Feeling less anxious now".

I found reflection and reflexivity extremely useful throughout my research, although at times I felt that I spent much of my time questioning whether there was a right or wrong way of doing things and when, at last my thesis was complete, how much impact would this small, yet potentially influential study have within the industry, especially with the uncertainty of how knowledge workers will continue to use offices during and after the Covid pandemic.

"am I again undermining my accomplishments ?"

The pandemic is having a major impact on how individuals work.

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"the challenge of individuals returning to the workplace has put significantly more importance on providing an appropriate and safe environment - inevitably will require more thought on the process of design for the future workplace, especially understanding the concerns employees will have on returning to the office and the responsibilities of the employer in providing the workspace"

It has been a long journey, enjoyable and challenging both personally and academically. I now better appreciate the rigours of research and believe I have reflected the research from both an academic and real world practical perspective. The findings answer the research questions posed, however, as a researcher and a psychologist I realise that this study has actually opened up even more questions and hypotheses, which acknowledges there is a great deal more we have to learn through continual exploration.

3.14 Summary

Chapter 3 has explored, justified and critiqued the research approach and design for this study.

The approach applied ontological, epistemological and axiological philosophies to inform the research. Constructionism in the form of constructive alternativism influenced the theoretical perspective. A qualitative data approach was identified, with the design utilising the method of repertory grid technique which was fully explained and decisions justified. The content analysis method was highlighted and is fully explored in Chapter 4. Limitations and trustworthiness were discussed and it is contended that the approach and design of this study are completely appropriate for this study, demonstrating reliability in addressing the research aims, which also supports the conclusion that future research could be replicated by others.

4 Data Analysis Strategy

4.1 Introduction

The chapter will begin by describing the demographics of the participants, then discuss the data analysis techniques for RGT adopted in this study, describing the approaches applied to both the individual grids and the aggregation of grids within each location.

4.2 Demographics

32 individuals, all full-time staff members of the participating organisation were recruited for the qualitative research study, 17 individuals from Location 1 and 15 from Location 2. The participation was spread across all departments and the gender split was 13 females to 19 males. (See Figure 4.1). Details of gender, role and LoS were collected to facilitate the analysis of any consequential variances within the constructs, which focus attention on workspace choice and influence factors and characteristics. Participants were allocated numbers to ensure their identities were not disclosed and remained confidential at all times.

Figure 4.1: Demographics

Gender	Line of Service (LoS)	Role
Male	Assurance	Associate
Male	Tax	Partner
Male	Assurance	Head of Practice
Male	Assurance	Associate
Male	Consulting	Consultant
Male	Infrastructure: Secretarial services	Manager
Male	Deals	Director
Male	Deals	Manager
Male	Infrastructure: Real Estate	Director
Male	Consulting	Consultant

Gender	Line of Service (LoS)	Role
Male	Assurance	Senior Associate
Male	Tax	Manager
Male	Tax	Senior Manager
Male	Tax	Senior Manager
Male	Tax	Senior Manager
Male	Assurance	Senior Manager
Male	Infrastructure: Real Estate	Senior Manager
Male	IFS	Associate
Male	Assurance	Manager
Female	Assurance	Senior Manager
Female	Tax	Manager
Female	Assurance	Director
Female	Assurance	Senior Manager
Female	Consulting	Consultant
Female	Deals	Associate
Female	Tax	Associate
Female	Infrastructure: Secretarial services	Personal Assistant
Female	Assurance	Associate
Female	Deals	Manager
Female	IFS	Senior Manager
Female	One Finance	Associate
Female	Assurance	Associate

4.3   Data Analysis of Repertory Grids

As discussed in Chapter 3, Research Approach and Design, there are numerous techniques which can be employed to analyse individual repertory grids and the aggregation of a number of grids, as not all grids elicit the same data. As a qualitative approach was determined the most appropriate to answer the research questions, the widely accepted method defined by Jankowicz (2004) was adapted and applied. The

rationale for this decision was supported by Jankowicz's background as a founding researcher of the repertory grid methodology and prolific empirical research. A qualitative approach also defers to the ideology of Kelly's (1955) personal construct theory, which explores 'how an individual makes sense of the world', rather than using quantitative statistical data which some researchers consider does not underpin this theory (Cassell and Walsh, 2004; Marsden and Littler, 2000), as using statistics deviates from the fundamental premise of Kelly's (1955) theory. The structured stages of this method, which encompass the analysis of each individual grid and the aggregation of all grids elicited within this study, were conducted manually to enhance immersion of the data, and are discussed below. The analysis process again follows the recommended format by Jankowicz (2004).

4.3.1   Analysis of Individual Grids

Stage 1: Process Analysis

Process analysis, the initial exploration of the data was conducted for each individual grid with emphasis on purely the conversational phase of the interview, rather than the results of the completed repertory grid. The analysis commences immediately after the completion of each repertory grid interview, with notes and reflections recorded by the researcher on how the participant responded and reacted to the components of the technique, i.e. the topic, elements, the qualifying questions, constructs and the ratings. Attention is also given to how the participant reacted during the interview process, did they demonstrate any specific emotions or make any comments regarding the elicitation (Jankowicz, 2004). An extract from the process analysis stage, with data attributed to participants 21 and 22 is shown in Figure 4.2.

Figure 4.2: Process analysis - P21 and P22

Participant	Researcher's Reflections
P21	Happy to be involved in the process, *"organisation puts employees high on the agenda - can see this through the workspace"*. 10 out of the 12 elements (workspaces) used, did not consider 2 to be alternatives for choice although accepted that others did use them. Very articulate during elicitation - knew exactly how and why. Was intrigued by the rating - gave food for thought as to future use.
P22	Was one of the liaisons in setting up schedule for this study and looked forward to the interview. Found the construct elicitation difficult as considers the workspace to be *"too relaxed" - "not professional enough"* for the firm's image. Was a little stressed during the process, regardless of how I tried to make the experience relaxed. Only 4 constructs elicited - ratings involved a lot of mid points within the 1-5 scale - unable to make associations between the workspaces.

Reflecting on participant interviews was a useful aide-memoire as to the complexity of the topic, with the participant views reflecting a number of the contradictory perspectives highlighted in the ABW and open workplace literature which supports the benefit of conducting this study. The process also established preliminary immersion into the data enhancing an awareness, for the researcher, of the relationships between the elements and constructs as defined by the participants (Jankowicz, 2004).

Stage 2: Eyeball Analysis

Eyeball analysis is more focussed on the output of the Repertory Grid. It was conducted at the end of each day's interview schedule to increase familiarisation of the primary data. Although the process is similar to stage 1 - process analysis, the emphasis is now on the meaning of the grid, reflected through the four (4) main components of

the repertory grid process; the topic, elements, constructs and ratings. Jankowicz (2004) recommends a six step procedure for process analysis (p80-82), however, the first two steps were eliminated, within this study, as they are relevant only when the topic and elements are elicited by the participants. As discussed in Chapter 3, the topic and elements within this study were determined by the researcher in order to accurately address the research topic and answer the three (3) research questions. Below are the remaining four steps used for familiarisation and researcher reflection:

Step 3   How many constructs were elicited? This demonstrates how engaged the interviewee was with the process and their interest/expertise in the topic.

Step 4   How did they rate the elements? What was the distribution between 1 to 5? Were there a lot of mid points ('3s') ? This could indicate the constructs were not representative of the element?

                How has each element been rated? Is there a pattern developing for each element?

Step 5   Familiarisation with elements, constructs and ratings. How does the participant view the elements.

Step 6   Draw conclusions. Summarise main points and observations.

The eyeball analysis stage highlighted the way in which the interviewees thought about how they used the workspaces within their working day, the way they categorised their work activities and which features fostered this choice.

31 out of the 32 individual repertory grids disseminated a similar quantity of data, as seven (7) constructs were elicited from each of these participants; only 4 constructs were elicited from the remaining participant.

To further elaborate on the breadth of data produced by steps 4, 5 and 6 of the eyeball analysis, Figure 4.3 and Figure 4.4 show extract examples of its application.

Figure 4.3: Extract - eyeball analysis for P11, constructs 1 and 2

Participant 11		1					Elements						5	
	Emergent Pole	1	2	3	4	5	6	7	8	9	10	11	12	Contrast Pole
P11-1	informal, open plan, collaborative	1	2	5	1	3	4	2	1	2	4	4	1	More confidential, specific, voice conferencing
P11-2	Collaborative, engagement, informality, openness	1	5	2	1	2	5	2	1	2	4	3	1	Formality, specific tasks, confidential, video/ voice conference

We can see from the first two constructs elicited from participant 11 that similar language was used to interpret and explain the similarities and differences from the first 2 triads. They contrast "informality, collaborative and openness" with "confidential, formal and specific". Through the rating system we see that informality and collaboration (emergent pole 1) correlates with 4 other elements (workspaces) numbers 1 4, 8 and 12 in both construct 1 and construct 2. Whilst formal and confidential (contrast pole 5) matches only one element (workspace) number 3 in construct 1 and two elements (workspaces) numbers 2 and 6 in construct 2. To illustrate this association, Figure 4.4 demonstrates that participant 11 perceives the more informal and open workspaces as conducive to collaboration and considered the more enclosed workspaces as appropriate for confidentiality.

Figure 4.4: Elements represented by workspaces - P11, constructs 1 and 2

Collaboration:

Element 1	Element 4	Element 8	Element 12

Confidentiality:
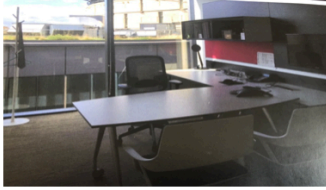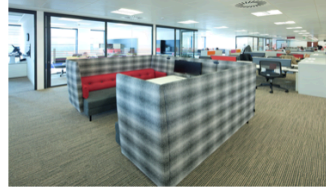
Element 2   Element 3   Element 6
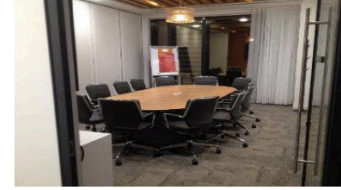
The results of the laddering technique, which promotes more in-depth explanations during the interview (described in Chapter 3, Research Approach and Design) and ensures that the participant's own perspective of the word/behaviour is documented, further enhanced the understanding of the meanings contained in constructs 1 and 2.

Collaboration: *"collective working with opportunity to discuss views and ideas"*

Openness: *"conveys the atmosphere where you have the ability to say what you think and feel"*

                      opposite

                      "more formal = more hierarchical - status"

Formality: *"more focussed and professional work with clients"*
                      "client meetings more serious - traditional /formal settings"

The eyeball analysis process was applied to each individual repertory grid which informed and shaped initial observations and conclusions. The combination of both the process and eyeball analysis also delivered an extensive evolving narrative of individual repertory grid interviews, which reflected the participants' views and experience of the ABW environment.

Stage 3: Simple relationships between elements

Step 3 is a more structured and explicit method of the eyeball analysis, which focuses on the differences in ratings on the elements by calculating a score, which then translates into a similarity % score. This analysis further develops our understanding of how the participant relates to one element and if this thinking is transferred similarly to other elements. As the analysis explores relationships between the elements, and highlights how each participant assessed each workspace, the results indicate which elements (workspaces) a participant perceives as 'most alike' and also which are 'least alike' (see steps below). As this study's aim is to understand how and why participants use the workspaces, establishing comparable characteristics and features of individual workspaces is critical to the findings, as it provides additional significant data in which to answer the research questions and form conclusions. The procedure involves the summation of differences and comparing the outcomes, a software package can be utilised, however as with all other analysis techniques in this study, the calculation was achieved manually and was implemented as described below:

Step 1:   The differences in ratings on the first pair of elements are calculated i.e. E1 and E2. The elements were then compared against each other i.e. E1 against E2, E3, E4, then E2 against E3 etc until all 12 had been compared against each other. This resulted in a number, labelled a sum of difference, for each pair of elements compared.

Step 2:   The sum of differences are then converted into a similarity % score using the following formula:

100 {[Sum of difference/(largest rating -1)]} x 100.

A score of 100% indicates that the workspaces being compared are considered identical to each other (Jankowicz, 2004), the more the percentage decreases the less alike the

elements become. An extract from the repertory grid for participant 11 illustrates the sum of differences computation for constructs 1 and 2 is shown in Figure 4.5.

Figure 4.5: Extract of Repertory Grid - element similarity % scores - P11

	Participant 11													
	1					Elements							5	
	Emergent Pole	1	2	3	4	5	6	7	8	9	10	11	12	Contrast Pole
P11-1	informal, open plan, collaborative	1	2	5	1	3	4	2	1	2	4	4	1	More confidential, specific, voice conferencing
P11-2	Collaborative, engagement, informality, openness	1	5	2	1	2	5	2	1	2	4	3	1	Formality, specific tasks, confidential, video/ voice conference
	Against	W1	W2	w3	w4	w5	w6	w7	w8	w 9	w 10	w 11	W 12	
	W 1		20	10	2	13	21	6	10	12	19	15	5	
	W2			18	20	13	5	18	18	16	9	13	25	
	1		28.57	64.29	92.86	53.57	25.00	78.57	64.29	57.14	32.14	46.43	82.14	
	2			35.71	28.57	53.57	82.14	35.71	35.71	42.86	67.86	53.57	10.71	

From this analysis we can determine that participant 11 appraised elements 2 and 12 (an enclosed office and informal sitting room) to be least alike (10.71%) and elements 1 and 4 (sofa style workspaces) to be most alike (92.86%). A visual representation of the differences/similarities between workspaces for participant 11 can be seen in Figure 4.6.

Figure 4.6: Workspace representation of 'most alike' and 'least alike' - P11

Most Alike   Least Alike

Similarity and difference scores and percentages were calculated for all participants, and were assimilated into the findings which are discussed in more depth in Chapter 5.

4.3.2   Analysis of More Than One Grid

On completion of the single grids analysis, the grids were then accumulated to enable the aggregation of the different meanings. As it is critical that this analysis preserves the participants' individual personal meanings as much as possible, this study followed the recommendations from repertory grid methodology literature (Jankowicz 2004), which is based on a form of content analysis. Similar to other qualitative content or

thematic analysis approaches, which code and categorise words and phrases, the repertory grid process categorises the constructs. A set of themes is required to be established, these can be determined through pre-existing categories within research literature or, as within this study, developed through a "bootstrapping" approach (Jankowicz, 2004), a practice in which the researcher creates categories throughout the evaluation of each bi-polar construct elicited from the repertory grid interviews. The use of the content analysis technique is rare in personal construct research, although it is regularly cited in organisational, psychology and management research (Jankowicz, 2004). This could be attributed to the fact that constructs often contain more comprehensive data, which is more complicated to associate to a single code. The complexity of coding, within this study, is discussed in more detail later in this chapter and illustrated through Figure 4.8.

Familiarisation of the 221 bi-polar constructs generated from the 32 repertory grids commenced at the individual grid analysis stage, where meaningful patterns were identified. This was then followed by the systematic assessment of each individual bi-polar construct, in order to begin the process of generating categories. Each bi-polar construct was printed onto cards, which were identifiable by both the participant number and construct number, that is the order in which they were elicited during the interview. To enhance making sense of the meaning of the construct, the laddering data and additional comments were written on the back of the card. See Figure 4.7 for an example of the bipolar construct card for the 5th construct elicited from participant 25.

Figure 4.7: Bi-polar construct and definition/comments card - P25, construct 5

	Emergent Pole	Contrast Pole		Back of construct card
P25-5	Non-sensitive business and social, knowledge sharing, changing channels	Meet and greet due to positioning in the office		Definition: "Changing Channels = being able to take time out and have some personal time"

Each card was also colour coded to denote gender which would facilitate exploration of whether certain aspects of the workspaces were more relevant to one specific gender classification. Male - grey; female - blue. Each construct card was then read and assigned to a category, with new categories created specifically to support all the elicited data, until all 221 constructs had been assigned.

Due to the depth of data gathered during the elicitation of participant's perspectives it became clear, when assigning the constructs to categories, that a number fitted into more than one category. On each occurrence, duplicate cards were printed and subsequently allocated into other appropriate categories, supporting the aim of making the data more manageable. A working example of multiple category potential, is illustrated in Figure 4.8.

Figure 4.8: Bi-polar construct - multiple category potential - P25, construct 5

	Emergent Pole	Contrast Pole
P25-5	Non-sensitive business and social, knowledge sharing, changing channels	Meet and greet due to positioning in the office

This example shows that participant 25, used and experienced the two elements (workspaces) considered similar from the triad being compared, to four (4) different

factors/characteristics, i.e. non sensitive business, social, knowledge sharing and changing channels.

The categorisation process was strengthened further through an iterative process of systematically reviewing each category on every occasion a new construct was added i.e. scrutinising and verifying that all constructs were associated with both the category and each other. This approach, although extremely time consuming, contributed to ensuring the fundamental concept of the category remained intact. The process also emphasised that there was a substantial amount of data from the contrast poles, which was extremely meaningful as to the users' assessment of the workspaces and which would not be incorporated into the data using the standard format of categorisation. This is again illustrated by participant 25's perception of the contrasted element (workspace) during the elicitation of construct 5. See Figure 4.9. Shown in purple, the contrast element (workspace) was deemed only suitable for "meet and greet" activities due to the positioning within the office.

Figure 4.9: Contrast pole data P25, construct 5

		Contrast Pole
P25-5	Non-sensitive business and social, knowledge sharing, changing channels	**Meet and greet due to positioning in the office**

As this additional fundamental knowledge is of great consequence in answering the research questions, a second analysis was conducted within this study, employing the same categorisation approach to the contrast pole elicitations as the emergent pole constructs, resulting in two sets of data to acknowledge all perceptions were elicited from the participants and to further augment understanding.

To strengthen research trustworthiness, several iterations of the full categorisation process were conducted, each after periods of reflection, which finally concluded in a set of categories within category themes being created. See Figure 4.10.

Figure 4.10: Categories within category themes: researcher version

Categories within Category themes:	Workspace use and influencing factors
Workspace activities:	Interaction, Collaboration, Participation, Engagement
	Other interactions - Groups, teams, catch-ups, 1:1
	Individual - day to day working, focussed working
Convention:	Formal - serious - structured
	Informal - relaxed - not serious
	Social
Privacy:	Private, Interruptions / Do not disturb / disturbance
	Barriers/Walls/Doors
	Noise / Quiet
Aesthetics:	Colour, warm
	Furnishings- seating - decor
Instrumentality:	Comfortable
	Proximity
	Openness- visibility
	Location
	Usability - not user friendly - Ease of use
Symbolism:	Hierarchy
	Organisational commitment
Well-being:	Personal time - me time, changing channels
Autonomy:	Choice, control

Following Jankowicz's (2004) recommended process to establish reliability, a senior member of the participating organisation's Real Estate Team and who is an expert in

workplace design, volunteered to become a collaborator and independently code and categorise the constructs. This process was replicated and conducted in a format similar to that of the researcher, i.e. he was given the construct cards and the list of category names and definitions and asked to allocate them accordingly, creating additional categories and highlighting discrepancies if necessary. Both sets of categories were then compared in order to verify the appropriateness of the allocations and agree definitions. After discussions and further interpretation of the meaning of the constructs, the discrepancies were either reallocated or remained in the initial categories. Whilst most of the differences were quickly agreed, well-being, autonomy and barriers/walls/doors were subject to much debate. The independent expert considered 'choice' to be a major influence within well-being, emphasising choice and control as features within organisational well-being strategy. As discussed in Chapter 2, this notion is also supported by research (Kim et. al., 2016) where self control and self determination are considered essential to support psychological wellbeing. Category theme allocation was again the issue regarding barriers/walls/doors, with the expert assigning these constructs to privacy. After reviewing the participants' meanings, it was agreed that these features were within the workspaces, and described as influencing functionality and supporting workplace activities and tasks, therefore they should be incorporated into the instrumentality category. Autonomy was considered an overarching category, which participants expressed as an influence in many of their decisions, it was therefore agreed by the researcher and expert to incorporate it wherever appropriate throughout the findings discussions.   Figure 4.11 illustrates the final version of categories and themes which formed the basis for analysis and discussion in order to address the three research questions.

Figure 4.11: Category themes and categories - final version

Categories within Category themes:	Workspace use and influencing factors
Autonomy:	Choice, control
Workspace activities:	Collaboration, Participation, Engagement
	Other interactions - Groups - teams, catch-ups, 1:1
	Individual - day to day working - focussed working
Convention:	Formal - serious - structured
	Informal - relaxed - not serious
	Social
Aesthetics:	Colour, warm
	Furnishings- seating - decor
Instrumentality:	Privacy, Noise / Quiet, Interruptions / Do not disturb / disturbance,
	Barriers/Walls/Doors
	Comfortable
	Proximity
	Openness- visibility
	Location
	Usability - not user friendly - Ease of use
Symbolism:	Hierarchy
	Organisational commitment
	Well-being - Personal time - me time, Changing channels

4.4   Summary

This chapter clarifies and supports the decision to use the Repertory Grid technique in order to elicit meaningful data from users, to identify how they are using the workspaces and what are the influencing characteristics and features.

The initial analysis approach focused on the relationships between the elements and constructs from individual users, indicating how they assessed the similarities and differences of the workspaces, which also produced 'least alike' and 'most alike comparisons and their views on utilisation and usefulness.

The second stage of analysis, the aggregation of all grids, initially followed the core categorisation process presented in repertory grid methodology literature (Jankowicz, 2004). It was then adapted to categorise data from both poles elicited on each construct, resulting in two (2) sets of data, which were subsequently combined. The final categorisation was independently corroborated with 340 constructs assigned to 19 categories within six (6) category themes.

This analysis data, together with the laddering quotes and final comments obtained at the end of each interview, supports and contrasts with the ABW literature discussed in Chapter 2, which reinforces the need to better understand how individuals perceive and use their workspaces. This data will be explored and discussed in Chapter 5, Findings with similarities and differences compared to both the ABW literature and the actual original design intention of individual workspaces, together with any findings of gender, role and line of service categorisation differences.

5 Findings

5.1 Introduction

The purpose of this chapter is to interpret the analysis and present the findings. The research questions will form the structure of this chapter; Section 5.2 will address RQ1 'how are the participants using the activity based workspaces?' drawing from the convention and workplace behaviour themes; Section 5.3 will locate the data in order to fulfil RQ2 'what are the factors and characteristics which encourage participants to use a specific space?', using expressions from the aesthetics, instrumentality and symbolism category themes. The findings from these two Sections (5.2 and 5.3) will then be reviewed and compared with the data obtained from the participating organisations ABW project documentation, to assess RQ3 'how the actual use reflects the original design intention?' in Section 5.4. Finally, Section 5.5 will appraise the summary findings for post project 'one year on' review, and discuss relationships and links with both the findings and relevant literature.

5.2 Research Question 1

RQ1: How are the participants using the activity based workspaces ?

The first research question explores the participants' preferences as to choice of workspaces within the ABW configuration, and how they support specific workplace behaviours and activities, collaborative, individual, formal and informal interactions, to gain an understanding of which deliver the best optimisation for each work practice (Morrow et al., 2012).

The frequency data of the elicited bi-polar constructs demonstrate the wide range of conventions and workplace behaviours which have potential to be of high importance, as to revealing how workspaces are used and for what activities. These constructs are

often labelled "key constructs". The emergent pole contains the perceptions elicited for the two elements (workspaces) which were deemed similar by the participants, and the contrast pole, the workspace which was different, describes how it was different from the other two.   Four (4) categories, two (2) within the theme of workplace behaviours and two (2) within the concentration theme dominated the number of elicited constructs, reflecting the participants' coherence between their perceptions and use of the workspaces. Figure 5.1 details the construct frequencies.

Figure 5.1: Construct frequencies - workspace behaviours and convention

Category Theme	Categories	Definition	Emergent Pole	Contrast Pole
Workspace behaviours	Collaboration	Working together towards a common goal, brainstorming, participation, engagement, sharing ideas.	33	15
	Individual	Individual, day to day working, focussed tasks, concentration, self working	31	17
Convention	Informal	Informal, relaxed, not serious	51	30
	Formal	Formal, serious, structured	31	26

The data on workplace behaviours emphasises that both individual and collective activities are a constant part of daily routine, whilst the convention frequencies demonstrate the dichotomy of formality and informality of these activities when defining how specific workspaces are used.

5.2.1   Workplace Behaviours

5.2.1.1 Collaboration

Increased interaction and collaboration are considered key elements within ABW strategy and accordingly, improved collaboration was identified as one of the participating organisation's ABW project objectives. Improved collaboration, however,

is often not realised within ABW designs (Rolfö et al., 2018; Bernstein, 2012) with many theories cited for this lack of success, i.e extensive diversity in the meaning of collaboration and lack of clarification of the ABW project objectives, both of which will be discussed in this section. Space, proximity and aesthetics are also factors impacting success, and will be examined in Section 5.3 Research Question 2.

The collaboration category of bi-polar constructs had a variety of contrasts, ranging from formal, confidential, organised to specific tasks and day to day working. The findings also demonstrate that when participants defined a workspace for collaboration it most correlated with informal, relaxed and comfortable.

P11-1	*"informal, open, collaborative"*	*— v —*	*"more confidential, specific tasks"*
P5-2	*"not client facing, informal sitting together, collaborative, fun"*	*— v —*	*"formal, organised, induces professionalism"*
P29-5	*"collaboration, open, bright, relaxed, informal"*	*— v —*	*"video conferencing, formal meetings and project updates"*
P18-7	*"collaborative, relaxed, colourful, small catch-ups"*	*— v —*	*"useless, badly designed, structured and uncomfortable"*

These findings suggest that the manifestation of relaxed, informal workspaces through their features and characteristics, emphasise the participants' perceptions of what facilitates collaboration, encourages the sharing of ideas, and how it influences the way they react to, and experience them (Dazkir and Read, 2012).

A particular issue this study found was the lack of a common definition of collaboration, which is a recurrent finding from empirical evidence. The constructs exhibited numerous and differing perspectives of what collaboration meant to the participants, accentuating the difficulty in understanding the actual meaning, underpinning the notion

that collaborative characteristics cannot be quantified (Katz and Martin, 1997). See Appendix 12 for the full listing of participants' definitions of collaboration.

P1   *"Problem solving - finding solutions to client problems together"*

P 2   *"Everyone having their say in order to make the best decision"*

P11   *"Engagement - collaborate together to share ideas"*
        Collaborate: *"working together to find solutions"*

P32   *"Looking at data and documents, reviewing together to help resolve
         query to client"*

P24   *"Brainstorming in small group"*
        "Brainstorming = generating ideas to solve defined problems"

Having an appreciation, therefore, of what the definition of increased collaboration is and how it may be observed and measured is necessary to better understand how the workspaces might encourage collaboration.

Significantly, the findings also indicate that all workspaces, with the exception of quiet spaces, were identified as being used for collaborative activities. Most notably, the breakout spaces, assigned as social space, time away from day to day working and socialising were seen as especially functional when interacting with peers.

P5-5   *"Client facing, more structured, sense*   — v —   *"Relaxed, collaborative"*
        of formality"   *("co-creating with colleagues")*

P7-3   *"Variety of uses - individual and*   — v —   *"formal activities, space for*
        collective, collaboration"   *presentations"*
        ("working with colleagues")

Further insight was gained from the laddering definitions and reflective comments, as to the participants' perception of the inherent characteristics of collaboration and how it shapes their daily activities.

P18-1   *"collaborative - working together to reach common goal"*

P18-7   *"environment enhances working together (relaxed and colourful)"*

P 25-2   *"collaboration - sharing information and working together on a project - just part of what we usually do"*

P7   *"everyday is varied, work on our own, work together on project, network so we choose workspace depending upon specific needs and atmosphere required and, of course what is free at the moment"*

P16   *"never know how each day will be until arrive in the morning, think it is going to be quiet then you get caught up collaborating on other projects"*

The overall collaboration category findings imply that collaboration is not purely shaped through the use of the collaborative workspaces, although they clearly demonstrate that informal, relaxed and comfortable characteristics are considered enablers. The participants expressed that the majority of their interactions were to progress and further develop specific tasks, suggesting that collaboration is an integral part of their role, a fundamental component of intrinsic motivation, essential to achieving individual and project goals.

5.2.1.2 Individual Working

The majority of the participants referred to working on their own as 'day to day working', which encompassed concentration and focussed work, number crunching, working on laptop and phone calls. The construct contrasts again were varied and, as would have been anticipated, included collaborative, more interruptible and formal.

The majority of the participants used the day to day desks, as the design intended i.e. a bookable, informal, individual working area, adhering to the protocol of a more quiet area without phone conversations.

Non Assigned Workspaces (Day to Day desks)

P10-2	" Individual or colleague catch up, close proximity for ad hoc conversations"	— v —	"formal telling sessions, feedback on project progress"
P6-7	"work tasks, concentration, individual"	— v —	"team, less private, more flexible, inject of ideas

However, there were also contradictions regarding the perception of the ambiance and purpose of this space with participants using it for small get togethers and phone calls, which is contrary to the original design intention and protocols.

P19-4	"conversation, get togethers, phone calls"	— v —	"More formal area, designated space, get stuff done, individual task"
P32-7	"day to day work, individual or with colleagues, open and more informal styling"	— v —	"enclosed for privacy yet open, feel with glass collaborative….."

Breakouts and quiet spaces were also perceived as suitable for individual and concentrated work, reflecting earlier evidence that participants choose workspaces based on preference.

Breakout workspace

P11-3	"ability to drop in, no need to book, work with oneself, freedom"	— v —	"collaborative, opportunities for discussions. ….."

Quiet workspace

P1-4	"Individual work on own, remote, no noise, no need to book"	— v —	"collaboration, team work"

The constructs and reflective comments identified a number of contrasting motivations for the choice of individual workspace; close proximity for ad hoc interactions, ability to concentrate and quick access to colleagues. Significantly, *"can just drop in"* and *"no*

need to book" were repeatedly elicited as motives for using alternative workspaces which may suggest, that although preferences and needs influence the choice of workspace, the requirement to book may be a deterrent.

5.2.1.3 Other Workplace Activities

The daily activities of the participants encompass a wide variety of activities, with the findings indicating a bias towards meeting rooms and structured workspaces perceived as private and confidential, for formal activities, and a wide range of workspaces used for informal, collaborative and individual work.   This practice continues with the other interactive activities i.e. catch up, team/ group meetings and one to one discussions, with the choice determined through activity requirements i.e. number of individuals, individual preference and availability of space.

5.2.2 Convention

Notwithstanding that each elicitation reflects a bi-polar construct, the informal - formal contrast was the only category which featured a direct duality within this study.   The findings underline the variances in how the users prefer to work and emphasised a substantial distinction between informal and formal communications from an interaction perspective. (Gomez and Daily, 2017; Ergen, 2010).

5.2.2.1 Formal

Formal, external, official and client focussed interactions were associated with hierarchy, rules and cultural norms, most often pre-planned and organised, and aligned with more structured and private workspaces, with a perception of privacy and confidentiality.

P8-1	"informal drop in, quick chats, almost all conversations except private and confidential	— v —	"Closed door = private + confidential, need to book
P14-5	"Meeting rooms, rigidity, clients and serious business topics"	— v —	"Multitude of options, groups, individual, fun, relaxing"
P14-7	"meetings - debate + share, projects	— v —	"old fashioned, traditional, hierarchical, headmasters study
P23-2	"client areas, outside formal meeting, appraisals"	— v —	"Meeting, solve issues, present ideas - stand at table, quick, flexible"
P1-7	"space - telling, difficult conversations, privacy"	— v —	"open, team meetings, encourages others to join in"

The laddering process within the repertory interviews further strengthens the individual users' perceptions of "formal" and "formality". Below are a few examples, Appendix 13 contains the full list.

P1: *"More serious side of the business"*

P3: *"More of a consequence / risk"*

P15 *"More official - most often linked to clients"*

P16 *"More defined by old style format and working styles"*

P26 *"More structured and serious discussions"*

These findings infer that the booking of meeting rooms automatically reflects the nature of the interaction which is most commonly dominated by client, external and official frames of reference.

5.2.2.2 Informal

In contrast to the perceptions of formal, informal interactions were deemed as routine activities, internal, often ad hoc and most commonly quick, short and impromptu.

P24-5	*"Free space, not bookable, impromptu chats'*	— v —	*"glass door, confidential, private meeting with visibility, need to book"*
P15-6	*"quick catch-up, ad hoc small business + social*	— v —	*"normal business, day to day task, meetings need to book"*
P11-6	*"ability to work together, informal, freedom of access, use at drop of hat"* (*"Freedom of use = no booking"*)	— v —	*"more formal, need to book, ability to work with reports, old fashioned"*

These 'informal' statements demonstrate that having the flexibility to just pop in and use a workspace were important for informal interactions, suggesting that formal bookable workspaces were considered inappropriate.

The users' reflective comments, substantiate the construct elicitation findings and expand our understanding further, revealing that informal working is most representative of daily interactions by the majority of the users, in which they used either a day to day workspace or one of the informal workspaces. Significantly, these informal interactions were rarely scheduled, with most taking place in an instance of time, for as little as a few seconds, involving specific topics requiring either an opinion or the need to progress or complete a task or goal, and took place near to the day to day desks or collaboration/alternative spaces. The way in which interactions are conducted and the variety of activities carried out in one day, reinforce the ways of working of the knowledge worker community (Prusak and Davenport, 2013; Parker et al., 2017). These findings are clearly representative of highly autonomous and highly interactive individuals within this specific ABW environment and may not be indicative for those individuals who have substantially different role and task profiles.

P1   *"Spend most days at workstation for a period of time and then at other workspaces - depending upon catch-up topic"*

P7   *"Everyday is varied, we work on our own, work together, network, so we choose our workspace depending upon specific needs, the atmosphere, and of course what is available at that moment"*

P14   *"my normal day consists of individual working and lots of short discussions to resolve an issue, brainstorm ideas or just catch-up"*

P24   *"Our work is really diverse, so the choice and relaxed format of workspaces is great for individual working, building team relationships and developing networks for other LoS groups"*

The links between hierarchy, structure and formal communication (Gomez and Daily 2017), together with frequency of informal interactions are regularly discussed in empirical research (Rashid et al., 2006; Kraut et al., 2002), which this study substantiates through both the elicitation of users' preferences and insights as to individual workspace utilisation, and their reflective comments at the end of the interview.

The findings clearly indicate that users' choice of workspace is influenced by the purpose of the workplace activity with a clear demarcation between formal, client focussed interactions and those of informal daily routine activities. There were numerous indications that participants had personal preferences and indeed there were perceptions that specific workspaces augmented their interactions through a variety of elements including technology, aesthetics and instrumentality. These influential associations will be discussed in Section 5.3 when the findings will explore RQ2: what factors and characteristics encourage participants to use a specific space.

5.2.2.3 Social

The participants stressed, through the construct elicitation and reflective comments, that social and networking interactions were important, both to them as individuals and to the organisation.   Developing their LoS and interest group community relationships were considered key to their success and ensured every opportunity was taken to socially connect in the more informal and relaxing workspaces.

P29   *"Often bump into people on my way to the coffee area, or from one catch up meeting to another, great networking opportunities, especially when I spend a lot of time in different locations "*

P24   *"Variety and relaxed format of workspaces is great for building team relationship and developing networking with other LoS"*

P13   *"Use workspace number one regularly for team lunches"*

Research acknowledges that social interactions are important within an organisation on a number of levels.   They help individuals to understand the nuances of the organisation, increase information flow and knowledge transfer, and have the potential to develop relationships (Abrams et al., 2003) which has the potential to increase and enhance successful collaboration.

5.2.2.4 Other Workplace Activities

The daily activities of the participants encompass a wide variety of activities, with the findings indicating a bias towards meeting rooms and structured workspaces, perceived as private and confidential, for formal activities, and a wide range of workspaces used for informal, collaborative and individual work.   This practice continues with the other interactive activities i.e. catch up, team/ group meetings and one to one discussions,

with the choice determined through activity requirements i.e. number of individuals, individual preference and availability of space.

5.2.3 Summary

It is clear from the findings that the participants consider their work to be diverse and highly interactive, a reflection of the nature of knowledge working (Morrison and Macky, 2017; Parker et al., 2017). Although the ABW strategy was developed to provide flexibility for changing work practices, the allocation of specific workspaces to enhance behaviours, such as improved interaction and collaboration, appear to portray a rather more stable and balanced perspective of employees.   Many of the findings concur with workplace literature that ABW workplace design can have a positive impact on the enhancement of defined workplace behaviours and objectives.   However, it is also apparent, within this study, that the participants' agency and autonomy, i.e. the empowerment they have to control and influence their day to day working choices (Rolfö et. al., 2018; Wohlers and Hertel, 2017) has a major influence on the how they use and choose their workspaces, rather than exclusively the design intention behind the physical characteristics of each specific workspace.

5.3   Research Question 2

RQ2:   What are the factors and characteristics which encourage participants to use a
specific space ?

This section explores what characters and factors influence the participants' choice of workspace.

Workplace design and configuration of the workplace can affect how individuals think, feel and behave. As this study gathers its data through the concept of personal construct theory, i.e. the way individuals construct meaning and reality, it is appropriate to also

draw on the organisational studies concept of sense-making (Hoff and Öberg, 2015; Sandberg and Tsoukas, 2015), a process where individuals give meaning to experiences and events, often confusing and ambiguous, which then form the basis of understanding, control and action (Weick, 1995). Within the knowledge economy, understanding these individual insights and perceptions can impart an appreciation and knowledge of the day to day use of the workspace and inform future decisions (Choo, 1996). Sense-making is also "focused on cues extracted from the environment because informational cues containing equivocality provide the raw material for interpretation" (Kudesia, 2017, p13).   Rafaeli and Vilnai-Yavetz (2004) presented sense-making through a framework of three (3) functions in organisational space 1) instrumental: how useable is the workspace and does it support the activity or task; 2) aesthetic: is it visually appealing and 3) symbolism: what are the associations conveyed by the space. This section will adopt this framework to explore the the influencers in the participants' responses.

5.3.1   Instrumentality

Instrumentality, as discussed in chapter 2, refers to the extent to which the physical working environment and the artefacts within it, support or hinder the activities of the user. The participants highlighted a number of features as key factors influencing their choice for workspace which were associated to: 1) privacy and noise, 2) visibility openness, proximity and location and 3) usability and comfort.

5.3.1.1 Privacy and Noise

Privacy and noise are overwhelmingly recognised as major concerns within ABW environments, leading to an array of issues such as distraction, employee dissatisfaction, reduced productivity and stress (Hodzic et al., 2020; Kim and de Dear, 2013).

Neither privacy nor noise were raised as an issue within this study, with the findings demonstrating a number of specific characteristics which influenced choice of workspace when there was a requirement for privacy and quiet. As discussed in Section 5.2.2.1, the formality of enclosed environments were automatically correlated with confidentiality and privacy, and consequently, the characteristics of walls and doors were elicited as enablers for privacy, substantiating early research where privacy was perceived as requiring a form of enclosure (Kaarlela-Tuomaala et al., 2009; Sundstrom, 1987).

The height of the backs of the workspaces encompassing sofas, and the partitions within the booths were also considered appropriate for activities which demanded a degree of privacy.

P12-1	*".… informality of seating, height/ walls for privacy when needed"*	*— v —*	*"catch up with colleagues ….."*
P1-5	*"private, formal, walls, telling environment - not interaction"*	*— v —*	*"public, less formal, team meetings ……."*
P19-1	*"Build rapport, comfortable, relaxed, private = height of partitions, collaborative .. multitask"*	*— v —*	*"phone - quick conversation, less interacting, private yet on show"*

The workspaces with integral height features were routinely chosen for many daily activities, as the duality of open atmosphere and the illusion of privacy were considered more conducive to informal collaboration and interaction. Glazed panels were also perceived as being a positive for privacy.

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| P32-7 | *"day to day task, .. open and more Informal styling"* | — v — | *"enclosed for privacy yet open feel with glass sides and doors, collaborative …"* |
| P21-6 | *"open, exposed, ….. groups, informal + impromptu"* | — v — | *"…project team meetings, ….., some privacy with glass"* |

Fully glazed panels incorporating manifestations, were also used as design features to facilitate both privacy and safety. Although the characteristics were generally considered aesthetically pleasing and fulfilling their intention, one meeting room elicited negative constructs from three (3) participants who perceived it as lacking privacy characteristics.

P27-3 *"Limited privacy - hard not to look in"*

P23-2 *"Visible therefore not conductive to privacy and sharing information"*

P26-6 *"Too visible, not one thing or the other, can be overheard despite walls and door"*

The participants who described the workspace negatively, emphasised that they avoided using the space owing to both its physical structure and informal furnishings. These views support a previous study which reported that users seem to prefer workspaces designed in a more functional way, especially when collaborative interactions within meetings rooms are involved (Appel-Meulenbroek et al., 2011). Conversely, one participant expressed their liking for this specific workspace, emphasising it usefulness for many activities, due to its ambiance, which in their view, was similar to a retreat.

P27-3   *"pet hate, strange room, low seating, glass door, middle of floor, feel watched, limited privacy"*

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P26-3   *"Pre-meditated, contrived, designer trying too hard, funky space, only use for chat"*

P21-3   *"Haven - incorporates comfy and professional space, meetings, 1-2 people with agenda, secure boundaries, privacy even although glass"*

These individual constructs illustrate the essence of how perceptions of usability can stimulate contrasting responses from users (Dazkir and Read, 2012).

Collaborative and breakout workspaces, specified for more informal, interactive behaviours were also elicited as preferences for activities requiring privacy, from both the perspective of the characteristics of the workspace and location within the overall office layout.

The two collaborative zones were specified as being useful for activities requiring a degree of privacy due to their location, near the periphery of the overall office space and a distance away from the day to day, non-assigned desks, which accommodate staff for the majority of time whilst in the office.   Whilst the breakout spaces (social), were regarded as a 'go to place' by three (3) participants when their activities required privacy, both collectively and individual.   One participant specifically used the breakout area for focussed individual tasks as they knew they would *'not be interrupted'* whilst working in this environment.   The disparity between the selection of these more informal workspaces and the those designed specifically for privacy demonstrate the polarity in individuals experience of privacy, suggesting activity needs, personal preferences and individual differences should be considered.

Lack of privacy tends to be associated with acoustic distractions, i.e. noise, referred to as 'unwanted' sound and voices of others in workplace research, and is ranked as one of the most prevalent distractions which impacts employee satisfaction, as well as

potentially being detrimental to well-being through increased stress. Quiet spaces are defined as a key feature of ABW environments, configured to support visual and auditory isolation and consequently were integrated into the participating organisation's workplace project design.

Two quiet workspaces were located adjacent to the day to day non-assigned workspaces which does not conform with the opinion of acoustic designers, that quiet areas need careful planning, and consideration given to sound and vibration isolation between potentially noisier and quieter areas of activity (Marmot and Eley, 2000). The findings concluded, however, that despite close proximity to more densely populated work areas, these workspaces were good for individual privacy and isolation.

P1-4	*"individual work, time on own, remote, no noise"*	*— v —*	*"collaboration, teamwork"*
P6-4	*"semi-private, quiet, comfortable, concentration enabler"*	*— v —*	*"relaxed, social, informal, team space, open ……"*
P12-4	*"individual thinking time, study, quiet, good views"*	*— v —*	*"home from home, very informal, social"*

The third quiet workspace, was a speciality designed soundproofed telephone box with the sole aim of enhancing privacy and noise reduction. Regardless of its functionality, the findings show that it was not a popular choice for privacy or noise reduction due to two (2) specific factors. Firstly, its size, there was a perception of being rather small, an secondly, the location, which was very close to the middle of the floor.

Despite these indifferent views, a few participants did make use of the phone box, purely to make private and confidential calls, both business and personal.

P31-1 *"by myself, confidential - shut off, non-one can hear, 5-10 mins only, small space"*

P32-1   *"me only, phone calls private, easy to pop into, see if empty/free"*

Although the majority of the participants generated more negative elicitations:

P18-1   *"not user friendly - hot, quite exposed"*

P21-1   *'isolated space, feigns privacy, exposed - middle of floor"*

P23-1   *"private phone calls, fun, overlook it, normally just use closer room"*

P30-1   *"aesthetic, funky, old school state boys, claustrophobic, personally go outside to make phone calls"*

P27-1   *"…….. exposed, uncomfortable …….could be useful for privacy and noise but too small"*

This private and quiet workspace was conclusively perceived as 'form over function' by the participants, with many criticisms pertaining to the perception of its positioning within the workspace being too public and open.   The association with exposure resonates with the earlier findings relating to glass partitions, where users perceived they were 'on view' and open to observation and scrutiny from others.   Although 'the phone box' appeared to meet all the criteria for ensuring privacy and alleviating noise, the lack of visual isolation impacted the feeling of psychological privacy (Wohlers and Hertel, 2017; Sundstrom et al., 1980).

The autonomy and agency participants have over how and where they work on a daily basis appeared to afford a mitigating affect to these feelings of exposure, as the phone box and meeting room were disregarded and alternative workspaces spontaneously used.

Although not specifically addressed, the findings reveal that noise was not an issue, with the exception of one (1) participant's construct in relation to the density of the day to day workspaces.

P27   *"Workstations too dense, seating too close, noisy with social chatter and phones"*

The combined findings of the construct elicitation and reflective comments emphasised that when the office was busy, there was a feeling of inclusion, referred to as 'buzz' by the participants, which was considered as essential to their project team work where collaboration is deemed essential to success (Growe, 2019). Buzz is often identified in commercial workplace literature as portraying a dynamic organisation, a 'general excitement' supporting the creation of ideas (Mould and Joel, 2010). The 'buzz' was also considered to aid privacy, especially when using the workspaces within the open areas, as it was perceived as giving the perception that no-one could overhear conversations, with voices appearing more subdued, providing an audible 'hum' acting as an effective background noise.

P3-3   *"heart of the firm, social interaction, noisy = fun, town hall meetings"*

P23-3   *"open plan, collaboration, isolate yourself with the buzz" (noise)*

P6-4   *"open spaces which encourages views/discursive"*

P25–4   *"workstation, busy, noisy = good, love working at these desks…"*
              ("good = seems to help with concentration")

P32-6   *"open day to day space away from formal workstations, buzz from*
              floor = can have confidential conversations"

P1-7   *"open, team, noise does not disrupt - encourages others to join in"*

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P26-7   *"business task focussed, collaborating, height of partitions = privacy*
               yet still feel the buzz in the office"

P12   *"noise occasionally can be an issue but there is plenty of choice to move*
               and get peace and quiet"

These findings highlight the many contradictions and inter-relationships within current workplace literature regarding noise. There is an assertion that face to face communication with colleagues is decreased due to the impact of noise and distractions (Bernstein and Turban, 2018; Otterbring et al., 2018) yet despite the negative impacts of noise, employees also appreciate open spaces for their sharing and aesthetic aspects (Bodin Danielsson, 2015).

It was clear that privacy and noise experiences were personal and diverse, which supports the view of Keeling et al. (2015) that privacy is mastered by an individual's ability and desire to control the flow of information, interaction and distractions. The participants' decisions as to choice of workspace was influenced by its specific characteristics, the circumstance and prerequisites of the interaction or work activity. Autonomy and choice assured that their individual interpretation of privacy was enacted through personal control of visibility, interaction and other environmental stimuli (Kupritz, 1998). Noise was embraced as a feature within the workplace and adopted to support workplace activities, as well as foster a feeling of inclusiveness. Through the participants' experiences of how the space works best, they determined when and where to interact or concentrate rather then being confined by the original design intention of the workspace.

5.3.1.2 Openness, Location and Proximity

Although open offices are seen to have implications leading to loss of privacy, which may impact collaboration and interaction, there is also reasoning that the absence of barriers actually elicits other positive perceptions and behaviours i.e. inclusiveness and quick exchange of information. Open environments such as ABW are recognised as being more positive and inviting, whilst older traditional formulas impose a feeling of being closed in.

The findings clearly endorse previous research which concludes that spatial variables i.e. openness, clear visibility and line of sight, location and proximity, has the capability to significantly impact on the pattern, shape and frequency of interactions and prompts spontaneous collaboration (Evans et al., 2017; Norman, 2013).

P13-2	"main office, visibility = feel part of things, individually and collectively"	— v —	"formal meetings, rigid, confined"
P10-7	"….open feels inclusive within office"	— v —	"open, social, fun, food"
P7-1	"informality, openness, connect to workspace = inclusive"	— v —	"more formal, conventional, cannot be overheard"

P2   *"openness drives energy by encouraging all levels to feel confident to interact"*

P18   *"like openness of space - can see what is going on"*
       "like that people are not in rooms, more approachable, no barriers"

P28   "openness - good to mix - pop over for a chat"

P29   "booth good for quick meetings, open plan is great, see what is going on so more approachable - no barriers"
       "often see someone and then think - ah it would be good to catch up with them"

P31   "quiet rooms are clinical and less friendly, should only be used for calls and private conversations"

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Location was also an influencer as to which workspace participants would use, specifically in respect of adjacency to their current location and, whether it was within the nucleus of the main floor, reflecting and corroborating the findings that openness promotes inclusiveness and workspaces on the periphery are perceived as isolated.

P 1   *"use whatever space is closest"*

P 7   *"quickly look to see what workspaces are free - the closer the better"*

P12   *"use workspaces which feel inclusive within the office"*

P25   *"like to be connected to the main workspace"*

P31   *"ease of connection to the main office"*

The preferred environment for the majority of the participants' activities and interactions were workspaces with connectivity to the main office layout, utilising the meeting rooms purely for formal and client focussed work.

Proximity, commonly referred to within workplace design as the geographical distance between individuals, asserts that the distance between individuals within the working environment is instrumental in determining to whom individuals will interact and collaborate (Coradi et al., 2015, Hua et. al., 2010).   The findings did not evidence this proximity effect as materially influencing interaction, however, what was apparent was the physical closeness of individuals i.e. personal space, whilst sitting within a number of the more relaxed, informal workspaces, which was elicited as a catalyst for developing relationships, breaking down barriers, encouraging knowledge sharing and augmenting collaboration.

P1-1   *"close proximity to others encourages sharing"*

P8-3   *"group chats, training, close proximity of people = relaxed and open discussions*

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P8-2   *"group meetings and training, close proximity to other, intimacy of sitting together "*

      (Intimacy: "sitting close together, often shoulders touching = commitment to working together"

P9-7   *"collaborative, relaxed atmosphere, no physical structures in the way of conversation, laughter, open minds"*
Open Minds *"enhances ability to see lots of alternatives"*

P12-2   *"individual or catch-up with few people, close proximity for ad hoc conversations"*

P21-7   *"close proximity of group encourages honesty"*

P23-1   *"seating close feels intimate, face to face interaction, encourages eye contact = sharing views"*

P27   *"closed in proximity of sitting in booths, helps focus and good for tutoring".*
("promotes a sense of relaxed working which develops trust")

P14   More intimate =*"close proximity of sitting together in a booth = feeling of working together"*

P32   *"use booth when working on plans and budgets, close proximity helps working together"*

These comments also demonstrate, that participants' work activities, often involve temporarily getting together for projects, disjoining and either reconvening later or developing new associations, actions which reflect 'temporary geographical proximity'. Taking the opportunity to interact face to face is also apparent from the findings in a number of the categories which support claims that temporary proximity facilitates face to face interaction (Henn and Bathelt, 2015; Robertsson and Marjavaara, 2014). Participants are continually seeking out colleagues, to share and exchange knowledge to fulfil their needs of achieving individual, team and organisational goals, which

emphasises organisational proximity, psychological obligation and psychological ownership. These elicited interactions and comments challenge previous research on geographical proximity i.e. sitting a specific metric distance between each other. The users changed workspaces, even when time was pressured, which suggests strength of working relationships and trust of other colleagues, rather than distance, is the impetus for interaction. However, without the participants' sense of purpose and motivation, the association between organisational and temporary geographical proximities can only encourage interactions and knowledge sharing. As these brief convergences build other categories of proximity, e.g. cognitive, social and organisational, these findings are significant to the debate, and propose all proximity dimensions are key criteria in understanding the complexities of interaction and collaboration.

5.3.1.3 Usability

The findings have explored how privacy, openness, and proximity have influenced the participants' use of the workspaces, which are most commonly associated with the ABW environment and researched in literature. How useful and suitable the physical workspace characteristics are in facilitating specific tasks or interactions are also critical to understanding the experiences and preferences of ABW users (Elsbach and Pratt, 2007; Vilnai-Yavetz et al., 2005). A number of workspace characteristics were highlighted as less than adequate, although these did not distract from their use. There were, however, three (3) workspaces which were identified by the majority of participants as being not user friendly as a result of bad design and, as a consequence, were rarely used.

A specifically designed collaboration room, with audio visual (AV) capability, 360 degree adjustable table and writable walls was designed for its potential to encourage

collaboration and brainstorming, the furniture, however, was highlighted as an issue. The seating was not 'user friendly, the stools were difficult to sit upon and the stadium style box zone uncomfortable and unhygienic and, as a result, regarded as inappropriate for an office environment.

P24   *"Reminds me of a football match"*

P32   *"Designers did not think about people who are short - cannot reach the foot-rail"*

P18-7   *"Useless, badly designed"*

P24-2   *"Cold, hard, uncomfortable, room is a waste of space"*

Undeterred by these issues, a number of participants saw the uncomfortable furniture as an opportunity to adapt the normal ways of working.

P23-2   *"meetings - solve client issues, present ideas - stand at table - rapid ideas and sense of purpose and quickly, flexbility*

P21-2   *"private, hi-tech, collaboration, innovation, ideas, changing boundaries, challenge the norm"*

         (Challenge the norm "through different ideas and concepts to improve business processes")

The collaborative workspace, illustrated below, was designed to encompass benches with the perception of it being aesthetically pleasing as well as facilitating the potential to improve space utilisation and collaboration through closer geographical proximity.

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<div style="text-align:right">

P1-3 *"uncomfortable, quick. meetings,*
     answer quick questions"

P9-5 *"oriented towards teams,*
     uncomfortable"

P9   *"benches too cold and hard"*

</div>

From day one, the employees were dissatisfied with this configuration, the benches were uncomfortable to sit on and there was a feeling of invasion of personal space, ultimately resulting in the workspace not being used. Following a number of months of discussion between organisational leaders and users, and whilst conducting this research project, the issue was rectified with benches replaced with office style chairs. These changes were emphatically supported by the users, evidenced by the revived and improved use of the workspace. The space is now perceived by the participants as a good choice for both individual and collective activities, and is one of the most frequented workspaces due to its flexibility. The large project table is capable of accommodating project teams collaborating both technologically and with documentation, and although situated near the periphery, it is also close to the nucleus of the floor layout, encapsulating the potential for interruptions by passers-by.

P1-7 *"open, team meetings, noise does not disrupt - encourages passers by to join in"*

P6-7 *"team, less private, more flexible, more interruptible, injection of ideas"*
   (more interruptible *"encourages passersby to join in freely"*)

P7-7 *"informal space, bright, open, more conducive to free thinking"*

P9-7 *"collaborative, relaxed atmosphere, no physical structure in the way of*
   conversations, laughter, open minds

P18-1   *"not user friendly*

P21-1   *"no ergonomics"*

P27-1   *"poor use of space, …, uncomfortable,*
          inadequate, shelving for laptop"

P22-1   *"fun but not practical, would not use it"*

The sound proof phone box, as discussed in Section 5.3.1.1 Privacy, was perceived, again by the majority of participants as not an acceptable space to conduct phone calls due to its size, visibility and climate conditions.

The functionality issues of these three (3) specific workspaces suggest that the designers may be more concerned with appearance and the social, playful aspects, rather than placing importance on having a clear understanding of how the design may fit into the context of user experience.

Comfort featured significantly in the perception of the inadequacy of workspaces, and predictably was presented as positively playing a key role in the choice of workplace. Although within literature comfort is most commonly correlated to environmental elements i.e. temperature and light, it was the comfort of the workspace which influenced choice, through the perception of its association with a relaxed environment and informality.

P6-1   *"comfy, cosy, welcoming, relaxed,*   *— v —*   *"Closed, formal desk, more private,*
          informal team space"   *individual task"*

P9-1	*"element of stepping out of the floor, relaxing, comfortable, beyond the norm" ("not usual traditional furniture")*	— v —	*"fully enclosed, privacy less relaxed, more static"*	

P19-2	*"informal drop in, comfortable physical furnishings set up"*	— v —	*"private room, formal, not comfortable, internal briefings/ formal session"*	

P24-2	*"comfortable, open space, informal, networking"*	— v —	*cold, hard, uncomfortable brainstorming - standing*	

P21-4	*"public areas, relaxed, comfortable chairs, social spaces"*	— v —	*"good individual working space, traditional desk, ….."*	

Individuals perceive features and characteristics of a workspace and discern the consequences of its use, supporting the interpretation of affordances as the relationship between its agent and object (Norman, 2013). The usability findings support this viewpoint, with participants perceiving comfort as representative of relaxed, informal interactions, as against more uncomfortable and traditional furnishings associated with more formal activities. The seating configurations perceived functional and aesthetic by the designer, were considered unconditionally flawed by the participants from a practical usage perspective. It is clear from the findings that exploring the factors and characteristics which encourage use, reveals the functionality features which influenced choice and subsequent use. Comfort was a positive correlation, whereas a number of workspaces were not representative of fit for use. The immediate discontent with the bench configuration and the simple resolution to the bench issue, supports the adoption of two (2) key components within the ABW workplace design implementation process and reinforces the relevance of this study. Firstly, the advantage of user participation at the design stage, which develops buy-in through the understanding of users specific needs and experiences (Van der Linden et al., 2016). Secondly, a more in-depth post

project assessment, to draw out the complexities of user experiences rather than the traditional method of questionnaire/survey, where most typically user' dissatisfaction and workplace underperformance is assessed (Deuble and De Dear, 2014; Baird, 2011).

5.3.2   Aesthetics

Aesthetics, a sensory reaction to a physical environment, is suggested to affect individuals' perceptions, attitudes and emotions differently, consequently influencing how they experience and react to them (Kallio et al., 2015; Dazkir and Read, 2012; Rafaeli and Vilnai-Yavetz, 2004, Lindgaard and Whitefield, 2004). Colour, light, decor, soft furnishings and textures are used as influential design features to afford psychological reactions, which can transform an individual's state of mind, mood and emotions as well as affect perception and perspectives. They also have the potential to portray powerful associations between organisational brand, culture and vision, a relationship which will be discussed further in Section 5.3.3 Symbolism.

Although not regarded directly as a major determinant in the choice of workspace or improving interactions, participants perceived colour and light as reflecting a positive ambiance of the space and state of mind.

P5-7   *"informal, bright, colourful, ….. breaks down barriers, not bound by hierarchy"*

P9-3   *"colour, full of life, energising"*

P22-3   *"colourful - uplifting on a great day, takes away from the mundane, modern and contemporary"*

P30-5   *"colours are nice - warm - dark red"*

P31-6   *"openness, relaxing and colourful - good for variety of activities"*

P20   *"was not expecting these colours - muted which is nice"*

P31   *"colours feels lots more creative, free to explore different ideas, bit less disciplined"*

Soft furnishings e.g. cushions and textures were also described as imparting a sense of a more relaxed workspace, resulting in a perception of encouraging openness in conversations, sharing, and conducive to creativity and innovation.

P3-2   *"group, face to face, encouraging   — v —   " Individual, get on with task"*   *sharing"*

P24-1   *"Collaborative, brainstorming, soft   — v —   "formal, quick confidential call"*   *furnishings - innovation, ideas"*

P3   *"The relaxed feel and shape of wave workspace and the face to face setup have an effect on sharing as you are relatively close together and have eye contact"*

P29   *"Relaxed and informal layout and furnishings help working together on joint projects"*

The aesthetics of the workspaces were clearly influential in the 'go to' choice for taking personal time out.

P28-5	*"Chat with 1 other person, quick conversation, not laptop work,…. busier spaces"*	— v —	*"Not busy, no-one passing, more comfortable and even more informal, relaxing, good for personal thinking time"*
P7-4	*"Collective, team events/ presentations, team working - join in"*	— v —	*"ability to move away to separate oneself, great for mobile phones, accoustic chairs*
P10-4	*"gathering spaces, relaxed environments for learning and development*	— v —	*"getting away from it all, good private space"*

"serious, structured, purpose focussed for task or meeting" — v — *"informal, relaxed, reset space - calmer, change of scenery, resetting mindset between tasks"*

The significance of colour, light, decor, soft furnishings and textures was unquestionably reflected in the responses as to what participants perceived as encouraging characteristics for both fostering sharing and taking time out for personal well-being. Their narratives also expressed that it is the shape of the workspaces which facilitates sitting closer together and facing each other, encouraging eye contact and developing trust and honesty. Whilst supporting literature, which asserts face to face interactions encourage knowledge sharing (Stryker et al., 2012; McElroy and Morrow, 2010), this study also augments this viewpoint by demonstrating distinct workspace features and characteristics which further influence and develop behaviours.

5.3.3 Symbolism

Symbolism, is the associations and meanings elicited from the physical working environment, which communicate the identity, values, culture and meanings from which employees form subjective interpretations (Kallio et al., 2015; Vilnai-Yavetz et al., 2005). With a shift to ABW principles, the participating organisation endeavoured, through the workplace design and organisational culture, to embrace a new mindset and support the 'new ways of working' objective.

The findings demonstrate a positive perception of the organisation and its commitment to the more flexible and collaborative ABW working culture.

P14-2	*"formal traditional office furniture, uninspiring"*	— v —	*"soft, relaxing, group or individual, makes you want to work here*
P5-7	*"informal, bright, colourful space breaks down barriers, = not bound by hierarchy"*	— v —	*"work, internal, client issues, not personal"*
P3-3	*"group work, client business, periphery = quieter"*	— v —	*"Heart of the Firm, social interaction, noisy- fun, town hall"*

P23   *"Space reminds me of why I came to work here"*

P32   *"Great protocols - clear desk policy - leave only footprints"*

P26   *"Has broken down barriers - I can be sitting next to a colleague one day, graduate the next and occasionally someone from the senior team"*

P18   *"Very proud of facilities - proud to bring clients here"*

Participants also expressed they retreated, on occasions, from daily activities to find solitude or quiet, feeling empowered by autonomy and personal control to nurture their well-being (Kim et al., 2016). Noticeably the 'go to' workspace choice for 'taking time out' was informal and relaxed, influenced by the lack of walls, doors or barriers and reflected the aesthetics of specialised lighting, natural light, colour and soft furnishings.

P28-5	*"Chat with 1 other person, quick conversation, not laptop work,…. busier spaces"*	— v —	*"Not busy, no-one passing, more comfortable and even more informal, relaxing, good for personal thinking time"*
P7-4	*"Collective, team events/ presentations, team working - join in"*	— v —	*"ability to move away to separate oneself, great for mobile phones, accoustic chairs*
P10-4	*"gathering spaces, relaxed environments for learning and development*	— v —	*"getting away from it all, good private space"*
P6-2	*"serious, structured, purpose focussed for task or meeting"*	— v —	*"informal, relaxed, reset space - calmer, change of scenery, resetting mindset between tasks"*

The findings support research which concludes that the design of open environments can symbolically reflect the organisational culture and working practices, influence perception of leadership and enhance employee commitment (Danko, 2000), a sense of belonging, satisfaction and motivation (van Marrewijk, 2010), ultimately initiating a narrative which facilitates organisational change (Skogland and Hansen, 2017; Boden Danielsson, 2015; Khanna et al., 2013).

The instrumentality, aesthetics and symbolism findings clearly demonstrate the assertion that workplace design layout, furnishings and artefacts can support the communication of an organisation's narrative which it wishes to portray (Boden Danielsson, 2015; Appel-Meulenbroek et al., 2011).

5.3.4   Summary

The findings in Sections 5.2 and 5.3 reflect dynamic associations between the participants and the workspaces, and further corroborate that users play an active role in their daily activities within the workplace (Zhang and Spicer, 2014), often perceiving and experiencing the workspaces and design features differently from their original design intention (Kjolle and Blakstad, 2014).

5.4   Research Question 3

RQ3:   How does the actual use reflect the original design intention ?

5.4.1   Introduction

The aim of this section is to reflect the actual use through similarities and differences, as compared to the original design intention and strategic objectives The data describing the design intention of the project were acquired through documentation analysis of plan layouts, photographs, steering group project and programming documentation

(including rules statements), and limited e-mail correspondence as described in Chapter 3 Research Approach and Design.

Within this study, the ABW workplace was designed to reflect a space which captured the values of the participating organisation's culture and values, creating a 'One Firm' experience. A space which would "break down barriers, promote openness and trust, offer employees choice and place collaboration and relationship building at its heart" (participating organisation documentation, 2013). As is the nature of ABWs, each workspace was designated for one of four (4) specific workplace behaviours e.g. collaboration, individual working, quiet work and meetings, and were designed with specific characteristics which were deemed to support and enhance the particular behaviour / work activity (Van Meel, 2019). There was also a breakout space, with the purpose of connecting everything and everyone together within the office layout, which was commonly used for refreshments and get-togethers. A number of alternative workspaces were also provided, which were intended to be used as supplementary options for activities. The specific workspace behaviours; collaboration, individual and quiet working and meetings will be compared to the actual original design intention of the workspace, using illustrations to support the discussion. The impact of, and the association with the use of the workspace in respect of formal and informal activities, instrumentality, aesthetics and symbolism, will also be deliberated.

5.4.2 Collaboration

Enhanced collaboration was defined as one of the key strategic objectives of the participating organisation's ABW project. As discussed in Chapter 2, it is difficult to define collaboration and therefore assessing whether activity based workspaces have a positive influence on encouraging employees to interact and collaborate is problematic.

Within this study it has also proved problematic to determine whether this objective was met, as there were no definitive data, i.e. pre-project levels of collaboration or specific performance indicators or measures, within the project brief (Blyth and Worthington, 2010), which would facilitate assessment of the degree of success.

Collaboration was expressed as a key activity by all participants and considered an integral component of their roles, rather than just being an activity to be influenced and enhanced by the features and characteristics of the workspace. The construct elicitations and comments reflected a more dynamic activity, delivering a joint outcome rather than simply an interpersonal action enhanced by the design of the collaborative spaces as illustrated in Figure 5.2.

Figure 5.2: Design intention: A representation of a collaborative workspace

The repertory grid technique demonstrates, through the participants' bi-polar constructs, that collaboration significantly correlates with a relaxed, open, comfortable and contemporary feel environment, contrasted with a more formal, structured and enclosed environment for other workplace behaviours.

| P11-7 | *"Discrete 1:1, more formality, enclosed office"* | *— v —* | *"open, informality, freedom of choice of use, collaboration"* |
| P13-7 | *"key business focussed, partners room, clients, enclosed, confidential* | *— v —* | *"relaxed, sharing ideas, project/team work"* |

P29-5   *"collaboration, open, bright, spread*   — v —   *"enclosed, video conferring, formal*
*out, relaxed, informal"*   *meetings and project updates"*

Although the use of the majority of the specified collaborative workspaces endorses the association between the original design intention and the user preference, two (2) workspaces were considered to be sub-optimal; the stadium style, bleacher seats (Figure 5.3), and the benches which were assigned to a large project table (Figure 5.4).

Figure 5.3:   Stadium Bleachers

Used as a physical symbol for collaboration and interaction by the designer, the stadium styled bleacher seats, were considered to be *"contrived and over-designed"* and more of a *"design fad"* resulting in a cold and uncomfortable environment not conductive of enhancing collaboration.

Figure 5.4:   Benches
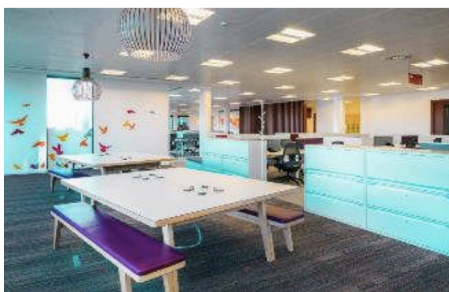
Designed to be aesthetically pleasing as well as to encourage face to face collaboration through close geographical proximity, the benches were elicited as having an adverse effect on collaboration through both lack of comfort and intrusion into personal space.

Notably, all workspaces, e.g. day to day working (non assigned desks), alternative workspaces, breakout areas, normally assigned as crucial social space, with the exception of meeting rooms, were also defined as preferences for collaborative activities.

These findings establish constructive feedback as to understanding user preference, and highlight, how participants' subjective perceptions and experience have the potential to contradict designer intention.

 They also appear to demonstrate the trend of workspace design 'fads' to foster specific behaviours through artefacts, rather than understanding the more in-depth interconnections between "social, cognitive, emotional and organsiational dimensions" (Peschl and Fundneider, 2014, p358). Fad and fashion are also frequently questioned in relation to management theories and practices, specifically in the context of workplace fun, (Bilginoglu and Yozgat, 2017), and as to whether "building creative workspaces has become a hype" (De Paoli et al., 2017, p3).

5.4.3   Day to Day Workspaces

Designated as office workspace and located in a number of different areas around the floor, the day to day workspaces (See Figure 5.5), often referred to in literature as non-assigned desks (Hoendervanger et al., 2018; Wohlers et al., 2017), are required to be booked on a daily basis to manage the ebb and flow of demand.   Used predominantly for routine individual working and concentration, the findings strongly related to the desired behaviour of the design intention.

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Figure 5.5:   A representation of day to day workspaces
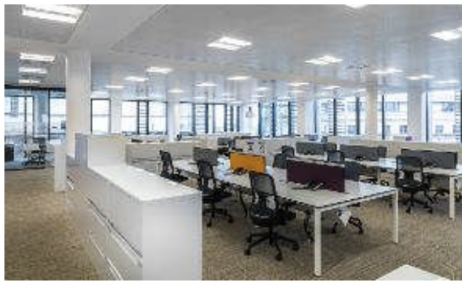
There were, however, a number of deviations from the designated activity of individual working and assigned protocols, with participants often preferring to have impromptu small group interactions around their individual day to day workspace and conducting phone calls, to alleviate the need to take time to switch to another workspace.

Contrary to the original design intention, breakout and quiet spaces were also used for individual tasks. See Figure 5.6 for illustrations. A number of participants retreated to the more social environment of the breakout space, interruptions were fewer, and the constant use and chatter within the space acted as an enabler for concentration. Remote and with very little noise, quiet spaces were also chosen for individual, day to day working.

Figure 5.6:   Representations of individual and concentration workspaces

Significantly, a key attribute which influenced the use of workspaces other than those specifically assigned as individual day to day workspaces, was the ability and flexibility to just pop into a workspace without booking.

5.4.4 Quiet Workspaces

The quiet workspaces, generally designed in ABWs to enable individuals to avoid distractions from noise and interruptions (Gerdenitsch et al., 2017), were designed in this study with specific characteristics, i.e. study area with no phones, accoustic chairs facing outwards to avoid distraction and a totally soundproofed box (See Figure 5.7).

Figure 5.7:   Design intention: quiet workspaces
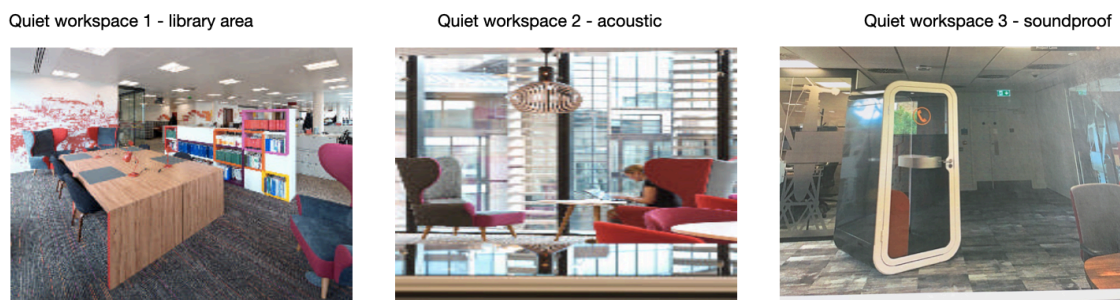
Workspace 1 - the library area, was used predominantly by graduates as a necessary quiet space to study for their professional examinations which partly matches the original design intention.

Workspace 2 - the accoustic chairs, meet the original design intention of a quiet workspace. They were also expressed as a 'first choice' workspace when participants wished to take time out from both the activity of work and the working environment. The positioning of the workspace on the periphery of the floor and its externally facing views were perceived as prerequisites for fostering well-being (Coburn et al., 2017).

This supplementary benefit was revealed through the elicitation process of the repertory grid interviews, underlining the effectiveness of the technique to uncover tacit

knowledge which is normally difficult for individuals to access (Tofan et al., 2011), substantiating the strength of this study.

Quiet workspace 3 - the soundproofed phone box, lacked congruency with its design intention, despite its materiality to provide all the essentials defined to enable privacy when making phone calls, including soundproofing to guarantee the elimination of noise. A criticism revealed in the findings was that the positioning of the box induced an atmosphere of exposure, which diminished the potential to contribute to providing the design intention. The location of the box is undoubtedly fundamental to the lack of use, as participants indicated they liked the concept, evidencing critical cause and effect feedback, which is beneficial knowledge for future workplace designs.

5.4.5 Breakout workspaces

Breakout workspaces were designed as the central refreshment area and as a conduit to connect all the space together naturally to encourage employees to come together in one space, both in small groups and large gatherings. (See Figure 5.8).

Figure 5.8: Design intention: representation of breakout workspace

Breakout spaces achieved their designed intention and indeed took on numerous different identities as evidenced by the findings. It was a workspace where participants, took a moment to have a coffee or a bite to eat, both individually and with colleagues; attended town hall meetings to be apprised of the latest organisational news and enjoyed

after hours social get-togethers. It was also a space participants utilised to immerse themselves in the 'buzz' to facilitate concentration, and to find solitude in the surroundings to "change channels" when time away from work was a necessity to enhance wellbeing. These findings again challenge the current research which considers that individuals require quiet space to facilitate concentration, although in the realm of creativity, ambient sound has been evidenced as being positive for creative cognition (Laverty et al., 2016; Mehta et al., 2012). As creativity is interpreted as a characteristic within knowledge working, this could suggest why the findings conflict with the research and further supports the importance of identifying the specific category of individual and industry sector for comparable results.

5.4.6 Meeting Rooms

Meeting rooms were designed with different styles, furnishings and configurations to support client and team meetings, internal events and training sessions. There was generally a clear consensus from all participants as to how they used and perceived the meeting rooms i.e. enclosed traditional structures emphasising formal, external and client business interactions as the focus. These perceptions and use matched the designed intention, although their purpose was to accommodate both formal and informal interactions. The glazed meeting room (Figure 5.9) was an exception, where participants either liked it or had an adverse reaction to it. The design of this meeting room differed from the enclosed traditional room (Figure 5.10), with walls and doors and proffered a finish and style through glazed panels, to create visual interest, and to depict the organisational culture of openness and transparency.
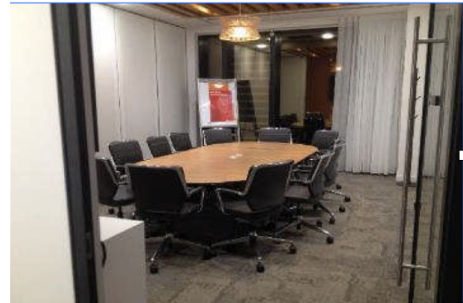
Figure 5.9:   Meeting room - glazed

Figure 5.10: Meeting room enclosed

The findings revealed that visibility and exposure evoked differing perspectives as to the usefulness of the workspace.   On the one hand, it was regarded as 'quirky' and an attractive option for meetings, although not for more formal client meetings as there was a perception of visible exposure incompatible with privacy.   Its comfy and professional space was perceived as advantageous when sensitive issues needed to be discussed i.e personal and people management issues and"mentoring, as it provided secure boundaries with a relaxed atmosphere.   It was also perceived as encouraging "knowledge sharing, collaboration and creativity" through its appearance of openness, lighting and relaxed decor.   Conversely, the glazed room was considered relatively open and exposed and therefore not conducive to interacting or sharing information, and certainly not *"adequately professional"* (P21), to support external discrete client meetings.

The use of meeting rooms within this ABW reveal the influence of individual perceptions and differences and highlight the complexities of designing workplace environments, both of which are indicative of the necessity to provide choice and flexibility which embrace a variety of perceptions.

5.4.7 Convention: Formal and Informal

Formal and informal elicitations were repeatedly evident throughout the majority of the findings within each category theme, creating a definite division as to preference and influence of workspaces. Formal was always related to a more enclosed and traditional workspace concept, considered as appropriate for serious business activities and certain individual and focussed tasks, due to its association with privacy and confidentiality.

Informal, identified most frequently with relaxed and comfortable, elicited a supplementary connection with enhancing sharing, opening minds and collaboration.

P16-2   *"open up, open minds with less / no formality, relaxed"*

P9-7   *"collaborative, relaxed atmosphere, no physical structures in way of conversation, laughter, open minds"*

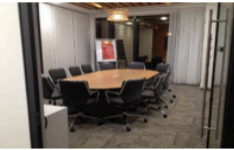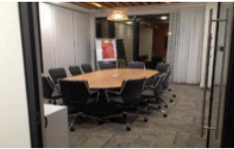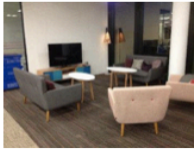P16-7   *"open, relaxed = sharing knowledge, business and personal …"*

P30-3   *"….. warm not stale, informal seats, comfortable, relax = more open in conversation"*
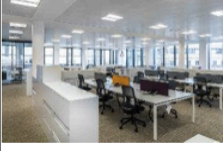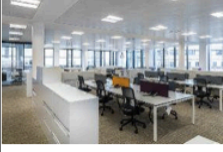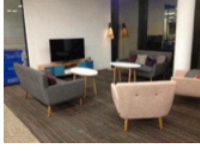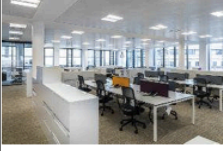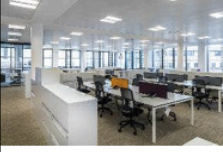
The contrast between formal and informal was also clearly expressed when interpreting the sum of differences findings, i.e. 'most alike' and 'least alike' comparisons. The findings are the expression of the relationship between the elements (workspaces) by each individual, as described in Chapter 4 Data Analysis Strategy.

The association with specific workspaces within the 'least alike' comparison reflected a formal setting, i.e. partners office, meeting room and day to day desks versus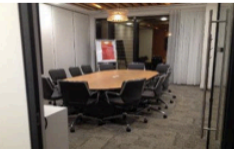 a perceived informal setting defined for collaboration and interaction, again highlighting this distinct formal - informal differentiation. These comparisons were analysed by location, as the furniture characteristics were slightly different, although the key concepts of the design intention encompass the same four (4) workspaces

configurations: collaborative workspaces, quiet space, alternative workspaces and meeting rooms. Figures 5.11 and 5.12 illustrate the workspaces identified as 'least alike' and 'most alike' respectively, by participant, gender and role for location 1. The data in both figures reinforces the concept that participants interpret the use of the workspaces through the distinction of formal meetings and activities as against informal interactions.

Figure 5.11: 'Least Alike' illustrated by workspace - location 1

Gender	Role	Least Alike Workspaces	
Male* Male Female** Male***	Associate Manager Consultant Consultant		
Male Male*** Male	Associate Consultant Senior Associate		
Male*	Associate		
Female**	Consultant		
Male Female Female	Consultant Senior Manager Manager		

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Gender	Role	Least Alike Workspaces	
Male Male Male	Director Manager Director		
Male Female	Partner Associate		
Female	Manager		
Female+	Director		
Female+	Director		
Male	Partner		
Female+	Director		

* participants' similarities % analysis indicated two (2) sets of 'least alike' workspaces

\+ participants' similarities % analysis indicated three (3) sets of 'least alike' workspaces

These findings further emphasise the strong divergence between formal and informal interactions with 16 out of 17, expressing a noticeable contrast between the workspaces that are formal: i.e. meeting room/partners office/non assigned desks as opposed to informal: collaborative, social and alternative workspaces. The one deviation from a formal / informal workspace split, was a contrast between a collaboration space and a quiet space (see last row on Figure 5.11).   From an original design intention viewpoint, this would be an expected consequence of 'least alike' workspaces.

Figure 5.12: 'Most Alike' illustrated by workspace - location 1

Gender	Role	Most Alike Workspaces	
Male* Male Female	Manager Director Senior Manager		
Male** Male***	Partner Manager		
Male	Senior Associate		
Female Male Male****	Director Director Consultant		
Male***	Manager		
Female	Consultant		
Male Female	Partner Manager		

Gender	Role	Most Alike Workspaces	
Male*	Manager		
Male**	Partner		
Male	Associate		
Male	Associate		
Male	Consultant		
Female Female	Manager Manager		
Male	Consultant		

* participants' similarities % analysis indicated two (2) sets of 'most alike' workspaces

The 'most alike' similarity % findings indicate that the majority of participants, 14 out of 17, perceived the more informal workspaces to be alike, whilst the remaining 3 participants identified more formal workspaces. The most cited workspace within the comparisons was the wave (See Figure 5.13) considered alike to four (4) other informal spaces on nine (9) occasions.
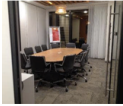
Figure 5.13:   The wave collaborative workspace

This collaborative workspace, with its strong colour palette and curved lines is closely positioned to one (1) of the day to day workspace sections, and was considered by the majority of participants as a good choice for both individual and collective activities. The shape of furniture has an influence on an individual's emotional response, with curvilinear forms manifesting stronger emotional reactions than those with straight lines (Salingaros, 2015; Dazkir and Read, 2012). Curves are also considered to invoke links to the natural world (Coburn et al., 2020; Vartanian et al., 2019; Salingaros, 2015), consequently influencing positive attitudes towards a specific item (Bar and Neta, 2006).

Reviewing the rating of elements (workspaces) in terms of 'least alike' and 'most alike' is central to this study's research questions, as it emphasises the commonalities between the pairings (Jankowicz, 2004), providing beneficial learnings for future projects through insight into what characteristics, features, tasks and activities are similar to both workspaces. An illustration for both emergent and contrast constructs comparing using the 'most alike' and 'least alike' configurations for participant 7 is shown in Figure 5.14.

Figure 5.14: 'most alike" and 'least alike' ratings - P7

		Most alike Rating		Least alike Rating		
	Emergent Pole - 1	**Element 4 Collaborative**	**Element 8 Breakout**	**Element 6 Meeting Room**	**Element 8 Breakout**	**Contrast Pole - 5**
1	Informality, openness, connect to workspace, co working, inclusive	1	1	5	1	More formal, correctional, secretive, confidential, cannot be overheard - future strategic plans
2	Open plan, brighter - light and colour - more inclusive	1	1	5	1	Confidential space, much more formal, need to book, quiet, often need to present case for booking, video conferencing
3	Variety of uses, individual and collective	2	1	5	1	Formal spaces for presentations
4	Collective team events, presentations, team working, everyone joining in	2	1	3	1	Ability to move away separate oneself great for mobile phones, confidential accoustic chairs
5	Confidential, old fashioned, more focus on clients	5	5	1	5	More modern, feels more creative/ innovative, individual and collective us, no need to book, use any time, informal
6	More open, specific task related, ability for team work/ connecting with others	1	1	5	1	Informal but also confidential, suggests do not disturb
7	Confidential space, needs booking suggests meeting, conference calls	5	5	1	5	Informal space, bright, open, more conducive to'free thinking'

We can see from the constructs that 'most alike' element 4, designed for collaboration, and element 8, designed for social gatherings, are rated extremely similar on each

construct. Both workspaces emphasise the features and characteristics which influence the participants' choice, i.e. modern, bright, open, relaxed, informal, as well as the significance of the day to day behavioural patterns of work, individual and collective activities, which have distinct influence and consequence as to the way the workspaces are perceived and used.

The 'least alike' breakdown comparison of an enclosed meeting room as opposed to social breakout space, further evidences the influence the characteristics and features of the workspaces have on the type of task and activity. We can see clearly the definitive formal - informal division, through the language used to describe the elements. In the majority of the constructs, expressions of confidential, formal, meetings and clients were attributed to the meeting room, whereas the social space was considered to be an informal, bright, open space more conducive to free thinking, team working and connecting with others. Additionally, we can see that the ability to just pop into a space rather than having to book, was an influential factor as to how and why a workspace is chosen. These 'least alike' differences further collaborate the 'most alike' findings in relation to the informality of space and co-working.

In assessing the similarity % findings for location 1 against the demographic data, overall there was a balanced split in most comparisons, indicating no notable variances attributable to gender, role or LoS, which challenges the literature which expresses a capacity for men and women to assess ABWs from a different viewpoint (Wohlers and Hertel, 2017). Location 2 demonstrated similar findings to Location 1, with the majority of the 'least alike' differentiations either collaborative workspaces with quiet spaces / meeting rooms, or meeting rooms with breakout areas. As with location 1, the 'most alike' comparisons again revealed similarities between the more informal

workspaces, i.e. collaborative, alternative and breakout areas, with one exception. In this instance, the breakout area was calculated as 'most alike' with a quiet area, although this at first glance seems a rather unusual pairing, the quiet area in question is also used as a reception area for visitors. Again there were no significant differentiations in location 2, between the demographics of gender, role and LoS.

Within this study, the participants were all knowledge workers, whose activities include multiple blocks of work, incorporating individual uninterrupted time interspersed with frequent brief conversations and longer periods of interaction and collaboration, necessitating a differentiation between formal and informal. However, the more focussed and static working patterns of other types of employees would suggest a different perception and use of workspaces, necessitating an alternative emphasis on activities and workspace classification, which again contributes to the significance of this study.

5.4.8 Instrumentality, Aesthetics and Symbolism

The perception of aesthetics and functionality of the workspaces were assessed as being influential in the choice of workspace and were elicited as improving the use of the space, as well as enhancing relaxation and comfort. The findings also demonstrated how individual perceptions of functionality and aesthetics evoked different responses from the participants in the way they reacted to, used or avoided a specific workspace. This was demonstrated in the discussion from Section 5.4.2 collaboration, where participants either refrained from using the bleacher seats, benches and the glazed meeting room or only used these for activities unrelated to the original design intention. These findings support current literature which evidence that aesthetics can affect

individuals attitudes, behaviours and commitment to the organisation (De Groot et al., 2015).

Exploring instrumentality from the perspective of what enhances and encourages particular behaviours, the findings expressed a number of characteristics and features which are essential in appreciating what users actually deem as influential in supporting their roles.

The usability and aesthetics of four (4) workspaces specifically enabled concentration, see Figure 5.15. Two were quiet workspaces: acoustic chairs and library area, which support the original designed intention and empirical literature, which express that concentration requires quiet and withdrawal (Brunia et al., 2016; De Been and Beijer, 2014). The other workspaces were the day to day desks and alternative living room workspace, revealing that choice of workspace is influenced by the degree of concentration and the personal preferences of the user, variances which suggest the need for designers to question what is the type and frequency of activity / task which requires concentration within an organisation, and as discussed earlier, what are the specific activity patterns of the users.

Figure 5.15: Representations of preferred workspaces enabling concentration
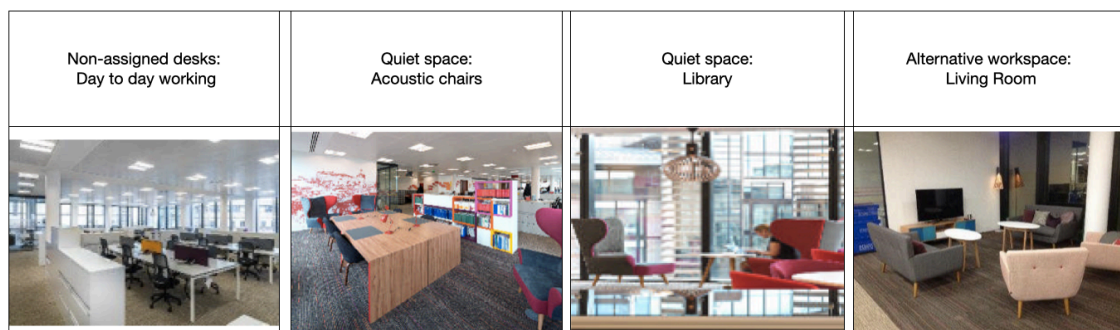
Physical presence, i.e. sitting closely together in a workspace, was an action which the findings reported as supporting eye contact.   Together with relaxed, informal, comfortable and homely furnishings, these factors were expressed as encouraging sharing of views and knowledge, ultimately developing honesty and trust. As might be expected,   the more open and relaxed collaborative and alternative workspaces were elicited as contributing to the facilitation of sharing.

The symbolism of corporate identity was embedded into the environment through the openness, visibility and relaxed atmosphere of the workspace, with each location embracing and reflecting its locality through coloured zones, distinct regional artefacts such as furnishings, art, manifestations and the naming of meeting rooms. The findings also supported the participating organisation's intention of their ABW workspace to promote an environment of openness and trust and to present genuine choice as to where staff can work, meet and relax, providing an enjoyable and fun place to work. The constructs revealed that the colour and vibrancy of the open aspect of the workspace were perceived as exuding a feeling of inclusiveness, sense of belonging and a welcoming atmosphere (Veitch, 2018).

P5-2   *"informal sitting together, collaborative, colourful, fun"*

P7-2   *"open plan, brighter (light and colour) = more inclusive"*

P9-3   *"…. colourful and life energising"*

P13-2   *"open office environment, visibility = feelings part of things, individually and collectively"*

P27-3   *"visibility striking - welcoming, informal discussions, coffee and lunch*

P22-3   *"colourful - uplifting on drey days - takes away from the mundane, modern contemporary"*

P3   *"the breakout area is central, bright and colourful, we have all our town hall meetings there and just feels like the heart of the firm"*

The participants also perceived the new activity based workplace as reflecting the overall vision of the participating organisation, through comments which were generated at the end of the formal repertory grid interview,

P7   *"Office is totally relaxed and friendly, and a really lovely place to work"*

P10   *"there is such a feeling of space and air and light"*

P18   *"Nice to bring clients - very proud of the facilities"*

P19   *"Environment works, informal, relaxed, casual, light and airy, good balance of space"*

P23   *"Space reminds me of why I came to work here"*

5.4.9 Summary

The significance of the disparity relating to participant use versus original design intention, highlights the subjective nature of preferences and suggest designers create the workspaces based on their knowledge, experience and preferences. ABW workspaces are becoming a frequent feature within organisations today, designed to specifically encourage collaboration and interaction, through a more open environment and a flexible choice of workspaces. There is, however, a tendency for designs to follow the blueprint of other workplace projects defined as exemplar projects, rather than identify individual organisational culture and strategy to support distinct needs (Moultrie et al., 2007). These contextual factors are a reflection of the motivation for this Study.

The comprehensive data generated from the repertory grid interviews, revealed contrasting views of workspaces through bi-polar constructs, generating knowledge and understanding of user preferences and experiences, which would be extremely difficult to deduce from the standard post occupancy evaluation methodology of satisfaction

surveys.   The findings, of this study, therefore have the potential to enhance future workplace design through a deeper understanding of, not only user preferences, but the need to acknowledge patterns of work activity which appear to have a significant impact on how workplaces are used.

5.5   Exploration of ABW 'One Year On' Project Review Documentation

The 'one year on' review documentation comprised summary results from an online employee survey which focused on the building users' assessment of, and satisfaction with the designed space and its designed purpose. This assessment was only conducted within Location 1, and therefore, does not furnish a complete picture from which to compare against the repertory grid interview findings. It does, however, give an insight into how the survey respondents assessed a number of key factors in relation to the project vision and substantiates the aims of this study, which advocates the definition of project objectives. It also advocates a more in depth understanding of how employees use an activity based workspace and what specific factors influence their views, perceptions and use.   The survey was conducted in February 2015, twelve months after completion and occupation of the new activity based workplace, and was responded to by 179 employees, 47% of the total workforce. The questions are of a more generalised nature rather than exploring more specific and in-depth design objectives, which tends be used as 'the standard' within the industry.   The questionnaire utilised a 5 point likert scale, ranging from strongly agree to strongly disagree, which is considered to uncover a deeper understanding of feedback and assist in identifying any improvement required.

Results from a number of questions within the survey, the likert scale questions and end of survey additional comments, correlate specifically with this study's research questions and its findings.   The following section will detail these specific survey likert

scale responses, the end of survey additional comments and the organisation's final conclusions. These results will then be contrasted with the repertory grid findings to underline the importance of identifying and understanding the actual design factors and characteristics which contribute to satisfaction.

Project vision: Promotes 'One Firm' experience.
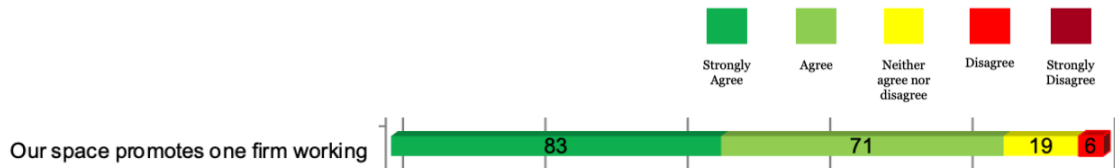
The 'One Firm' philosophy has been meet from a satisfaction perspective. Many elements are encompassed within this objective (as described in the Section 1.6) and although it is extremely positive, it does not assign discrete attributes which represent these sentiments, as the answers are in response to pre-detemined 'a priori' questions, rather than based on the participants' own vocabulary and experiences (Jankowicz, 2004). The repertory grid interviews enabled the development of a deeper appreciation of each distinct objective to promote a better understanding of the use of the ABW and how that compared with the design intention and strategic objectives.

Project vision: Quality destination for clients
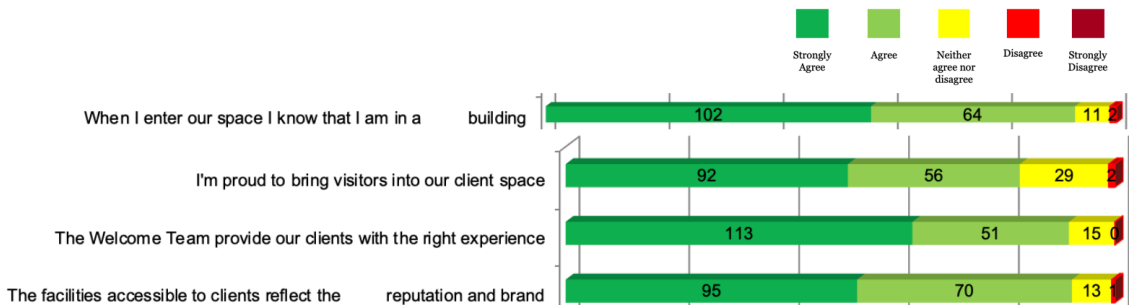
"I*t is a brighter, modern office that you can be proud of and promotes the XXX brand*"

High satisfaction figures are once more exhibited, inferring that the facilities did reflect the desired reputation and brand, providing an experience in which employees could feel proud to bring visitors into the buildings.   The survey responses do not impart precise explanations as to what reflects these sentiments, whereas the repertory grid findings highlighted numerous characteristics, features and motivations as to why individuals feel the new ABW is a quality destination for clients .

Project objective: Choice

	Strongly Agree	Agree	Neither agree nor disagree	Disagree	Strongly Disagree

I feel empowered to choose where I want to work | 41 | 90 | 26 | 18 |
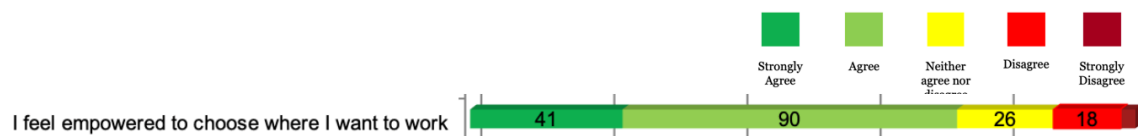
"It's a bright, comfortable working environment that allows different work styles depending on personal preference, specific task and concentration throughout it"

"Plenty of space for informal meetings - no need to arrange meeting rooms etc"

The survey responses again demonstrate satisfaction with choice, with the comment regarding informal meetings extremely relevant.   The repertory grid interview findings correlated with these opinions and further elaborated on the differences between formal and informal interactions, the use of meeting rooms as well as identifying specific preferences and reasons for choice of workspace.

Project objective: Encourage interaction and collaboration

	Strongly Agree	Agree	Neither agree nor disagree	Disagree	Strongly Disagree
Our workplace supports collaboration with colleagues	79	88	11	1	
Our workplace promotes interaction with people from different grades	63	80	24	11	
Our workplace promotes interaction with people from different LoS	47	77	31	21	
Our workplace promotes interaction with my firm wide colleagues	40	72	54	12	

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"Much more open: have got to know colleagues from other LoS since moving to Atria One."

This question highlights the need for definition of project objectives. The study findings indicated that although collaboration and interaction were continual within the ABW, the majority of the interactions were based on the need to meet personal and team objectives.   They also identified which workspaces were conducive for specific types of interactions which is beneficial insight for future workplace design.

There were nine (9) additional comments in relation to concern with noise from open plan and   alternative work areas.   This contrasts with the repertory grid interview findings where noise was deemed as having a positive impact on both privacy and the feeling of inclusion.

Satisfaction is clearly important within workplace design and, as can be seen in literature, is cited as a major influencer in how individuals perceive working within new working envrionments and how researchers and organisations measure success.   What these post project evaluation surveys do not deliver is the identification of the distinct elements and circumstances within the workplace design which exert influence, persuade and shape the way in which individuals are both satisfied with and interact with the workspace. The design elements of ABWs and other 'new ways of working' environments are the central focus of transformational change projects, it would seem appropriate, therefore, to define the desired objectives and outcomes in more detail, to enable a more rigorous and valuable assessment of success to support future learnings for future projects.

6 Discussion

6.1 Introduction

The purpose of this study was to explore how the actual use of specific workspaces reflected the intention of the design within an Activity Based Workplace (ABW) environment. This was guided by applying the repertory grid technique (RGT), and its association with personal construct theory. Through the elicitation of participants' workspace perceptions and use, similarities and differences were explored. This facilitates the discovery of how the users experienced and adapted the workspaces to meet their preferences and needs, as well as identifies specific features and attributes found to be either beneficial or less functional in supporting distinct activities and tasks.

Whilst setting the scene, this thesis highlighted how the deterministic assumptions of workplace design frequently neglects to address the complexity of roles, perceptions and needs of individual users. This section, through the findings from the research questions, will discuss the differences and interdependencies influencing the divergent responses, perceptions and user outcomes within an ABW implementation.

6.2 Activity Based Workspace Overview

Activity based workspaces, designed with flexible zonal settings and non-territorial, unassigned desks are becoming established within organisations, especially as evidence demonstrates financial and space optimisation benefits (Hoendervanger et al, 2018). The open environment and variety of workspaces are seen as essential to the development of increased interaction and collaboration, and offer individuals a choice as to preferred ways of working (Rolfö and Babapour Chafi, 2017; Appel-Meulenbroek et al., 2011). Workplace design, however, has its challenges as many empirical studies

emphasise inconsistencies and contradictions in regard to the outcomes of proposed benefits (Wohlers and Hertel, 2017; Keeling et al., 2015; Davis et al., 2011) and frequently document employee dissatisfaction, decreased performance (De Bean and Beijer, 2014) and increased stress (Seddigh et al., 2014). ABWs have been studied in terms of employee productivity, satisfaction, health, engagement, causal relationships between the physical working environment and behaviours such as interaction and collaboration, all in an attempt to create improved workplace environments. These studies rarely, however, compare 'like for like' in respect of types of workspace configurations, employee type or industry sector. They are also commonly framed from the perspective of how the workplace impacts the individual, however individuals have agency, the ability to act independently and to make their own choices. As freedom of choice is one of the key strategies of ABWs, it seems appropriate to study user experience, from their own perspective, of how they use and adapt the workspace to meet their own preferences and needs, a significant aspect which is addressed by the aims of this study.

6.3   Research Question 1

RQ1: How are the participants using the activity based workspaces?

This aim was to assess how the participants were using the activity based workspace configuration, which incorporated a full range of workspaces designed for different work activities, e.g. interaction, collaboration, individual working, concentration.

The ABW is a designed open environment with a variety of workspaces, which signpost the suggested interaction or activity to improve interaction and collaboration, however researchers continue to debate as to whether these spatial interventions support or hinder the expected behaviour (Bernstein and Turban, 2018).

Within the ABW project being studied, improved collaboration and relationship building were key objectives and a promised deliverable by the designers, through the configuration of the overall open envrionment and workspaces. Two types of spaces were for designed for enhancing collaboration, bookable meeting rooms and collaborative workspaces, with the ability to just 'pop in' and use as needed. The findings significantly differentiated the way in which the two spaces were perceived and used from both an aesthetic and contextual perspective which, as a result, defined how participants viewed activities, i.e. formal and informal. Spaces with a more traditional design, e.g. doors and walls, signified a more formal quality, most often involving external and client interactions or more top-down internal information flow, and recognised as planned interactions and less collaborative. Whilst the more relaxed and open layout and workspaces reflected the informality of normal day to day activities, which reflected immediate and spontaneous collaboration. This distinction is significant and emphasises an important contrast to existing literature and the design intention, which present the principal aim of meeting spaces as meeting the needs of a diverse range of collaborative activities, both formal and informal.

The informality preference shown in this study reflects the way in which the participants engage on a daily basis and suggests an incongruence between the daily activity behaviour and design expectation. It does however, express that an open, visible and relaxed environment facilitates a more informal approach (Sailer and McCulloch, 2012).

Two additional determining factors were significant when choosing to move to a workspace irrespective of type of activity or task, 1) the accessibility of the workspace and 2) closest point to the individual's current location. The participants stressed that their working day was rarely a planned event, and their tasks and activities regularly impacted by the need to frequently interact and collaborate. The ability, therefore, to just

'pop in' to another workspace to quickly resolve an issue as it arose, rather than having to book a defined collaboration space, was considered essential and crucial. These findings further emphasised a contradiction of the design intention, that is, rather than use the perfect space for an activity, the need for quick catch ups prompted the use of any workspace which was close to location in which the participants were presently situated. They also suggest that although users did switch workspaces as the need arose, it was perceived as rather time-consuming from both a booking and distance perspective. Therefore, it is important to understand the dynamics of user collaborations, i.e. interactions could be as short as a few minutes, or last more than an hour, which determines affective reactions to assessibility and ease of use.

Day to day desks, designed for individual tasks and concentration, were also identified as a space where participants could catch up with colleagues, further emphasising that from the users' perspective the majority of workspaces are multifunctional, interchangeable and demonstrates agency by adapting the workspace to suit their needs and ease of use, regardless of defined protocols. This behaviour challenges current literature, which implies that individuals prefer to use workspaces within an ABW envrionment which are designed to match their activity or task, or alternatively they would prefer to remain in one workspace rather than moving (switching) from one workspace to another (Appel-Meulenbroek et al., 2011; Qu et al., 2010)

6.4   Research Question 2

RQ2:   What are the factors and characteristics which encourage participants to use a
           specific space?

Spatial characteristics, usability, aesthetic features and symbolism were strong influencers in how participants chose and used the variety of workspaces.

6.4.1 Openness and Visibility

Research deems that the spatial pattern of ABWs, i.e. openness, and transparency facilitates increased interaction and collaboration (Evans et al., 2017; Wohlers and Hertel, 2017). The findings from this study clearly endorse these insights, and contribute further to knowledge by suggesting that the absence of barriers elicit perceptions of inclusivity and a safe environment to approach and interact with others.

6.4.2 Proximity

Geographical proximity, the specific distance to the nearest colleague within the ABW, is considered a predictor in shaping individual behaviours, i.e. interaction and collaboration (Coradi et al., 2015; Hua et al., 2011, 2010). The findings of this study did not demonstrate support or counter evidence to these specific insights. They did however, support temporary geographical proximity research (Henn and Bathelt, 2015), demonstrating that, regardless of close geographical proximity, the participants continually collaborated, shared and exchanged knowledge to meet individual and project needs and goals. This behaviour is conducive to the role characteristics of knowledge working, suggesting other forms of proximity, e.g. cognitive, social and organisational are significant in the collaboration debate. The findings also established an illuminating consequence of proximity, revealing that the actual physical closeness of individuals, whilst sitting shoulder to shoulder, within an informal, relaxed workspace, was considered a catalyst for developing relationships, breaking down barriers, encouraging and augmenting knowledge sharing and collaboration. These subtle distinctions promote awareness into users' perceptions and adds further knowledge to the face to face seating concept which is deemed to enhance collaboration.

6.4.3 Privacy and Noise

Privacy and noise are frequently cited as tensions and paradoxes within ABWs (Morrison and Macky, 2017; de Been and Beijer, 2014; Jahncke and Halin, 2012; Appel-Meulenbroek et al., 2011), however they were not considered an issue within this study. The findings demonstrated that privacy was linked to formal activities, and accordingly, the ability to withdraw from the open environment to more enclosed workspaces, with characteristics such as doors, walls and glazed panels, providing the opportunity for privacy, confidentiality and freedom from interruption, if required by the study participants.   Whilst for informal interactions, the furniture characteristics, e.g high backs of booths, accoustic chairs and library areas, furnished adequate barriers for privacy, if necessary, within the open and visible envrionment of the ABW. These findings suggest, therefore, that privacy is enhanced by an appropriate design of features and barriers.

In terms of noise, despite it being cited as an underlying factor of stress and dissatisfaction within existing research, it was considered a positive environmental feature within this study.   It was referred to as a 'buzz', which acted as a form of 'noise masking', with the capacity to enhance privacy when collaborating or requiring privacy within the open environment.   Background noise was also elicited as promoting a feeling of inclusivity and energy, demonstrated by participants using collaboration and alternative workspaces within the open envrionment, both for formal and informal interactions, and facilitating concentration for individual tasks.   Noise not being raised as an issue suggests that participants, within this study, assumed autonomy and agency to eliminate the consequence of exposure, by switching and using workplace locations as appropriate to suit their specific needs.   From these findings we can,

therefore, discern that it is individual perceptions and differences in job role and activities (Hoendervanger et al., 2016) which determine the impact of noise and privacy and subsequent choice of workspace (Pierette et al., 2015). Although noise was not directly addressed in this study, the implications of the findings can be inferred to challenge existing research, which maintains that generally individuals are dissatisfied with privacy and noise (Oseland and Hodsman, 2018; Rolfö and Eklund, 2015; Kim and de Dear, 2013) and continues to highlight the many contradictions in workplace literature.

6.4.4 Usability

Usability of all the ABW workspace is crucial to knowledge workers, as their day to day role demands the continual switching of locations, to fulfil the needs of each discrete activity and task.   The findings demonstrated, that although the majority of the workspaces were practical and multifunctional, there were three workspaces which were considered not functional, useful or conducive for activities or tasks. These sub-optimal workspaces were: one (1) collaborative room considered to lack professionalism through its impractical and bleacher style furnishings; one (1) collaborative space incorporating benches, which were perceived as encroaching upon personal space due to sitting in close proximity; and one (1) quiet space which although complied with all appropriate features, was perceived as claustrophobic and lacking psychological privacy.   The designer's perception of relaxed interaction, interpreted through a metaphor for collaboration, was based on the bleacher style seating and picnic style benching which did not reflect the way in which participants construed their meaning. As a result the concept was unsuccessful in reflecting its design intention. This interjection by the users, reflects limited appreciation of their needs and raises the

importance of identifying success factors through evidence based research, to better inform the planning and design process. Such flaws reflect that original design intention can often be based upon fashionable trends, designer fads and fuzzy guidelines for workplace design (Klooker et al., 2016; Sailer et al., 2010; Moultrie et al., 2007). Within this study, functionality and comfort of workspaces were influential in both the choice of workspace and supporting the activity or task (Appel-Meulenbroek et al., 2011) i.e. privacy was promoted through barriers, walls and background noise, whilst informality and comfort of workspaces enhanced collaboration.

6.4.5   Aesthetics

The findings demonstrated the significant affect aesthetics, i.e. colour, material and overall design of the ABW had on the individuals' affective responses (Gonzalez-Suhr et al., 2019), which literature suggests subsequently has the potential to impact motivation, performance, satisfaction and well-being (Waistel, 2016; De Groot et al., 2015; Schell et al., 2011).   Aesthetics signposted the significance and differences of the users' day to day working routine, specifically their perceptions of what represented formal and informal work activities, and were central to the choice of workspace when taking time out or relaxing, contributing to a feeling of well-being.   Supporting the objectives of breaking down barriers, building relationships and a sense of belonging, the ABW was perceived to have created an atmosphere and visual perception (Brown, 2018), which prompted different meanings for the participants, ranging from a sense of belonging, personal preference for workspaces and employee commitment. Within post project evaluations, the aesthetics and overall design of the ABW is normally assessed through satisfaction.   This study establishes the link between aesthetics, the overall design of ABW envrionment and how the participants shape the way they act, through emotions, feelings, perceptions and needs, which subsequently creates defined

workspace behaviours and experiences. However, with the focus primarily on furniture solutions and occupancy metrics, ABW and transformational change projects rarely consider these effects. Awareness and consideration of the relationships between the workspace, aesthetics, users and activity profiles would further enhance lessons learned, supporting future design decisions.

6.4.6 Symbolism

The findings emphasised how fundamental organisational culture was to the overall success of an ABW environment. The participants' responses, illustrated and emphasised that the participating organisation had embraced a new mindset to support the new flexbile working practices, with the participants feeling empowered to assume the autonomy, agency and flexibility they needed to fulfil both needs and expectations. The transformation, from a hierarchical and traditional way of working, to a more flexible and adaptable manner was also reinforced through trust and independence from the leadership team (van Koetsveld and Kamperman, 2011). Intrinsic to understanding how the participants use the workspaces, these interdependencies reflect the complexities of what makes a successful ABW workplace design project, which further supports the focus of this study. These findings are contrary to many arguments in research which consider ABW features and characteristics have a negative effect on employee attitudes, behaviours and performance (Ashkansy et al., 2014; Ayoko et al., 2014).

6.5   Research Question 3

RQ3: How does the actual use reflect the original design intention?

Overall, the ABW design was positively perceived and, in general, supported a variety of work tasks and activities.

6.5.1   Openness and visibility

The ABW project objectives of openness and visibility, shaping and prompting interactions was achieved. Research deems that the spatial pattern of ABWs, i.e. openness, and transparency, facilitates increased interaction and collaboration (Evans et al., 2017; Wohlers and Hertel, 2017). The findings from this study clearly endorse these insights, and contribute further to knowledge, by suggesting that the absence of barriers elicit perceptions of inclusivity and a safe environment to approach and interact with others. There were, however, inconsistencies in relation to how the participants used the specific workspaces versus the design intended behaviour (Tagliaro and Ciaramella, 2016) which stresses the need to better understand the specific characteristics and features, together with the reasons behind individual motivations, which influence choice.

6.5.2   Workspaces

A prime strategy for the ABW project was flexibility of workspaces, each designed to best suit a specific activity or task, e.g. collaboration, concentration, general day to day work. Although it could be claimed that the participants' choice of workspace was influenced by the design of the workspace, i.e. using collaboration spaces for interactions and accoustic chairs for quiet or private time, the majority of workspaces were considered multi-functional and used constantly for other activities and tasks. It

was clear that there were similar characteristics between workspaces, which participants considered to be extremely effective to facilitate their required activities, needs and preferences, feedback which could be extremely advantageous during the design stage.

Users also played an active role in determining the relationship between the ABW and the appropriateness required for the task and activity, producing personal spatial meanings to determine use, e.g. the use of meeting rooms for purely formal interactions and alternative workspaces for day to day working, rather than the workspaces designed for the specific behaviours (Zhang and Spicer, 2014). This agency reflects the role characteristics of the users, and supports recent literature which proposes the view that knowledge work consists of contrasting activities, therefore workspace choice should reflect the preferences and needs of current task and mood of the individual (Peteri et al., 2021).

Flexibility was interpreted by users as the ability to use a space which they could just 'pop into' without booking, preferably near to their current location, rather than the design intention of variety of choice of workspaces. This contradiction accentuates the aim of this study to explore the differences between the designers' and users' interpretation of meanings. It also emphasises the need to acknowledge that switching behaviour dynamics are significant, as they evidence how they influence and affect use. The participants, within this study, used the ABW through the nature of their activities i.e. immediacy and spontaneity, observations which ultimately will lead to better informing ABW design practice in the future.

6.5.3 Collaboration

The findings demonstrated that the participants purposefully interacted and collaborated, motivated by the need to secure or share information, progress a goal or

activity. The shared spaces and visibility enabled individuals to see others within the office, supporting more informal, impromptu and often quick interactions. More complex exchanges required defined workspaces and were chosen by specific needs and preferences. These findings, suggest through the participants' behaviours and choices, that their job roles revolved around autonomy and interaction, which significantly influences positive experiences and attitude towards the openness and flexibility of the ABW (Van Meel, 2019; Duffy, 1997). The users' appreciation of how their roles encompassed immediate and spontaneous collaboration may also be the explanation as to why they did not perceive lack of privacy, noise or distractions as issues. In contrast, individuals with more focussed and individual roles may reflect upon the ABW from a less favourable perspective and consider distractions and interruptions negatively (Babapour Chafi and Rolfö, 2019, Engelen et al., 2019).

These findings validate the link between the original design intention and user preferences. It is essential, however, to recognise that these behaviours reflect that the interaction occurred through participant intentions, rather than the influence of the configuration of the workspace. As collaboration was deemed integral to their role, it suggests that rather than encourage or discourage collaboration, the ABW workspaces and configuration supported individual needs and goals. Although the ABW did not directly influence collaboration, the more open, informal, relaxed and comfortable workspaces were considered enablers. These findings are distinctly different from existing collaboration literature, which explores how ABWs and open plan workspaces enhance behaviour or create negative impacts (Ayoko and Ashkanasy, 2020; Kim et al., 2016; Kim and de Dear, 2013). This study expands the research, through user centric explanations of how the participants use the workspaces and the underlying reasons and motivations for their selection. It further demonstrates that the interdependencies of

knowledge workers' role characteristics and intrinsic motivation fosters a willingness to collaborate, which consequently questions the causal relationship between ABW configurations and collaboration.

It also highlights their agency and empowerment within the organisation to adjust the way of working to support their preferences and needs. These different meanings and interpretations, substantiate this study's aim to better understand how and why a user chooses specific workspaces, compared with the designer's perception, with the potential to better inform industry practice.

6.5.4   Organisational Culture

Participants recognised and appreciated the transformation in working culture, from a hierarchical and traditional way of working to a more flexible and adaptable style through the breaking down of barriers (Bjerke et al., 2007; Danko, 2000), reinforced through trust and independence from the leadership team (van Koetsveld and Kamperman, 2011).   ABWs are often implemented to address organisational change (Lahtinen et al., 2015; McElroy and Morrow, 2010), therefore creating a transparent and strong culture, created through consistent and authentic behaviours, which support core values and norms.   This is vital as it engenders employee engagement, increased motivation and organisational commitment.

It was clear from the perception of the participants that the overall transformational change, workplace design and attractiveness of the ABW enhanced their job role, engagement and commitment to the organisation, which has the potential to positively impact performance (Veitch, 2018; Bakker and Leiter, 2010). There was also a sense of belonging and evidence of affective commitment to the organisation (Fernandez-Lores et al., 2015). Both outcomes have the potential to strengthen organisational

competitiveness and influence recruitment and retaining employees (Danko, 2000), which met strategic objectives of the participating organisation's workplace design project.

Further supporting this study, and intrinsic to understanding how the participants use the workspaces, these interdependencies reflect the complexities organisational culture and its relevance to understanding of what makes a ABW workplace design project a success.

6.6   Workplace Design Implementation Process

There is negligible research and sparse guidance as to the process for the implementation of an ABW, especially from the perspective of the degree to which the project was successful.

This ABW project appeared to be committed to industry 'best practice', conforming to developing a detailed project brief, incorporating user participation and conducting pre and immediate occupancy evaluations, and a post project first year review. However, the findings and conclusions of this study, can only make assumptions and surmise on the comparison of the design intention versus the actual use, due to the lack of definitive measurement indicators for the project's strategic objectives, which were determined at the briefing stage.

6.6.1   Briefing

Briefing should identify the day to day workings of the organisation, encompassing what and how activities are carried out by the users, and, to successfully assess the project. A statement of intent should establish key objectives and expectations with defined requirements and measurements, which can be used as a comparison against the

original objectives to support the project post occupancy evaluation (POE). These outcomes which are linked to the design intent should then be the platform for assessment of the implementation success of the ABW project.

6.6.2 User Engagement

The advantages of promoting user participation in workplace design is its potential to foster commitment and ownership to the project, bringing an appreciation of the culture of the organisation and the way things are done, i.e. organisational practices and norms, resulting in better design, and ultimately reflecting best practice.

The participating organisation initiated an employee engagement and participation programme, commencing at the start of the design project with the aim of encouraging authentic collaborative and collective communication, in order to facilitate a successful workplace change. The study data suggests that giving users the opportunity to be involved in the design decision process, in a meaningful way, ensured their needs and requirements were incorporated (Hamilton, 2014), and was a fundamental component of the success of the ABW project. Users are often only consulted closer to the completion of the design project, normally at the furniture solution stage, to pilot a new chair, choose colours and designs for corporate manifestations, or put names to meeting rooms, with no real influence on the way in which the design will support their ways of working. Current literature suggests that involving employees in the design process, with empowerment to be co-designers delivers a high degree of employee satisfaction (Rolfö et al., 2017). Whilst a lack of influence in decision making may limit the benefits of user participation (Lahtinen et al., 2015), neglecting to engage users purposefully in the design process carries the risk of resistance to change and unfulfilled user preferences and needs (Gerdenitsch et al., 2017).

Despite input from users during the design stage of this project, usability issues were revealed, which suggest there is still a tendency to gravitate towards 'fad and fashion'. Three workspaces, subsequently deemed unsuitable for any type of use, were physical representations of desired behaviours. Although the bench issue was quickly resolved, the bleachers and phone booth are seldom used and were still in situ twelve months after the completion of the study interviews. The findings imply that emphasis should be placed on better understanding behaviours, e.g. collaboration or concentration, through the way in which they manifest during contextual day to day working, and what drives that specific behaviour, particularly from organisational and cultural contexts, rather than in terms of number of workspaces for specific behaviours, using occupancy ratios which is currently recognised as the norm.

6.6.3 Post ABW Project Assessment

The post project evaluation is a methodology to assess the experience of users, gathering information of what went well and not so well, to enable learnings to be carried forward to future projects. In practice, however, these evaluations are rarely carried out in any depth and most frequently are conducted through employee satisfaction surveys, which do not provide an understanding of user experience or the variables which influence specific workspace choice.

The organisational documentation illustrated that a post project evaluation survey was conducted twelve months after occupation, which consisted of an employee satisfaction survey, considered standard practice within the industry practice. As it gathered purely satisfaction and perceived productivity data, this was limited in its ability to effectively evaluate the design intention versus actual use, illustrating that to fully understand the functionality of ABW design from a users' perspective, we need to assess how and why

they are using it, contextually through their day to day activities, against clearly defined and measurable objectives.

6.6.4 Summary

This study suggests that it is imperative to have a better understanding for measuring the success of the original design objectives.

The findings demonstrated that the adoption of the workplace design implementation process, incorporating user engagement and the empowerment to co-design, positively correlated with the perceived success of the ABW project. This interpretation was validated by the participants, a number of which were actual members of the ABW project steering committee, which further emphasised that employee participation also facilitated outcomes which were beneficial to both the users and the organisation. The initial design brief embraced both occupancy data and human factors, defined as critical to user needs. As comprehensive performance measures were not defined, success was simply measured through satisfaction and perceived performance.

Encompassing an understanding of user perceptions and meanings are essential to developing a more comprehensive critique of the workspace, which subsequently has the potential to challenge the decisions of the original design intention.

7   Key Conclusions and Contributions

7.1   Introduction

The overall aim of this study was to determine the correlation between the actual use of individual workspaces within an ABW environment, and through this insight, inform the workplace design implementation process as to use and preferences for inclusion in future projects. This study was guided by applying the repertory grid technique (RGT), and its association to personal construct theory. Through the elicitation of participants' workspace perceptions and use, similarities and differences were explored, facilitating the discovery of how the users experienced and adapted the workspaces to meet their preferences and needs. It also identified specific features and attributes found to be either beneficial or less functional in supporting distinct activities and tasks. Additionally, the study has demonstrated an alternative approach to understanding individuals use of ABWs, by developing a more in-depth appreciation of how new workplace environments can further support employees, identifying the way in which individuals are utilising and adapting to the more flexible ways of working in unconventional, and often idiosyncratic workspaces, and reflecting on how to optimise understanding of these behaviours.

7.2   Key Conclusions

7.2.1   Integrating Assessment of Actual Use - Versus - Design Intention

Participants frequently used workspaces in ways which were not assigned by the original design intention, appropriating them in accordance with their preferences and needs.

The findings were elicited through a unique methodology which assesses how and why individuals use the workspaces and explores and analyses what characteristics and features influenced their decisions. This underpins the proposition that actively engaging in a collaborative approach of assessment is influential in ensuring user preferences and needs are gathered and realised, in both the design concept and after completion of the ABW to resolve potential workspace inefficiencies.

7.2.2 Assessibility and Ease of Access

Rather than choice being based on the functionality of the design intention, it was based on strategies according to assessibility 1) the position of the workspace in relation to current location, indicating distance was a limiting factor and 2) the ability to 'pop in' spontaneously, rather than waste time attempting to book a 'designed activity' workspace. Whilst the workspaces were considered multi-functional, the spatial and activity designed workspace configurations of the ABW both enhanced and inhibited the impromptu and spontaneous activities and tasks of the users, due to time and effort required to either relocate or attempt to book a workspace. Assimilating the key components and mechanisms identified as contributing to more effective workspaces, e.g. easy access and functional, rather than incorporating diverse workspaces with different features to facilitate the desired workplace behaviour, symptomatic to the latest design trends, would lead to the delivery of a more applicable and functioning design configuration.

7.2.3 Conventions of Working

The exploration of use, identified distinct working conventions, accentuating that the majority of daily activities were dynamic, predominantly focussed on individual tasks and project goals, thereby aligning with a more informal way of working. Interactions

were conducted at or around workspaces, determining that informality was more conducive to the role of precipitating instantaneous activities. This insight questions the delivery of the original design intention through a ratio of formal and informal workspaces rather than being aligned with the distinct and routinely used working conventions.

7.2.4   Role Characteristics in Workplace Interactions

Motivation to collaborate is not purely shaped through the use of the collaborative workspaces, although the findings do demonstrate that informal, relaxed and comfortable are considered enablers. Collaboration was integral to a participant's role, a fundamental component of intrinsic motivation, essential to achieving individual and project goals through the self determining management of their own work. Role characteristics, salient in this study, also influenced experiences within the ABW, with users adapting to the issues of privacy and noise, through workplace switching and valuing the buzz of the organisation as a feeling of inclusivity and energy. These benefits, however, may not be evident in users with similar roles with a different perspective of collaboration.

Through the lens of role characteristics, it becomes apparent that the ABW configuration has a neutral effect on the achievement of collaboration, supporting the move away from a cause and effect relationship, to appreciating collaboration as a process rather than an outcome, further enhancing knowledge on role characteristics and the influence on individual and collective interactions and collaboration.

7.2.5 Sub-optimal Design Features

An issue with inadequacies of specific workspaces resulted in inefficient use of workspaces, ultimately reflecting the ABW did not fully meet its original design intention. Three workspaces, defined incompatible for use, and either infrequently used or completely ignored, were designed symbolically through metaphor or physical representations of a desired ambiance. These follow a common design trend, which often appear innovative and fun during the design planning process, however the message they transmitted within this study was deemed inappropriate for intended use and unsuccessful in portraying a professional character. Exploring preferences and needs identified these inefficiencies and provided important critique, for the leadership team and designers, to facilitate substituting them with more suitable workspaces. Incorporating evidence based feedback, in the form of analysis of preferences and needs, is extremely beneficial both during the initial stages of the workplace design process and post occupancy, to provide more functional and desirable workspaces in the future.

7.2.6 Freedom of Choice

Autonomy and agency were the most evident manifestations of the empowerment the users experienced within the new ABW, intentions which supported needs, preferences and activity patterns. The users demonstrated self determination of where they chose to work and reflected control over how and when they collaborated and completed tasks and activities.

7.2.7 Culture

The ABW proved successful in encouraging agency and facilitating autonomy, which was reflected in both user' and leadership' perceptions as to the success of the implementation, a consequence which is not commonly supported in empirical research (Bernstein and Turban, 2018; Engelen et al., 2019).

The elicited constructs also reflected the culture of trust through 1) an authentic transformation in working culture in breaking down barriers; 2) trust and independence displayed by the leadership team, and 3) workplace design enhancing job role and organisational commitment. ABW implementations must be more than just spatial design and furniture solutions, behavioural and cultural change management processes are pivotal to the success of a project.

7.2.8   Integrating Change Management

The findings clearly demonstrated that incorporating a comprehensive transformation process was instrumental in generating positive outcomes in both behavioural change and organisational and ABW project commitment. A key consequence of the success was the alignment of the organisation's culture, values and norms with the design intention, which emphasised that spatial design and desired changes in behaviour must be interdependent.

Spatial design is often accomplished independently through a separate task force. It is essential to acknowledge that implementing an ABW encompasses major changes in the physical space, organisational and employee behaviours, and as a consequence the spatial design should not be managed independently as is often the practice, as the changes and impacts are intrinsically interlinked.

'One size does not fit all', it is essential, therefore, that consideration is given to other industry sectors and employee groups, as an ABW's open, transparent and flexible approach may not necessarily be effective or appropriate for differing organisational cultures or employee work profiles (Qu et al, 2010; Greene and Myerson, 2011; Skogland, 2017).

7.2.9 Framework to initiate a more user centric implementation process

The study demonstrated that incorporating a more user centric process, through the exploration of how individuals experience, use and perceive ABW workspaces, can reveal illuminating and insightful data. A number of elicited constructs and comments uncovered surprising and least expected responses, which supported and challenged both the original design intention of the project and current workplace design research. It also underlines that fundamental to fully appreciating the results of the ABW transformation, is the assessment of the design intention and user needs, preferences and experiences.

Current workplace literature asserts that ABW environments are seldom used as the original design intended and advocates the need for continuing detailed inquiry. From a client, consultant and designer perspective, this study offers a framework to gain a deeper understanding of ABW workplace features and characteristics, which either enable or hinder daily working activities, through contextual user behavioural feedback. Figure 7.1 illustrates a framework, defining key elements from this study, which when incorporated into the workplace design implementation process will impart benefits for the organisation and most significantly the users.

Figure 7.1: ABW design implementation framework: the user centric approach

Gather and incorporate user perceptions and meanings throughout the entire design process.

Initiate	Define Vision, Values, Culture	Gather pre-occupancy user preferences through user centric repertory grid framework		
Interpret	Develop the brief	Define KPIs with measurement criteria against strategic objectives	Identify role characteristics, behavioural work patterns	Consider ratio mix from accessibility, ease of use and multi-functional perspectives
Imagine	Develop the concept	Translate vision and context specific characteristics and needs into tangible ideas and ABW design approach	Appraise and encompass evidence based design research and best practice principles	
Pre-Implementation	Review and re-evaluate design concept with Vision, Values, Culture and strategic objectives	Reassess defined context specific characteristics and user preferences and needs		
Investigate	Post occupancy assessment – within 3 months of occupation - Actual use – versus - design intention assessment	ABW project review 12 months post occupancy - Actual use – versus – design intention assessment		

User participation

Change management and communication programme

Design decisions are simply hypotheses of desired performance parameters, therefore fundamental to the design process framework is the commitment to measuring their success.

Using the metaphor of the customer journey (Meyer and Schwager, 2007), this study's findings describe the user journey through the participants' responses as to how they experience the ABW during their normal working day. The findings highlighted their experiences from a number of different perspectives, rational, physical, emotional and sensorial (Gentile et al., 2007) and identified differences between the individual workspaces, reflecting Kelly's (1995) view that the repertory grid technique is beneficial when seeking to capture a user perspective.   The participants' constructs identified distinctly personal perspectives and characteristics (Lemke et al., 2011), which influenced favourable behaviour towards the workspace, reflected limitations which are significant, and revealed how and why the designed workspaces were used.   This in-

depth data has the ability to better facilitate assessment of the project original design intention and organsiational objectives, to challenge and further inform future design.

7.3 Original Contributions

This study identifies two categories of original contribution to the concept of ABW work design practice and research.

7.3.1 Contribution to Method Within the Field of Workplace Design

This study offers a contribution of method through the use of the repertory grid technique.

In order to evaluate how participants are using the activity based workspaces and to understand what factors and characteristics encourage their choices, the repertory grid technique was adopted. Although an unconventional method within workplace design research it was used in preference to quantiative and mixed methods, which are the more established approaches. Although both of these deliver significant results, they do not generate the data required to elicit user experiences, preferences and needs, and as a consequence the repertory technique commonly used in marketing and consumer research, was considered most appropriate for the study. A cognitive mapping tool, underpinned by the underlying theoretical assumptions of personal construct theory (Kelly, 1955) which acknowledges the uniqueness of individuals, the RGT can have a positive impact on workplace research through a number of factors. It has a robust and structured approach to elicit findings; is considered valuable in exploring uncommon research paradigms; and it reduces researcher/observer bias (Goffin et al., 2012; Fransella et al., 2004; Jankowicz, 2004). The laddering technique, used during the elicitation of the bi-polar constructs, proved influential in the gathering of additional information to further understand the participants' meanings. The use of actual

photographs of the elements, assisted participants to accurately recall the workspaces and describe specifically what influenced the choice, enabling a more in depth understanding of user needs, perceptions and behaviours.

The interviewing technique was new to the participants and, with the exception of one, all found the process intriguing and enjoyable. A number of the pilot study participants also stressed the eliciting of personal constructs prompted them to think more rigorously about similarities and differences, emphasising in more depth, the specific reasons of why and how they used the individual workspaces. The strength of the technique lies in acquiring underlying realities through the elicitation of personal constructs, representing tacit, explicit and implicit knowledge from the participants.

There are, of course, potential limitations to RGT which are important to acknowledge and which are discussed in Section 7.4 Limitations.

7.3.2   Contribution of Different Study Approach

The study explores the ABW from the perspective of how the individuals' use, adapt and modify the environment to meet their personal needs, preferences and activities in contrast to the majority of current studies, which approach ABW from the perspective of its impact on the individual which identifies: positives and negatives, and tensions and contradictions between the two phenomena. These results, however, do not provide evidence as to the achievement of ABW objectives or what implementing an ABW approach may contribute to the organisation. The unique findings from this study, through the understanding of congruency between the original design intention and actual use, challenge and add to existing workplace design knowledge and practice.

7.4 Limitations

This study reflected purely the perceptions of the users within the study organisation, and although the findings were compared and contrasted with the design intention and strategic objectives, these were extracted through the document analysis rather than the personal perceptions and views of the designers and the leadership team. Discussions were planned to capture this data, however, due to competing priorities, dates were continually cancelled due to both time issues and individuals leaving their respective organisations, consequently they were never rescheduled. Although the participants concurred with the researcher's assimilation of the intended design and strategic objectives, the written word often cannot reflect the exact nuance of personal meanings, therefore the assumptions and conclusions may have generated slight variances.

The participants were all current employees of the study organisation, who had either been involved in the ABW transformation or individuals who had joined within the first year of the change in working practices. However, it did not include individuals who subsequently left the organisation after the transition to the new activity based workplace. Reflecting on my Human Resources experience, reasons for leaving often represent concerns regarding workspace practices and conditions, which could have potential to impart different views from the current employees, affecting the final conclusions and subsequent value to the study.

The repertory grid technique is a time-consuming approach and within real world research poses significant issues for a number of reasons. Firstly, scheduling sessions with extremely focused and busy knowledge workers is complex and although employees were enthusiastic about participating in the study, all interviews were limited to forty five minutes, and often were required to be rescheduled, which extended the

time the researcher was required to be located in the study organisation's offices. Secondly, the structure of the interview and completion of the grid can be demanding, and depending upon the number of constructs elicited it can take longer than anticipated to complete. This has two implications, firstly the participant may become restless and bored with the process and secondly the time constraints may affect the quality of the data due to lack of relevant constructs being elicited. Timing is regularly cited as an issue when conducting interviews within exploratory research, however, although the timings were extremely tight within this study, all interviews were completed within the research strategy parameters and delivered substantial and meaningful data. On completion of the RGT structured interviews, if time permitted, conversations took place with a number of participants which gave further insights into the participants' perceptions of the ABW, further suggesting that additional time would have been advantageous.

Two RGT methodological factors also need to be considered to avoid limitations in future research. Firstly, the rating scale within the grid has a mid point and it is imperative that this does not create uncertainty as to its meaning (Yorke 2001). Generally, rather than use the midpoint, participants have a view as to which dimension the construct falls towards, either the emergent or contrasting pole. Within the pilot study, all four participants asked what the mid point represented. To alleviate any confusion, it is essential to gain insight into how the participant is using the mid point, "is it balanced between the two dimensions, not applicable to either dimension?' or "are they unsure of where it fits?". The ratings of mid points within this study were acknowledged and recorded on the individual matrix grid. Secondly, the recommended qualitative data analysis process within RGT literature (Jankowicz, 2004) mainly

focuses attention on the constructs which identify as similar (emergent pole) during the elicitation. However, the differences (contrast pole) in respect of user perceptions should not be overlooked as this also generates rich data, an insight which is demonstrated within this study.

Notwithstanding these limitations, I believe that this study further augments workplace research, with specific focus on Activity Based Workspaces. It encapsulated the current tenets of workplace literature on ABWs, however, it has also appraised the main principles from a different viewpoint, that of the how the individual uses and adapts the ABW to meet their preferences and needs. Through the unconventional method of RGT, the findings provide a richness of personal constructs, often missing from a quantitative approach, which also contribute to the aims of this study by reflecting the agency asserted by individuals in the enactment of their roles within the workplace rather than behaviour being determined by the ABW design strategy.

7.5 Practical Implications and Future Recommendations

This study identified how participants use the ABW and which features and characteristics influenced the choices. The findings support the perspective that an ABW can be designed to encourage desired behaviours through flexbility of workspaces, openness and visibility. They also demonstrate a number of factors which emphasise important insights to inform industry best practice.

The complexity of the knowledge workers' role, i.e. high levels of activity variation, autonomy, interaction and self motivation, correlates well with the strategy of the activity based workplace (van Meel 2019; van Yperen and Wörtler, 2017). As the majority of the participants within this study were knowledge workers, this may convey

an explanation for the inconsistencies between this study's findings and current workplace literature. The findings, therefore, demonstrate the need to recognise and take into account, the variance of needs and preferences between task/activity patterns and job classifications e.g. individuals who have a more focussed and static work pattern, when designing and implementing a new physical working environment.

The continuing trend of design fads, i.e. work settings represented through physical symbolism, e.g. bleachers for interactions, continue to have the potential to diminish use or fail to achieve the design intention and business objectives. Incorporating creative design features without analysis of their impact frequently results in misuse or be ineffective for the defined activity, emphasising the view that user behaviour is not transparent and often does not reflect the anticipated design outcome. Adopting a more critical analysis as to how and why design features are interpreted would validate the design choice for specific activities, further enhancing the opportunity to inform current and future workplace design projects.

An ABW project impacts changes to both the physical characteristics of the environment as well as working practices, with consequences and influences presented through two mediums, empirical research and project post occupancy evaluations, both of which commonly evidence that space impacts the individual. Although inconsistencies between intended and actual use are frequently highlighted in literature, the findings focus on user outcomes, tensions and paradoxes rather than discovering explanations, processes and consequences of how individuals use and adapt the space. The findings from this study emphasise the need for a shift in focus from user outcomes to understanding the preferences, needs and motivations behind the user's choice of specific workspace, especially when looking to determine the success of a workplace

project. Measured findings document the success factors of design intent and strategic objectives, which are fundamental to enhancing and informing future design practice and demonstrate the benefit of establishing and committing to an evidenced based design process (Hamilton 2017).

The study therefore suggests, that as the association between design intention and actual use is unpredictable, and the physical working envrionment affords perceptions and behaviours not anticipated or planned by the design (Brown, 2018; Morrison and McKay 2017; Stryker et al., 2012), that effectiveness and success is determined by how individuals perceive and use the ABW. Future ABW projects would benefit from ensuring behavioural patterns, individual perceptions and needs, and potential impacts of changes to organisational culture are viewed as an essential part of the design process and assessed along side standard activity settings and occupation metrics.

This study aims to enhance the understanding that the impact of ABW design, from the perspective of how employees perceive and use the ABW space, through the introduction of the unconventional workplace research methodology of the repertory grid technique, subsequently strengthening the assessment of design effectiveness and success of ABW projects. The participants embraced this unusual technique of comparing and contrasting workspaces, which enabled them to discuss pros and cons, as well as challenge the design intention of the workspace. This process also coincidentally reinforced, or occasionally altered their views, of how and why they selected where to carry out specific activities, as they were recounting actual experiences rather than expressing opinions. Integrating this technique into the design process and /or project assessment has the potential to enhance understanding of the specific design factors and

characteristics, which facilitate desired behavioural changes and satisfy user preferences and needs.

The determining of measurements for objectives, implementing more in-depth post project assessments, and acknowledgement of lessons learned could be challenging to incorporate into the design briefing process and post project evaluation (Ayoko et al., 2014). Lessons learned, if identified, are infrequently shared and designers often "do not learn from their mistakes" (Leaman et al., 2010, p565). The natural reaction to the completion of design projects, is to celebrate the success; the designer then quickly moves on to the next project, taking his ideas from the current project onto the next. Simultaneously, the client, satisfied on completion, accepts there are likely to be issues that inevitably follow a transformation change process. If design intention and organisational objectives are not distinctly expressed, through measurable objectives, then how can the success of an ABW project be assessed without ambiguity.

7.6   Contribution to Practice

Working sessions are being scheduled with the participating organisation to discuss the findings and suggested recommendations to further inform best practice and improve the design, implementation and assessment of their activity based workplaces. A number of designers have also shown interest in the study, accordingly sessions will be arranged after consultation with the participating organisation.

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Appendix 1: Workspace images aligned with design intended behaviour

Workspace Activity	Designer Intention

Collaboration

Spaces to encourage interaction

Create a 'Buzzy" area

Feature areas within floor with clear view of all elements of the practice

Workspace has the opportunity to 'flow" around collaboration space

Workspace Activity	Designer Intention

Collaboration

Spaces to encourage interaction

Collaborative individual and group setting with AV facility

Secluded, away from main circulation

Collaborative group setting with AV facility

Speciality space to enhance creativity – hi tech tools

Workspace Activity	Designer Intention

Collaboration

Spaces to encourage interaction
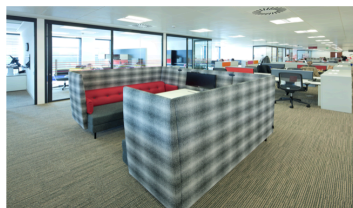
Intermixed within general working environment

Furniture booths for individual and group with high panels for privacy

Located within general workplace environment
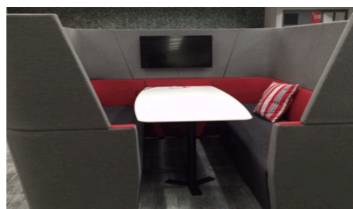
Individual and group collaboration with screen

Facing window to provide more privacy

Collaboration

Spaces to encourage interaction

Double aspect external views

Collaborative, individual and group

Located within general workplace environment

Quiet spaces

Acoustic chairs facing outwards to avoid distraction from others

Quiet, comfortable space for concentrated work individual tasks or gathering thoughts

Study area, no phones

Library shelving to create sense of privacy

Quiet spaces

Phone Booth

Easily accessible with main workspace

Quiet, comfortable space for concentrated work, individual tasks or gathering thoughts
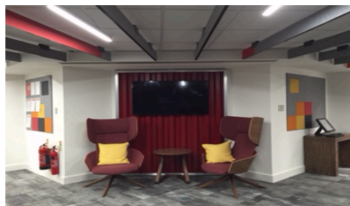
Acoustic style chairs

Positioned in quiet area between main office and reception

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Breakout

Space connecting everything together naturally

Heart of the Firm

Meet, eat, socialise, large group gatherings
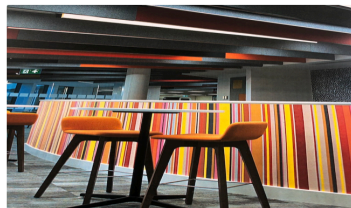
Focal floor space

Meeting Rooms
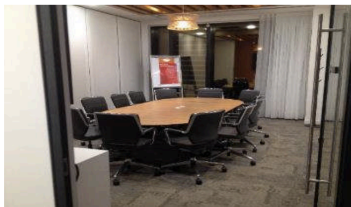
Adaptable furniture and wall space with AV technology

Enclosed rooms for formal and confidential internal and external interactions

Meeting room alternative

Partners office – around periphery of workspace environment

Meeting Rooms

Glass panels and doors with manifestations providing privacy whilst retaining a sense of transparency

Enclosed rooms for formal and confidential internal and External interactions

Traditional concept with relaxed furniture with natural daylight

AV enabled for virtual interactions

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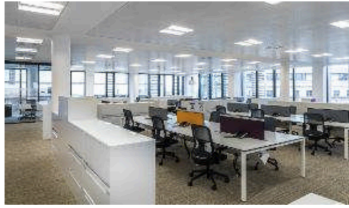
Day to day working

Open – positioned to gain maximum light

Day to day working – bookable space
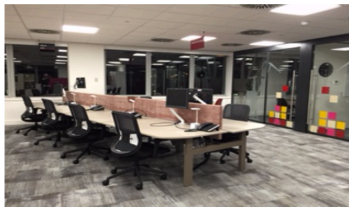
Modern curved style desk with screening

Alternative workspaces
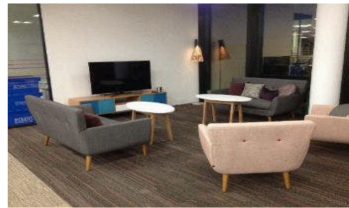
Close to main workspace

Statement furniture cosy and intimate

Provide even greater choice for individual and activities
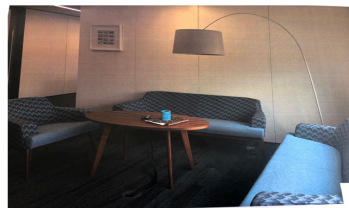
Plush sofa and low seats for formal or informal discussions

Secluded areas away from main circulation

Alternative workspaces

Relaxed, interaction space close to day to day desks

High panel for separation between work areas and enhance privacy

Provide even greater choice for individual and group interactions

Acoustic chairs

Welcoming clients

Away from open office environment

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Alternative workspaces
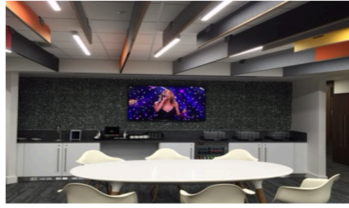
Relaxed, colourful area
for small or large sessions
with refreshment hub

Mentoring / training

**Provide even greater choice for individual
and group interactions**

Appendix 2: Kelly (1995) 11 colloraries with interpretation of meaning

1   **Construction Corollary**

"A person anticipates events by construing their replications".

Through the identification of similarities and differences of our past experiences we construct anticipation of our events

2   **Individuality Corollary**

'*Persons differ from each other in their construction of events".*

Each person is unique, therefore they have different experiences and abilities and subsequently construe events in a variety of different ways.

3   **Organization Corollary**

"Each person characteristically evolves, for his convenience in anticipating events, a construct system embracing ordinal relationships between constructs".

Constructs are organised in an hierarchical order, inter-connected through a complex system of relationships with a variety of levels, including superordinate and subordinate.

4   **Dichotomy Corollary**

"A person's construction system is composed of a finite number of dichotomous constructs".

All constructs consist of pairs, bi-polar opposites e.g. interesting or uninteresting, individuals make distinctions and interpret events through these contrasts

5   **Choice Corollary**

"A person chooses for himself that alternative in a dichotomized construct through which he anticipates the greater possibility for the extension and definition of his system".

Individuals choose to either increase their potential to gain more experiences or anticipate the world through their existing constructs

6   **Range Corollary**

"A construct is convenient for the anticipation of a finite range of events only".

Construct are only applicable to a specific range of events (range of convenience) to facilitate its usefulness.

7   **Experience Corollary**

"A person's construction system varies as he successively construes the replications of events".

We consistently review our constructs, which either substantiate or disprove our expectation of an event, which in turn develops into a learning process.

8   **Modulation Corollary**

"The variation in a person's construction system is limited by the permeability of the constructs within whose ranges of convenience the variants lie".

Some constructs are relevant and can be adjusted to fit within new experiences whilst others are resistant to change.

9   **Fragmentation Corollary**

"A person may successively employ a variety of construction subsystems which are inferentially incompatible with each other".

Construct systems are determined through a variety of contexts, which can result in constructs being in conflict with each other resulting in inconsistent behaviour.

10   **Commonality Corollary**

"To the extent that one person employs a construction of experience which is similar to that employed by another, his processes are psychologically similar to those of the other person".

As we share experiences with others, constructs and behaviours may be similar to others.

11   **Sociality Corollary**

"To the extent that one person construes the construction processes of another, he may play a role in a social process involving the other person".

Through the understanding of the constructs of others we are able to interact and attempt to see the world from their viewpoint.

Adapted from:
Winter, D. A. and Reed, N. (2016). *The Wiley handbook of personal construct psychology*. Chichester, West Sussex: Wiley Blackwell. The Kindle Edition

Appendix 3: Research strategy summary - table format

Method	Data Source	Research Aims	Aims	Analysis
Stage 1				
Document review	Organisational and design practice project files Primary evidence	A. Explore and assimilate understanding of how the Physical Working Environment Design project was conducted from initial concept to post occupancy evaluation. Specific emphasis on: - briefing process - translation of design - project goal evaluation - employee participation	Explore and assimilate understanding of holistic picture of physical working environment design project	Document Review
		B. Identify and understand links between briefing process, design and post occupancy evaluation (if conducted)	Identify links between vision and objectives with design intention	
		C. Identify and review use of Evidence Based Practice	Identify and review use of evidence based practice	
		D. Determine association between project aims and goals and specific workspace design interventions		
	Post Project Annual Review Survey Summary	Identify key results which link with project design intention and objectives to enable comparison with main study findings	Identify and assimilate results from employee survey with findings from	
Pilot study Repertory Guide interviews	Users of physical working environments to be used in main study	A. Review appropriateness of rep grid technique to elicit individuals preferred use of workspace choice B. Trial use of photographic images of workspaces as elements (verbal labels are commonly used)	To review appropriateness of tool to elicit individuals preferred use of workspace choice	Process Analysis Eyeball analysis

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Method	Data Source	Research Aims	Aims	Analysis
Stage 2				
Main Study Repertory Grid interviews	Repertory Grid Data from Users of workspaces within study organisation	A. How are participants using the specific workspaces? B. What are the factors, characteristics which encourage them to use a specific space rather than other options? C. How does this differ from the original designed intention?	To explore and identify actual workspace use Identify specific factors and characteristics Evaluate results against workspace design intention	Process Analysis Eyeball analysis Content analysis

Appendix 4: Participant information sheet

THE STUDY: 'Actual workspace behaviour versus original design intention: Evaluations of workplace design and delivery process'

Researcher: Jacqui Harrington MSc DipPsych(Open)
Supervisor: Professor Richard Harding, University of Westminster Business School

You are being invited to take part in a research study evaluating how individuals actually use the workspaces within their office environment versus the designers' intended use.

Purpose of Research
There is a perception that workplace design says much about an organisation and how it operates, its brand, culture and standing in the market place. Understanding the way in which the workplace impacts business operations and influences individual behaviours are a key focus for clients, designers and workplace consultants.

Workplace design is much more than just achieving the 'wow factor' and receiving an 'award winning' accolade for a stylish and polished environment. It is a critical component in business strategy having the ability to support and facilitate individual and business success.

Yet, there is still a lack of evidence of understanding business needs, limited appraisal of how individuals actually use the workspaces versus the designers' intended use and minimal understanding of how individuals are having to adapt their behaviours to their new 'real world environment' .

Proposed nature of your participation
Your interview (face to face) utilises an interactive technique involving visuals and prompts to elicit an in- depth understanding of how you actually perceive and use the choice of workspaces. The interview will take approximately 45 minutes, be recorded and conducted in your office environment.

Researcher's Responsibility
Your identity and responses will be confidential and anonymous together with any other information you proffer. No individual will be identifiable from the collected and analysed data, written reports of the research or any publications or presentations arising from it.

All data will be electronically stored on a private performance cloud with encryption key security to ensure data protection and disaster recovery capability complying with the Data Protection Act 1998.

Voluntary Participation
Your participation in this research is entirely voluntary.

You may withdraw from the project or refuse to be included in a particular aspect of the research at any time without explanation. You also have the right to request your data be withdrawn as long as this is practical, and personal information destroyed.

Further Information
Other colleagues, members of the project team responsible for the development and design of your new working environment, and the Design Team are supporting the research project.

University contact details
The researcher can be contacted during and after participation by email (jacqueline.harrington@my.westminster.ac.uk) or by telephone 07748 986252.

If you any have concerns about this research project you can contact my research supervisor, Professor Richard Harding by email hardinr@westminster.ac.uk.

Appendix 5: Participant consent form

'Actual workspace behaviour versus design intention: Evaluation of workspace design, briefing and delivery process'

Researcher: Jacqui Harrington MSc DipPsych(Open)

Have you read the Participant Information sheet ?	**Yes** ❐	**No** ❐
Have you had an opportunity to ask questions and discuss the study ?	**Yes** ❐	**No** ❐
I have received satisfactory answers to all my questions	**Yes** ❐	**No** ❐
Have you received sufficient information about the study ?	**Yes** ❐	**No** ❐
Do you understand that your can withdraw from the study at any time without consequences ?	**Yes** ❐	**No** ❐
Do you agree to the recording of my interview	**Yes** ❐	**No** ❐
May I use your anonymised interview material in my Doctoral Submission, future publications, presentations/talks?	**Yes** ❐	**No** ❐
Are you willing to assign your recording copyright to me (this enables use of the material in the event you are uncontactable) ?	**Yes** ❐	**No** ❐
Do you wish to receive a copy of my Consent Form ?	**Yes** ❐	**No** ❐
I note that the data collected will be retained for a period of time and I am happy for my anonymised data to be resumed as part of future research.	**Yes** ❐	**No** ❐

I confirm I am willing to be a participant in the above Research Study

Participant:

Signature:

This consent form will be stored separately from any data you provide so that your responses remain anonymous

I confirm I have provided a copy of the Participant Information Sheet approved by the Research Ethics Committee to the participant and fully explained it contents. I have given the participant an opportunity to ask questions, which have been answered.

Researcher:

Signature: **Date:**

Appendix 6: Repertory grid interview information sheet

1   **Explain why both here**

There is a perception that workplace design says much about an organisation and how it operates, its brand, culture and standing in the market place. Understanding the way in which the workplace impacts business operations and influences individual behaviours are a key focus for clients, designers and workplace consultants.

Workplace design is much more than just achieving the 'wow factor' and receiving an 'award winning' accolade for a stylish and polished environment. It is a critical component in business strategy having the ability to support and facilitate individual and business success.

Yet, there is still a lack of evidence of understanding business needs, limited appraisal of how individuals actually use the workspaces versus the designers' intended use and minimal understanding of how individuals are having to adapt their behaviours to their new 'real world environment'.

Wish to gain a deeper understanding of how and why individuals choose particular environments to perform specific tasks.

2   **Check understanding**

3   **Describe the grid in general terms**

a)   structured interview

b)   trying to understand the interviewee in their own terms and NOT to collect 'right answers'. (This is the key to the whole research)

c)   technique improves the ability for great precision, but you can choose how much detail you wish to go into

d)   be asking you to make a series of systematic comparisons

4   **Confidentiality**

Restate confidentiality and anonymity

5   **Acceptability**

Check interviewee is happy with the terms and process before commencing

Appendix 7: Repertory grid interview process 'aide memoire'

1   **Topic:** Use of Location 1 / Location 2 ABW workspaces

2   **Elements:** Photographs of 12 workspaces within location

3   **Explanation of process:** Wish to find out how they think about the workspace, how they use it and what factors and characteristics influence their choice. Will do this by asking them to compare them.

4   **Triads:**

        Qualifying Phrase: "in terms of thinking about how you use the space"

        "Which two of these are the same in some way and different from the third ?"

        [Always assure there is no right answer - it is just how they see the workspaces]

        "What do the two have in common, as opposed to the third ?"

5   **Annotate on the grid sheet:** left hand side for commonality, right for contrast

6   **Understanding:**

        MAKE SURE the contrast is a true bio-polar expression

        ALWAYS CHECK you understand what contrast is being expressed - use participants own words as much as possible, however, also possible to negotiate a form of words that make sense to both participant and interviewer.

7   **Ratings:** phrase on left 1 and phrase on right 5

        Explain: Now the words I've written on the left : they define the 1 end of a five point scale. The words on the right define the 5 end of the five point scale.

        I would now like you to rate each of the 3 workspaces (elements) from this Triad into the grid.

        Give each of them a number from 1-5 - indicating which end of the scale they are nearest to.

8   Now continue to elicit more construct from different triads

9   **Final Stage:** Rate the 1-12 workspaces (elements) against all the constructs

Appendix 8: Photographs of workspaces (elements) by location

Location 1

Location 2

Appendix 9: Interview triad combinations

Traids 1 - 4 were elicited by all 32 particpants (17 location 1, 15 location 2)		
	Location 1	**Location 2**
Triad 1 : Elements 1, 2, 3		
1, 2 -and 3	2	12
1, 3 and 2	14	2
2, 3 and 1	1	1
Triad 2: Elements 4, 5, 6		
4, 5 and 6	6	4
4, 6 and 5	4	0
5, 6 and 4	7	11
Triad 3: Elements 7, 8, 9		
7, 8 and 9	7	2
7, 9 and 8	8	0
8, 9 and 7	2	13
Triad 4: Elements 10, 11, 12		
10, 11 and 12	6	1
10, 12 and 11	5	12
11, 12 and 10	6	2
Triads randomly selected by particpants		
	7 random triads (17 participants)	19 random triads (14 particpants)
Elements 6, 2, 8		
6, 2 and 8	11	
Elements 8, 6, 9		
8, 6 and 7	1	
Elements 2, 7, 9		
2, 7 and 9	1	
Elements 9, 1, 5		
9, 1 and 5	8	

5, 9 and 1	7	
Elements 8, 4, 3		
8,4 and 3	6	
3, 4 and 8	2	
Elements 5, 7, 11		
5, 11 and 7	2	
Elements 2, 7, 9		
2, 7 and 6	1	
6, 2 and 7	7	
7, 6 and 2	2	
Elements 1, 6, 9		
6, 9 and 1		2
9, 1 and 6		2
Elements 2, 4, 8		
2, 4 and 8		1
4, 8 and 2		1
Elements 2, 5, 8		
2, 5, and 8		1
5, 8 and 2		3
Elements 6, 8, 11		
8, 11 and 6		3
6, 11 and 8		1
Elements 5, 11, 9		
5, 11 and 9		1
11, 9 and 5		3
Elements 3, 5, 11		
5, 11 and 3		1
Elements 1, 2, 4		
1, 2 and 4		2
Elements 1, 5, 9		

1, 5 and 9	275	1
5, 9 and 1		2
Elements 2, 4, 7		
2, 4 and 7		1
4, 7 and 2		2
2, 7 and 1		1
Elements 7, 8, 10		
7, 8 and 10		1
8, 10 and 7		1
Elements 1, 8, 10		
1, 8 and 10		1
8, 10 and 1		2
Elements 1, 5, 10		
1, 10 and 5		2
Elements 2, 4, 5		
4, 5 and 2		1
Elements 5, 8, 11		
5, 11 and 8		1
Elements 2, 3, 8		
2, 3 and 8		1
Elements 1, 8, 9		
1, 8 and 9		1
Elements 2, 5, 7		
5, 7 and 2		1
Elements 1, 4, 9		
1, 4 and 9		1
Elements 6, 8, 11		
6, 11 and 8		1

Appendix 10: Extract from confidentiality agreement (redacted version)

CONFIDENTIALITY LETTER

Jacqueline Harrington

[Insert address]

Proposed disclosure of confidential and sensitive information by participating organisation (including its subsidiaries and affiliates) and hereinafter referred to as "XXX" and Jacqueline Harrington of [insert address] and hereinafter referred to as **"JH"**.

XXX refers to the discussion between XXX and JH regarding the proposed disclosure of confidential and sensitive property data in connection with a project relating to real estate development and design (the **"Project"**).

1.   Introduction

In connection with the Project:

1.1   xxx will provide JH with the Information in connection with the Project (all such information being referred to as xxx **Information")**; and

1.2   JH will provide xxx with the Information in connection with the Project (all such information being referred to as **"JH's Information"),**

and in consideration of:

1.3   xxx being prepared to supply or procure the supply of xxx Information; and

1.4   JH being prepared to supply or procure the supply of JH's Information,

each party undertakes and agrees with the other as follows:

2.   Definitions

In this letter:

"Confidential Information" means xxx's Information, or as the case may be, JH's Information;

"Group" means in relation to a company, that company and all its subsidiaries, all its holding companies and all other subsidiaries of each of its holding companies;

"holding company" and **"subsidiary"** shall have the same meaning as their respective **definitions** in the Companies Act 2006 and in the case of a limited liability partnership which is a subsidiary of a company or another limited liability partnership, section 1159 of the Companies Act 2006 shall be amended so that (a) references in section 1159(1)(a) and (c) to voting rights are to the members' rights to vote on all or substantially all matters which are decided by a vote of the members of the limited liability partnership; and (b) the reference in

rights or remedies that the Provider or might have, the Provider shall be entitled to the remedies of injunction, specific performance and other equitable relief for any threatened or actual breach of the provisions of this letter.

8.2 The obligations contained in this letter shall terminate and cease to have effect two years from the date of this letter but without prejudice to any right or remedy of any party existing before termination.

8.3 This letter may be signed in any number of counterparts, each of which when signed and returned will be an original but all of which when taken together will constitute one agreement.

9. Third Party Rights

A person who is not a party to this letter may not enforce any of its terms under the Contracts (Rights of Third Parties) Act 1999.

10. Governing Law and Jurisdiction

10.1 This letter and any dispute or claim arising out of or in connection with it or its subject matter or formation (including non-contractual disputes or claims) are governed by the law of England and Wales.

The Provider and the Recipient irrevocably agree that the courts of England and Wales have exclusive jurisdiction to determine any dispute or claim that arises out of or in connection with this letter or its subject matter or formation (including non-contractual disputes or claims).

Please indicate your agreement to and acceptance of the above by signing and returning the enclosed copy of this letter.

Signed by)
a duly authorised signatory for and)
on behalf of XXX

Position (in BLOCK CAPITALS)

Accepted and agreed:

Signed by Jacqueline Harrington)

Appendix 11: Participant recruitment: participating organisation email

From: Office Senior Partner, participating organisation
To: Location 1: all staff
Date: 02.09/2016 14:03
Subject: Edinburgh relocation project research

Good Afternoon,

To further improve the ongoing development of our workplace design within the Firm, our Real Estate team wish to better understand how our staff perceive and use both the defined workspaces and the overall office environment. They have partnered with a business psychologist, Jacqui Harrington, to research our awarding winning project to determine how you as individuals work and interact with your office envrionment.

With us having moved into the workplace some considerable time ago, you'll now better understand how the workplace operates for you: individually, collectively and in terms of the business.

Jacqui has been collating and reviewing masses of information since moving into the building, her nest step is to conduct a series of 1:1 interviews comparing and contrasting the different workspaces to gain a deeper understanding of how and why you choose particular environments to performa specific tasks, the output of her work will form the basis of her Professional Doctorate Research (brief details below) and prove valuable to our Real Estate Team in assisting their process for continual improvement as we roll out the transformation of our offices throughout the UK.

"The Value of Workplace Design: Original Design Intention -versus- actual workspace behaviour"

"There is a perception the workplace design says much about an organisation and how it operates, its' brand, culture and standing in the market place. Understanding the way in which the workplace impacts business operations and influences individual behaviours are a key focus for clients designers and workplace consultant.

Workplace design is much more than just achieving the 'wow factor' and receiving an 'award winning' accolade for a stylish and polished environment. It is a critical component in business strategy having the ability to support and facilitate individual and business success.

Yet there is still a lack of evidence of understanding business needs, limited appraisal of how individuals actually use the workspaces versus the designers intended use, and minimal understanding of how individuals are having to adapt their behaviours to their new 'real world environment'.

We're looking for volunteers from different grades and LoS to be interviewed when Jacqui visits our location from 5-9 |September and would really appreciate your support. If you are available and willing during this time please let xxxxxxx know when and we will look to co-ordinate diaries accordingly.

Kind regards,
Office Senior Partner

Appendix 12: Participant definitions of 'collaboration'

Includes participant variances of the word e.g co-working, problem solving, brainstorming

Participant	Collaboration
P1	Work together to meet project objectives
P2	Everyone having their say in order to make the best decision
P3	Being creative to find a solution with others
P5	Co-creation of ideas and debate, co-creating with colleagues
P6	Working together to achieve goals Opportunity for everyone to have a say
P7	Collaborating together either 2 people or small group
P9	Ability to get together and all contribute Relaxed atmosphere opens minds
P11	Collective working, opportunity to discuss views and ideas Engagement: collaborate together to share ideas Collaborate: working together to find solutions"
P12	More than one person interaction
P18	Working together to reach a common goal Environmental enhances working together
P19	Working together to reach good/best agreement for project Space conducive to working together
P21	Working with others towards shared goals
P23	Working together and brainstorming ideas for best result for the client Ability to share and debate together face to face
P24	Brainstorming in small groups of 5 or 6 people Relaxed environment helps bring people together, relaxed informal space with some privacy and soft furnishings" Working together on client issues to resolve together
P25	Sharing information and working together on a project
P26	Focussing on solutions whilst working together on a client or business project/problem
P27	Space: open, relaxed informal space good for working and brainstorming together
P29	Relaxed and informal layout and furnishings help working together on joint projects Open space with lots of room to share ideas with others and work together on tasks/projects
P30	Creatively sharing ideas to formulate a solution Collaboration Room has all the 'perceived' requirements for working together, but style and layout does not allow it to deliver it potential
P32	Looking at data and documents, reviewing together to help working on joint projects Working together to reach a common goal Space is both enclosed and open giving a more relaxed feel

Appendix 13: Participant definitions of 'formal'

Includes variances of both words, e.g. formality/informality, more formal/informal, not formal

Participant	Formal		Informal
P1	More serious side of the business Specific furniture and spaces are formal		
P2	Business/client focussed		
P3	More of a consequence /risk		
P4	Client facing / focussed		
P5	Rigid, traditional business convention Professional Linked to the type of furniture		
P6	Exclusiveness, confidential		
P7	Restrained, hierarchical, serious		
P10	Reserved furniture Austere: formal, stuffy		Relaxed formality: easygoing, less traditional
P11	More focussed and professional work with clients More serious business - traditional formal settings Furniture dictates formality		Not rigorous or more serious work
P12	Correct, proper for business use		Informality of seating
P13	Conventional business focus		
P14	Official business		
P15	More official, most often linked with clients		
P16	More defined by old style format and working styles		
P17	Official, following strict business process		
P18			Furnishing - cushions Not client business oriented
P19	Day to day desks -behave differently		Coffee spaces Can just drop in
P20			No booking More interactive
P21	Focussed work (day to day desks)		Impromptu activities
P24			Furnishing, more relaxed
P26	More structured and serious discussions		

Participant	Formal		Informal
P27	Organised meetings and activities		Furnishings
P28			Interactions and interruptions are ok Contemporary spaces = easier to collaborate
P29	Scheduled meetings, project updates		Relaxed, both activity and furniture
P30			Seating and furnishings
P31	Focus and individual work (day to day desks)		Relaxed, more social, coffee and lunch
P32	Protocols (day to day desks)		No structure or agenda