

**A NEW METHODOLOGY FOR
PLANNING TEACHING AND
LEARNING SPACE WITHIN A UK
BASED HIGHER EDUCATION
INSTITUTION**

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ABSTRACT

A New Methodology for Planning Teaching and Learning Space Within a UK Based Higher Educational Institution.

The topic for the research is focussed on establishing a new working procedure to help universities improve the way they use and manage space. This research is important to the higher education sector for two reasons. Adopting this new procedure will help space planners achieve improved space efficiency with associated cost savings but more importantly it achieves the efficiencies in ways that complement how staff wish to deliver teaching and how students wish to learn.

The current space planning methodology within the sector predicts and controls space use through a spreadsheet based application that calculates demand by multiplying student numbers by a space norm. Specifically the aim of the research is to develop a collaborative space planning methodology that engenders academic commitment to effect space utilisation efficiency. The central research question posed was to understand if such a radically different approach to space planning, that considers the variable concept of the learning interaction, can improve space utilisation.

The research to develop the space planning framework is presented in the form of a case study within a university faculty. The ontological and epistemological position reflected by the methodology moves away from positivism's experimental approach that attempts to prove through a quantitative assessment of space that a faculty has too much or too little space. The research strategy is positioned within a very different participatory paradigm. (Onwuegbuzie, Johnson and Collins, 2009, p.122) The methodology encourages the space planner to reflect on a much wider interpretation of the definition of an effective learning environment.

The qualitative data gathered through the case study was developed through action research, specifically co-operative inquiry. The process of engaging the stakeholders is the new learning presented by this research. Overall the department that was the focus of the case study believes the resources provided and planned for in the immediate future will meet the requirements of the proposed curriculum plan. In addition, the net internal area proposed for the department will be significantly lower, 17% less than the base case assessment calculated through the use of traditional space norms.

The research suggests that this different methodology can improve space efficiency and contribute to improving the planning procedures within an educational organisation. The findings of the research were subject to validation by space management practitioners within the University of Gloucestershire and external sector experts. Further research is proposed through the Association of University Directors of Estate (AUDE).

AUTHOR'S DECLARATION

I declare that the work in this thesis was carried out in accordance with the regulations of the University of Gloucestershire and is original except where indicated by specific reference in the text. No part of the thesis has been submitted as part of any other academic award. The thesis has not been presented to any other education institution in the United Kingdom or overseas. Any views expressed in the thesis are those of the author and in no way represent those of the University.

Signed.....

Date.....

TABLE OF CONTENTS

Abstract	ii
Author’s Declaration	iv
Table of contents.....	v
List of figures	viii
Glossary and abbreviations.....	x
Chapter 1 Introduction	3
1.1 Background of the Research	3
1.2 Research Aims & Objectives.....	4
1.3 Research Questions.....	6
1.4 Structure of the Thesis	7
1.5 Learning Reflections: Introductory Chapter	11
Chapter 2 Literature Review	12
2.1 Introduction and Structure to the Literature Review	12
2.2 Theme 1: University Operating Context.....	14
2.3 Theme 2: Current Methodologies for Planning Space Allocation	16
2.3.1 Space Charging	17
2.3.2 Recent Advice to Resource Managers.....	18
2.3.3 Current Advice to Resource Managers	19
2.3.4 Components of the Space Assessment Model	21
2.3.5 Limitations of the Current Space Model	22
2.3.6 Space Planning Tools	23
2.4 Theme 3: Impact of Learning Theory on Design of Space	25
2.4.1 Conflicting Priorities.....	30
2.5 Theme 4: Changing Mode of Delivery as a Consequence of Technology	33
2.6 Conclusions Drawn from the Literature Review	43
2.7 Learning Reflections: Literature Review	46
Chapter 3 Methodology	47
3.1 Introduction	47
3.2 Research Questions and Objectives	48
3.3 Designing the Research Methodology.....	49
3.4 Research Methodology: Design Stages: Ontology (stage 1).....	49
3.5.1 Ontological positioning (stage 2).....	51
3.5.2 Epistemology	55
3.5.3 Research Purpose.....	56
3.5.4 The Influence of Ontology and Epistemology on the Research Strategy.....	56
3.5.5 Justification of Research Paradigm	57
3.6 Is this Fundamentally a Quantitative or Qualitative Inquiry? (stage 3).....	57
3.7 What type of Qualitative Study is this Inquiry? (stage 4)	62
3.7.1 Contrasting Characteristics of Qualitative Approaches	62
3.7.2 The Nature of the Inquiry	65

3.8 What type of data collection tool? (stage 5)	67
3.8.1 Space Evaluation Frameworks	67
3.8.2 Planning the Interaction.....	72
3.9 Developing the Research Strategy (stage 6).....	73
3.9.1 Action Research.....	73
3.9.2 Creating Communities of Inquiry within Communities of Practice.....	74
3.9.3 Action Research: Building Theories in Practice	75
3.9.4 Action Research : Intrepretation.....	75
Combining Interpretation with Rigorous Testing	75
3.9.5 Action Research: Change Management	75
3.9.6 Action Research: Values and Skills	76
3.9.7 Action Research: Co-operative Inquiry.....	76
3.10 Design Advice for the Novice Action Researcher (stage 7)	78
3.10.1 Context.....	78
3.10.2 Inquiry Mechanism.....	78
3.10.3 Inquiry Cycle	79
3.10.4 Outcomes	79
3.11 Research Design: Adopting a Role within the Action Research (stage 8).....	79
3.12 Research Design: Understanding the Political Dimension (stage 9)	81
3.13 Research Design: Ethical Implications (stage 10)	82
3.14 Learning Reflections: Methodology.....	89
Chapter 4 Methods.....	90
4.1 Co-operative Inquiry Cycles	90
4.2.1 Co-operative Inquiry Cycles Phase 1.....	91
4.2.2 Co-operative Inquiry Cycles Phase 2.....	94
4.2.3 Co-operative Inquiry Cycles Phase 3.....	96
4.2.4 Co-operative Inquiry Cycles Phase 4.....	98
4.3.1 Data Analysis.....	101
4.3.2 Validation.....	102
4.3.3 Validation: Process.....	103
4.4 Learning Reflections: Methods	104
Chapter 5 Action Research.....	105
5.1 A Case Study at Francis Close Hall.....	105
5.2.1 Research Approval and Ethical Considerations.....	107
5.2.2 Research Approval.....	110
5.2.3 Research within a University Faculty.....	111
5.2.4 Space Assessment Using Current Methodology	113
5.2.5 Space Demand Estimated	119
5.3 Co-operative Inquiry Cycle Phase 1: Focus of Inquiry	121
5.4 Co-operative Inquiry Cycle Phase 2: Understanding Current Practice	124
5.5 Co-operative Inquiry Cycle Phase 3: Introducing Solutions	132
5.6 Co-operative Inquiry Cycle Phase 4, Development Plan Proposals.....	155
5.7 Concluding the Research within the Inquiry Group	165
Chapter 6 Analysis.....	166
6.1 Analysis Relevant to the Research Questions	166

6.2 Design of the Space Planning Framework: Phase 1 Pro forma	167
6.3 Design of the Space Planning Framework: Phase 2 Pro forma	170
6.4 Design of the Space Planning Framework: Phase 3 Pro forma	180
6.5 Design of the Space Planning Framework: Phase 4 Pro forma	185
6.6 Validation: Space Efficiency Judgements.....	186
6.7 Validation: Process Judgements.....	187
6.7.1 Validation discussions with Kilner Planning.....	188
6.7.2 Validation discussions with University of Bristol	190
6.7.3 Validation discussions with peers within the Estates Department.....	192
6.8 Learning Reflections: Analysis	194
Chapter 7 Conclusions and Implications	195
7.1 Main Findings: Managing change.....	196
7.2 Understanding the context and formal / informal rules of use	197
7.3 Understanding informal and formal learning processes generating ideas	197
7.4 Harnessing technology brings flexibility through delivery	198
7.5 Providing adequate support structures enable flexibility and efficiency	199
7.6 Generating shared commitment leads to effective solutions.....	199
7.7 Improves strategic resource planning processes	199
7.8 Has led to space efficiencies within this case study	199
7.9 Time consuming and requires significant effort.....	200
7.10 Limitations of the Research.....	201
7.11.1 Contribution to Knowledge.....	201
7.11.2 Contribution to Practice	203
7.12 Reflections on the Research Strategy Adopted	203
7.13 Next Steps.....	205
7.14 Learning Reflections: Conclusions.....	206
Chapter 8 Reflective Diary	208
8.1 Why DBA?	208
8.2 Personal and professional implications of undertaking doctoral study.....	209
8.3 The Thesis.....	213
References.....	216
Appendices	227
Appendix A: JISC (2007) Evaluation Framework Definitions.	227
Appendix B: The Joint Academic Coding System.....	232
Appendix C: Guidance Note for use with the Space Planning Tool.....	233

LIST OF FIGURES

Figure 1, Themes within the Literature Review, (source author).....	12
Figure 2, The Inefficiency Multiplier (SMG, 2006)	18
Figure 3, AUDE (2010) Space Assessment Model.....	20
Figure 4, Anderson (2003, p.2)	31
Figure 5, Examples of a managed learning environment software application.....	35
Figure 6, Wordle Demonstrating Technology Diversity (Edutopia, 2012).....	36
Figure 7, Technology preferences for various learner types.	38
Figure 8, JISC (2007) A Conceptual Framework for the Evaluation of Learning Spaces.....	42
Figure 9, Learning from the Literature Review	46
Figure 10, Learning from the Literature Review	48
Figure 11, Underlying Belief Systems of Contemporary Research Paradigms	51
Figure 12, Creswell, (2007) Characteristics of Qualitative Research.....	61
Figure 13, Contrasting Characteristics of Five Qualitative Approaches	64
Figure 14, Draft Space Planning Tool.....	69
Figure 15, Arne Collen (1988), Concentric Circles of Research.....	84
Figure 16, Mapping the Development of the Research Strategy	86
Figure 17, Co-operative Inquiry Phases	90
Figure 18, Space Planning Tool, Inquiry Cycle 1: Focus of Inquiry	93
Figure 19, Space Planning Tool, Inquiry Cycle 2: Current Practice.....	94
Figure 20, Space Planning Tool, Inquiry Cycle 3: Introducing Solutions.....	97
Figure 21, Space Planning Tool, Inquiry Cycle 4: Development Plan	99
Figure 22 Data Analysis within the Case Study	101
Figure 23 Validation.....	103
Figure 24 Validation: Process.....	104
Figure 25, Space Utilisation Survey Results October 2011	106
Figure 26, Space Management Working Group (SMWG) Terms of Reference.....	107
Figure 27, Timetable Landscape Architecture	112
Figure 28, Space Need Framework: Conversion Course.....	114
Figure 29, Space Need Framework: Diploma Course.....	115
Figure 30, Space Needs Framework, 1 st Year Course	116
Figure 31, Space Needs Framework, 2nd Year Course	117
Figure 32, Space Needs Framework, Final Year	118
Figure 33, Space Assessment Models and User Guide (2010), Table 6.....	119
Figure 34, Total Area Estimated Using a Space Needs Framework	120
Figure 35, Landscape Architecture: Inquiry Cycle 1: Focus of Inquiry	122
Figure 36, Cycle 1 record photographs	122
Figure 37, Landscape Architecture: Inquiry Cycle 2: Current Practice	124
Figure 38, Floor Plans and Area for the Department: Current Arrangement.....	129
Figure 39, Magnolia Court, Francis Close Hall.....	141
Figure 40, Inquiry Cycle 8; Development Plan Proposal	156

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GLOSSARY AND ABBREVIATIONS

EMS.	Estates Management Statistics, a database describing performance statistics for higher education institutions in the UK.
FTE.	Full-time equivalent
GIA.	Gross internal area
NIA.	Net internal area
SAM.	Space Assessment Model
Space Needs Framework or Model.	Space assessment models are spreadsheet based tools for assessing academic space needs.
Space Profiles.	Space profiles provide an indication of how much and what type of space an institution may need based on its numbers of student and staff and range of activities.
Utilisation.	$\% \text{ frequency} * \% \text{ occupancy} / 100$ <p>Where frequency is the number of hours a room is in use as a proportion of total availability (the timetabled week)</p> <p>Where occupancy is the average group size as a proportion of the total capacity for the hours a room is in use.</p>
Base rooms	Rooms dedicated to a particular cohort in a department and not available to other university departments.

Chapter 1 Introduction

1.1 Background of the Research

The topic for the thesis is concerned with establishing a new working procedure to help universities improve the way they use and manage space. As a consequence of the Browne Review of higher education, (2010) the funding mechanism to universities has changed from a central funded government focus to a model that places much more responsibility on the learner. Students are now considering some very significant loans as a consequence of pursuing their studies. Students unsurprisingly now expect much more and some universities are struggling to respond to this expectation as some income streams reduce and costs continue to escalate. University expenditure on estates typically relates to between 9 and 10 per cent of income (HEFCE, 2011) and so each institution needs to pursue every cost saving or income generating opportunity available if they are going to maintain high quality learning nationally and internationally.

As a manager within the higher education (H.E.) sector responsible for a university estate, it is believed that there is still real opportunity to improve the way space within a university campus is managed. The economic imperative to manage space in a radically different way requires true innovation to establish a fundamental change. Unfortunately despite this escalating imperative, incremental improvement has been the output of the space management effort across the sector for the last decade. Much has been written on the topic and extensive guidance produced to aid space managers in their quest to reduce area allocation per student and staff full time equivalent (FTE). (HEFCE, 2009) Latest data associated with space efficiency is reported by HEFCE (2011) in an annual estates performance report and incremental improvement is noted again whereby median space per student and staff FTE has gone down from 9.6m² to 8.8m². The report questions whether this marginal improvement in performance when the disproportionate growth in student and staff numbers is also considered. A decline in student numbers of just 8.3 per cent would reverse this improvement.

The current space planning methodology within the sector predicts and controls space use through the use of a simplistic planning tool. HEFCE note in the 2005 publication, 'Review of Practice' that cultural issues concerning ownership of space, resistance to change and lack of trust remain barriers to implementing change. The methodology is based on the use of space norms that allocate an area for a particular activity. A learning space is constructed by multiplying the predicted student cohort size against this space norm. This approach and earlier variants have not significantly changed since the Joint Academic Coding System was developed in the mid-eighties. This work proposes a fundamental revision to the current methodology which if adopted across the sector could contribute to space efficiency and a resultant reduction in university operating cost. The benefit of this improvement could help to sustain and improve the future quality of the student experience.

1.2 Research Aims & Objectives

The new process that has been developed and evaluated by this research seeks to establish space demand by reversing how we seek the core data that enables us to make an informed judgment on area allocation. The new methodology places an emphasis on seeking and assessing a much wider data set from the space users as it is believed that in line with Price (2007) that the dominant discourse of facility management within a HEI environment remains focused on cost-per-unit area. The contribution of this work is focussed on process development. The research set out to inquire whether by establishing and developing a progressive dialogue with academic colleagues an improved space management methodology could be developed. This improved methodology would rely on understanding and reconstructing multiple competing variables linked to the definition of an effective learning environment and interaction. The new methodology is founded on the basis that effective space distribution considers many more variables than are noted within the current quantitative procedure. Specifically the aim of the research (that was derived from the gap analysis identified from a review of current practice) was to develop a collaborative space planning methodology that engenders academic commitment to effect space utilisation efficiency. The assumption was that the current deterministic methodological approach used within the sector (Space Management Group Space Assessment Model, AUDE, 2010) could

have been derived from a positivist or post positivist stance, a methodology that predicts and controls space as a consequence of established laws characterized within the current space planning tool. As an example, 20 students studying computer science can be multiplied by a space norm of 2.75m² per student therefore establishing the rule that the learning space should be an optimal 55m² in size. The research presented in this thesis was founded on the assumption that this approach is too simplistic and as a consequence asked whether the current procedure can be improved by adopting a different approach.

Designing an effective learning space was considered to be more complex than current models suggest and in the early sections of the literature review (p.20) the complexity of this interaction is explored. The work sought to understand the impact that different learning theories make on the types of space we use and also how changing modes of delivery influence the nature of the spaces we use. The literature review also identified the complexity of the topic which also clarified why this continues to be a significant issue within the sector and worthy of further research. Understanding the individual space related reconstructions stakeholders would wish to adopt is a different methodology for determining space distribution. The research set out to ask whether improvements to the procedure can be achieved as a consequence of introducing a constructivist ontological perspective or world view within the design of the alternative space planning tool. This alternative approach would place a focus on what the space is used for and the learning forms that take place. The knowledge and learning from such research would consider the realities associated with that interaction, which in turn would inform the design and distribution of space as a management practice. This was the essence of the alternative methodology trialled and evaluated within this research.

The research investigates whether adopting this alternative approach could provide shared goals between space planner and user which could ultimately lead to improved institutional space utilisation. The purpose of the research was therefore to evaluate whether a more informed, inclusive and progressive discussion between space users and planners can provide a more effective space planning procedure for all.

1.3 Research Questions



A number of research questions were formed to investigate if this more inclusive approach could provide an improved space planning tool. The research questions are introduced in this introductory chapter to establish the focus of the research but were developed as a consequence of the learning from the literature reviewed. Figure 10, p.48 describes this in more detail.

- What is the impact of learning theory on space design and distribution of space? The thesis explores the impact that learning theories have on how we use a learning environment. The work explains this relationship and looks to establish the importance associated with how the course designer wants to deliver the learning experience and how the space satisfies that requirement.
- What impact does the changing mode of academic delivery have on space design and distribution of space? This question seeks to understand how different technologies can be used to vary the learning experience and with this knowledge understand how we can develop effective solutions to meet the needs set out by the course designer.
- How can evaluation frameworks guide the development of a new space planning tool? An evaluation framework is simply a checklist that prompts us to think about a wide set of variables that we encounter when considering different learning spaces. It acts as a list to help us as space planners to prompt a more detailed discussion about the spaces we use. This question seeks to understand if designing a new methodology through the use of a space evaluation framework can provide a creative way of questioning the use of and allocating space.
- Will a space planning tool that is designed to consider the variable concept of learning interaction improve space utilisation? This final question draws the early questions together and seeks to understand if all the key variables tested through the first three research questions can cumulatively come together to provide a new and more effective solution for the sector.

1.4 Structure of the Thesis

The introduction opens by setting context to the research and notes why a different space planning approach may be necessary within the higher education sector. Space utilisation improvement has historically not been achieved in line with expectation. (SMG, 2004; Downie, 2004; HEFCE, 2006). This is further developed to establish as an output the purpose of the research which is to develop and evaluate a modified space planning procedure to improve space efficiency. The current space distribution methodology is noted as being driven by property managers not academics (SMG 2007), the principles of which focus on a quantitative process (AUDE, 2010a), allocating space based on simplistic calculations multiplying student numbers by space norms for each type of activity. The introduction also sets out the specific research aims, objectives and questions to establish the focus of the enquiry.

The second chapter of the thesis is the literature review. The literature review introduces ‘sub themes’ which explore the context and background to the research, current methodologies and the effectiveness of such procedures across the sector. Further themes look at previous research into how the space users wish to use learning environments now and in the future, reflecting on learning theories that impact on a range of delivery modes. The first sub theme reflects on opportunities to develop a space planning tool by noting the limitations identified in the literature of the current space model. The current space tool places little emphasis on understanding the impact of course design including learning theory, mode of delivery and new technologies on the allocation of space (AUDE, 2010a). Consequently this causes cynicism (Lofthouse, 1994) with academics that provide the core data which in turn undermines the quality of the space model developed through the space planning process. Further sub themes introduced consider different learning styles and the impact of technology on space design (Meesing, 2004; Nagowah, 2009, & Jarvis, 2009). The review identifies research suggesting that it is important to understand the nature of the interaction when planning learning resources (Meighan, 1988; Kozma, 1991; Groat & Stern, 2000; McWilliam, 2008; Saeed, Yang & Sinnappan, 2009). Similar levels of deep and meaningful learning can occur when the type of learning interaction changes (Anderson, 2003). Student to teacher

interaction can be limited (for economic reasons) as long as alternative interaction is provided (Anderson, 2003). Conflicting priorities were anticipated as a barrier for this new methodology whereby space managers will continue to see new technologies and different modes of delivery as opportunities to plan reduced built area (HEFCE, 2002) whilst academics focus primarily on new developments as a means to improve quality of the delivery of the curriculum (HEFCE, 2007; Jenkins, 2010).

Understanding the impact of learning styles, the mode of delivery and the effect of modern technology (Saeed, Yang & Sinnappan, 2009; Traxler, 2010) has on space and resources is difficult to interpret (Anderson, 2003). The interpretation within academia is subjective, at times contested (Clark, 1983; Kozma, 1991; McWilliam, 2008; Jenkins, 2010) and is rapidly changing making it difficult for property managers to understand. The review identifies the limited existence of tools described as ‘evaluation frameworks’ (JISC, 2007) that help draw out data that describes the complex interactions that take place within learning environments. The limited frameworks available are noted and then used to develop the new data collection tool used within the research. The tool is later designed to enhance the current simplistic quantitative space planning process (AUDE, 2010a) to a more collaborative, qualitative and quantitative framework.

The third chapter describes in stages how the research methodology was developed. The stages of development are summarised in tabular form as set out in figure 10. The chapter opens by exploring different paradigms or world views and reflects on how alternative ontological perspectives have shaped the current space planning methodology. The purpose of the research and the implications of adopting different world views are debated. The discussion progresses by establishing that a participatory world view as described by Onwuegbuzie, Johnson & Collins (2009) is adopted to enable the inquiry.

The methodology progresses by considering the nature of the inquiry. The research presented is fundamentally a qualitative inquiry however some quantitative data is also presented to validate findings. The approach presented is quite different from the current process and

procedure. It is acknowledged that the current procedure is still of considerable benefit and this is acknowledged through the research and used to validate the findings of the research back to a measurable position. The research presented is in the form of a single case study. A case study was selected after considering the characteristics of different qualitative approaches. In particular, a framework developed by Creswell (2007) was used to contrast the variant forms described as 'Narrative Research', 'Phenomenology', 'Grounded Theory' and 'Ethnography' before adopting the 'Case Study' approach. The chapter considers the benefits and constraints of adopting a single case study, reflects on politics within the organization, ethical matters, values and skills a researcher will need to consider in designing such a qualitative enquiry.

The fourth chapter reflects on the methodological approach described in the previous chapter and introduces the specific methods proposed within the research. The new learning and contribution of this work is the knowledge provided to space planners in how to design and lead a co-operative discussion about space. On that basis this chapter purposely sets out what the planned research method was rather than the actual research method adopted. The fifth chapter describes the actual research undertaken and highlights aspects of the research method that either worked or needed variation through use. Reflections associated with the changes to the planned and actual process adopted are noted through the analysis in chapter 6. In terms of the research method adopted within chapter 4, action research, specifically cycles of co-operative enquiry is described as the method for data collection within the research. The cycles provide data which in turn is documented within the new space planning framework which is the primary data gathering tool developed through this work. Further cycles describe the procedure of gathering data from participants, sharing their thoughts about how space should be developed, managed and allocated in the future, using their experience to inform the discussion. The space planning framework draws to a conclusion by establishing a development plan which is debated and adopted by the inquiry group in the final cycle. To conclude this chapter a quantitative assessment of space was also undertaken. The spreadsheet assessment was calculated to provide an area assessment for the department. Space norms were used to calculate the size of the accommodation. The formulaic assessment

was then used to triangulate the findings of the research back to an area output that would have been derived if the focus of the investigation was limited to include an exchange based on using the current procedure adopted across the sector.

The fifth chapter sets out the actual research conducted. The focus of the enquiry was within an academic department within the University of Gloucestershire. The chapter initially describes how the researcher went about managing stakeholders to achieve consent to progress the work and to seek various data sets to inform the action research that was central to the study. The chapter describes the output of the various phases of the action research and presents the data for each cycle within the proposed space planning framework (the data capture tool). A development plan is the output of the fourth phase.

The analysis is presented in chapter six. The output of the action research is assessed using the current quantitative procedure to assess how the development plan, derived from a qualitative exchange compares to the previously used simplistic allocation of space based on student numbers and space norms. The analysis reflects back to the sub themes discussed within the literature review, specifically the work undertaken by Meighan, R., (1988), Kozma, R., (1991); Groat, L & Stern, L. (2000); Meesing, A. (2004); McWilliam, E. (2008); Saeed, N. Yang, Y., & Sinnappan, S. (2009); Nagowah, L. (2009); & Jarvis, P. (2009) concerning learning theory and the alternative modes of delivery available to practitioners today. In this chapter the findings associated with adopting this new space planning procedure are discussed with sector experts and space planning practitioners to test and validate the findings of the research.

The penultimate chapter reflects on the action research undertaken and draws conclusions associated with the effectiveness of this modified procedure. The chapter sets out the contribution the research has made to professional practice and considers the limitations of the research.

The final reflective chapter concludes by reflecting on the process of the DBA journey and sets out next steps proposed for the further development of the new methodology.

A summary text box is presented at the end of each chapter to set out the key learning points and map the journey of the development process that has led to the methodology adopted. Footnotes are included throughout the research to show the key learning points and connectivity through the process of development.

1.5 Learning Reflections: Introductory Chapter

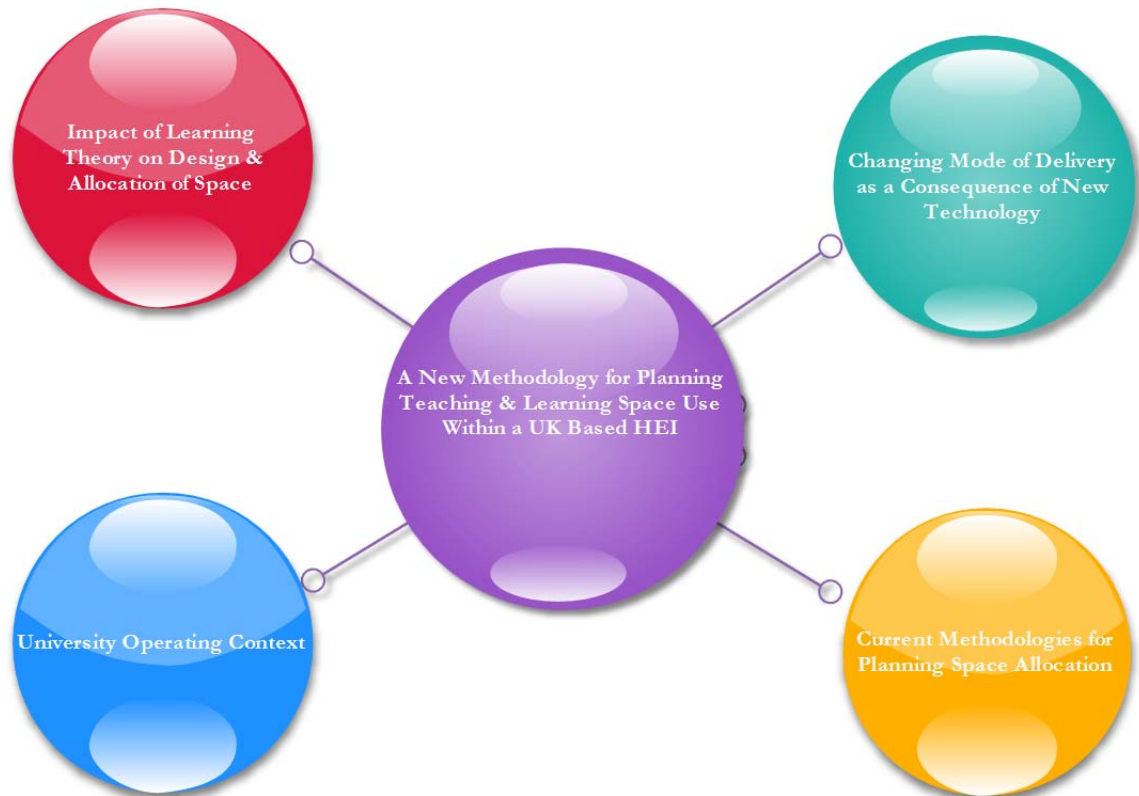
1. Context of the research introduced, historical poor space use performance and escalating economic need to address this continuing issue.
2. Purpose of the research in the form of ‘process development’ described.
3. Research aims, objectives and questions established.

Chapter 2 Literature Review

2.1 Introduction and Structure to the Literature Review

This review introduces four themes as presented in figure 1 below.

Figure 1, Themes within the Literature Review, (source author)



The central research theme specifically considers the effective management of teaching and learning accommodation within a university environment. The literature review initially considered the operating context for UK based higher education institutions. Bradwell (2009) notes that the future of higher education is changing rapidly with significant pressure being applied to universities as public funding reduces as a response to the worldwide recession and change of UK government policy. He notes that there is increasing expectation for universities to extend their role to become learning societies that are committed to lifelong learning as a mechanism prompting economic success.

The university operating context is critical to the research area as the reality of economic pressure and the resultant strategic changes adopted by universities provide relevance for resource managers within the higher education sector. The context outlined within this initial theme brings a relevance to the research topic by suggesting that a confluence of factors characterized by Bradwell (2009, p.24) as a 'perfect storm' within higher education is pressurizing universities to consider radical and unprecedented change associated with how space is planned and distributed.

The literature review is developed with a critical appraisal of how universities have developed space planning tools and currently manage the distribution of space. The review identifies how space is specifically measured and apportioned; commenting on how effective management practice has been across the sector over time.

A further theme considers the influence of how students learn and the impact learning theory has on space measurement and apportionment. The review considers whether current space planning methodology places adequate emphasis on understanding how teaching and learning is delivered and the impact different learning styles may have on space allocation and utilisation.

Finally the review draws an understanding of the impact modern technologies may have on the mode of delivery within a university. Different delivery methods prompt different learning spaces. Current evaluation methods for assessing the effectiveness of technology rich learning spaces are considered. This allows a critical appraisal of the current methodologies in light of the development strategy, technology and learning development which leads to the research question of identifying how the current space planning methodology could be developed and varied with the objective of improving institutional space utilisation. The literature review draws the four themes together and reflects on how a different approach to space planning could develop a space planning tool that not only has benefit to resource managers but fosters a methodology that draws student user groups, academics and managers together with

a shared goal providing effective, well planned resources to underpin teaching and learning activity.

2.2 Theme 1: University Operating Context¹



The executive summary of the Dearing review of higher education (1997, p.1) concluded that ‘economically successful nations will be those that become learning societies: where all are committed, through effective education and training to lifelong learning’. Shabha (2000) reflects on this change and organizational transformation into this virtual world. There are risks for those that are slow to engage and he considers if the built form of the university as we know it will exist at all.

Bradwell (2009, p.24) describes the ‘perfect storm,’ a metaphor illustrating the economic and social imperative for continuous higher learning and innovation continuing to escalate whilst the primary means to achieve this continues to come under more pressure. He concludes that on many counts universities appear to be in ‘rude health’ (Bradwell 2009, p.7) and suggests that the current way universities work and operate is unsustainable. Annand (2007) has similar concerns to Bradwell’s (2009, p.24) description of the ‘perfect storm’ within higher education. Annand (2007, p.4) suggests that the growing demand for higher education cannot be met ‘within a controlled paradigm like the present, conventional university system’. He concludes this after examining the increasing strategic role of knowledge in determining the prosperity and security of nations, the growing correlation between education, the quality of life and the worldwide entrepreneurial culture of today.

But is this really Bradwell’s ‘perfect storm’ (2009, p.24) within higher education or just rhetoric fuelled by recession cuts? A significant tide of feeling summarized by Christensen and

¹ **Context:** Discussions surrounding the current operating context for UK based HEI’s establishing the need for the research.

Raynor (2003, p.21) suggests that ‘disruptive innovators’ (the economic imperative) may occur when a simpler, cheaper, more convenient way may appeal to a new or previously unattractive customer base (higher education leaders). On a similar basis Daniel, Kanwar and Uvalic-Trumbic (2006, p.1) predict that a ‘tectonic shift’ will transform the map of higher education worldwide. Peters (2004) believes a more incremental change is likely and notes the difficulties associated with considering such a fundamental change. He reflects on the fixed academic structures and conventions which are normally resistant to change and restrict flexibility and reminds us that for most universities such a ‘tectonic’ change (Daniel, Kanwar and Uvalic-Trumbic 2006, p.1) would mean trying to innovate and modernize not only the learning-teaching system, but also the mission and sense of direction of the institution. Van Dusen (2000) presented a similar level of cynicism associated with the universities’ ability to respond to the external environment however introduced the term ‘millennial restructuring’ to describe a view whereby radical restructuring of university education is necessary to respond more rapidly to changing social, demographic and economic pressures.

A fundamental element of this view is the removal of traditional constraints of learning, both time and place. He suggests that new technologies adopted by appropriately reorganised universities could be used to create significantly new approaches to the management of higher education, creating a move away from the classroom based, faculty centred model of most UK based higher education institutions. Annand (2007) has introduced a number of ‘disruptive innovators’ (Christensen and Raynor, 2003, p.21) or has identified a confluence of factors increasing pressure on university systems worldwide to change. With economic pressure paramount in tertiary education it can be seen that the strategic management of space within universities is critical as the cost of providing, maintaining and servicing such accommodation is noted by AUDE (2010a) as being the second largest cost for higher education institutions.

Whilst this is significant, Murphy (1994) notes that getting to grips with an institution’s rooms, their use and the ways of improving their utilisation is a daunting, messy and long term task. Coleman & Briggs (2000) encourage resource managers by noting case studies

where a fresh look at the way in which space was managed revealed considerable potential. Opportunities such as this are very welcome as economic pressure escalates for higher education resource managers. Economic pressure typically in the form of funding guidance published through HEFCE, (2009a) clearly sets out the importance of financial and environmental sustainability for universities, highlighting the relationship between effective space management and carbon management for the university estate. Irrespective of your view on the intensity of the argument, it is clear that space managers are obliged (HEFCE, 2009a) to plan and operate the university estate in ways that reduce space, reduce operating cost, reduce the carbon impact and support universities becoming more efficient in terms of the delivery of the academic portfolio.

2.3 Theme 2: Current Methodologies for Planning Space Allocation²



Early publications on the topic of space management in higher education date back to the 1970's and provide advice to space managers to allocate space by multiplying student numbers against space norms to identify an area target. (UGC, 1987) In 1996 the National Audit Office published a good practice guide for higher education space management.

Summary advice provided suggested that the higher intensity of use of space would reduce the need to develop more university accommodation with resultant savings benefiting the university and the sector as a whole. Space saving estimates, some as high as 50 per cent of current space were suggested to entice universities to consider and adopt such procedures. The advice came with a series of planning tools to achieve the efficiency targets in the form of a space charging methodology, the development of an institutional space strategy, centralised

² **Current Practice:** A review of the historical and current practice for managing space within HEI's resulting in the identification that current procedures adopt space norms and place little emphasis on understanding how space is used as a contributory factor linking to space distribution.

timetabling (timetabling coordinated by a management team) of accommodation and processes to effect space re-modelling and reallocation. HEFCE (2006) also summarized the findings of the NAO (1996) report identifying that leadership, establishment of clear objectives; accurate information, high quality communication and the support of practical tools were fundamental factors for successful space management.

2.3.1 Space Charging

Space charging is an administrative process that allocates a cost based on the proportional allocation of space a department or faculty occupies. HEFCE (2005) notes that twenty nine per cent of institutions have space charging, fourteen per cent of HEI's plan to introduce space charging and nine per cent are undecided. Fifty two per cent of HEI's are not planning to develop space charging procedures. Weatherhead (1997) advocated the use of space charging to ensure space users understood through an internal rental system the real cost of its operations. Cock and French (2001) also noted and supported the merits of this type of internal administrative arrangement. Bon et al (2002) suggested the process of space charging was supported by 70 per cent of facilities managers surveyed within universities; a mandatory survey (CREMRU-JCU) completed by the vast majority of higher education institutions. General support for space charging continued through the further publication of space charging variants by HEFCE whereby Griffith (1999) described two alternative models concluding that space efficiency would come from a quantitative assessment of data summarized with a compelling analysis and the high level commitment of a space management champion to drive the improvements identified. Despite some support for space charging the process and subsequent derivative arrangements have not provided the significant improvement in space efficiency predicted (DEGW 2000). More recently Downie (2004) considered the outcomes from space charging in UK universities and concluded from a statistical assessment of space performance indicators that the data offered very little evidence of increased efficiency from space charging.

2.3.2 Recent Advice to Resource Managers

Whilst space charging is still a useful tool adopted by many universities the disappointing performance across the sector was acknowledged by funding councils through the formation of the Space Management Group (SMG) in 2004. The group has made a significant contribution to improving space utilisation with the publication of multiple papers and the introduction of new management tools such as the *Space Assessment Model* and the *Model of the Affordable Estate*. (SMG, 2006a). To illustrate the cost of space inefficiency the SMG published in 2006(b) the following advice that identifies the correlation between space inefficiency and high estates running costs. At the EMS reported sector median of 27 per cent utilisation, 3.7 m² is being provided for every m² in use. At this rate, the sustainable estate provision for every m² in use is £601 and the total estate provision is £797. It is clear that very low levels of utilisation are especially costly. It is also apparent that, at low levels, even a relatively small per centage increase in utilisation makes a big difference to cost. For example, going from 5 per cent to 10 per cent would reduce the amount of space provided for each m² in use from 20 m² to 10 m², and the cost for each m² in use halves. Aggressive targeting of very low levels of utilisation can have a substantial impact on cost. (SMG, 2006)

Figure 2, The Inefficiency Multiplier (SMG, 2006)

Utilisation rate %	Total m ² provided for each m ² in use	Sustainable estate provision for each m ² in use (£)	Total estate provision for each m ² in use (£)
5	20.0	3,248	4,306
10	10.0	1,624	2,153
15	6.7	1,083	1,435
20	5.0	812	1,077
23	4.3	706	936
25	4.0	650	861
27*	3.7	601	797
30	3.3	541	718
35	2.9	464	615
40	2.5	406	538
45	2.2	361	478
50	2.0	325	431
55	1.8	295	391
60	1.7	271	359
70	1.4	232	308
80	1.3	203	269
90	1.1	180	239
100	1.0	162	215

HEFCE (2007) summarize the work of the SMG and describe two quantitative approaches presenting interactive space management tools. Firstly, a spreadsheet based model that enables higher education institutions to calculate the full annualised cost of their estates and to secondly benchmark the size of their estates with a framework for calculating indicative space need, based on the higher education institution's staff and student numbers, particularly academic portfolio and methods of delivery.

2.3.3 Current Advice to Resource Managers

Despite extensive guidance and the development of some comprehensive planning tools, AUDE (2010b) have developed an updated series of tools in response to concerns about some aspects of the guidance, in particular the limited use of the suite of documents by universities and the interpretation of the information generated by the planning tools. AUDE (2010a) introduce the latest advice as a toolkit for a sustainable estate prompting the linkage between space efficiency, the cost of running the estate and the assessment of the carbon impact. The application for the space model has been characterized the, 'Space Assessment Model' or SAM in abbreviated form. The example model is presented in Figure 3.

Figure 3, AUDE (2010) Space Assessment Model

A	B	C	D	E	F	G	H	I	J	K	L	M
	Student numbers	Average no. of events per week	Student hours per week	Core timetabled week	Minimum no. of workplaces at 100% utilisation (planned size)	Target frequency of use %	Target occupancy of space %	Target utilisation rate %	No. of workplaces at scheduled utilisation rate (planned numbers)	Projected area per workplace m ²	Ancillary allowance if needed	Area predicted m ²
Defaults Teaching & learning UG and PGT centrally timetabled space				40		0.8	0.7					
Lecture	200.00		0.00	40.00	0.00	0.80	0.70	0.56	0.00	1.00		0.00
Seminar	200.00		0.00	40.00	0.00	0.80	0.70	0.56	0.00	2.25		0.00
Tutorial	200.00		0.00	40.00	0.00	0.70	0.70	0.49	0.00	2.25		0.00
Workshop	200.00		0.00	40.00	0.00	0.70	0.70	0.49	0.00	4.00	1.00	0.00
Studio	200.00		0.00	40.00	0.00	0.70	0.70	0.49	0.00	4.00		0.00
Computer lab	200.00		0.00	40.00	0.00	0.75	0.70	0.53	0.00	2.75		0.00
Lab	200.00		0.00	40.00	0.00	0.70	0.70	0.49	0.00	4.00	1.00	0.00
Other	200.00		0.00	40.00	0.00	0.70	0.70	0.49	0.00	0.00		0.00
Subtotal	200.00		0.00									0.00
Total space predicted and space per student FTE												
Subtotal - centrally timetabled space												
Full cost based on AEM average sustainable estate cost								£229				
Estimated notional energy emissions (kg CO2) per m ² NIA based on EMS sector median per m2 GIA								106				

2.3.4 Components of the Space Assessment Model

Space Norms

The model presented in figure 3 is very similar to original approach used through the 1970's in that it is based on the same principles as the method used to calculate University Grants Committee (UGC) and Polytechnics and Colleges Funding Committee (PCFC) space norms. The norms adopted for the model are taken from the Joint Academic Coding System and are summarized in appendix b. Typically net internal area (NIA) of space per m² is allocated per full time equivalent (FTE) for various subject areas. As an example the schedule suggests that the subject area of 'Law' warrants 1.7m² per full time student whilst 'Fine Art' would require 5.9m² per full time student. It is noted that the spreadsheet does not prompt the user to consider the impact the teaching mode of delivery will have on space.

Utilisation

Utilisation assumptions are prompted to be considered within the model, default 40 hour time frames are included to represent the available timetabled hours per week.

Student Numbers and Hours

Column B of the model prompts the planner to input the student number full time equivalent. As an example a class of 30 students prompts the entry of '30' into the record column. Column C prompts the user to input the average number of events per week, defined within the AUDE (2010) user guide as 'the number of hours each student is likely to spend in different types of space. Column D requires the student hour's data drawn on the Higher Education Policy Institute findings on student workload by subject reference. Data used is based on averages and is qualified to the point where users are prompted to *estimate* the balance between taught hours, non-formal and private study. Clearly assessing the quantity of taught provision depends on the structure of the course adopted by the course designer and invariably significant variation can be achieved by modifying this input.

2.3.5 Limitations of the Current Space Model

The framework offered is designed to encourage institutions to develop a model at departmental and organisational level and is flexible and scalable in its design to cater for this wide variation. The AUDE (2010a) user guide presents worked examples of the Space Assessment Model (SAM) and notes that changes to the volume of activity, hours of delivery, staff and student ratios will materially affect the resultant area per full time equivalent. Latest revisions to the guide encourage universities to plan non formal contact and private study time in academic related spaces. In practice, making changes to column C, 'the hour's students spend in different types of space' makes a very significant change to the output space required by the model. The SMG (2007) encourage universities to adopt a space management 'champion' or senior person responsible for space utilisation improvement, however the collection and population of this type of data going into the model is usually prompted and led by the university estates department. (The tool has been developed by the Association of University Director of Estates network.) Apart from providing a definition of the input data for column C (the average number of student hours per week) there is no detail to explain the complexities of the judgement the user is being asked to assess. As a practitioner and user of the model, the following limitations are noted:

- The data requested is an average assessment rather than an accurate assessment derived from meeting with the course leader.
- Using an average assessment of hours per type of space suggests retrospective assessment rather than forward planning of the curriculum area.
- Forward planning in the form of course development plans could significantly impact on the type of space required and the number of hours required within the distribution.
- Does the course planning consider any progressive changes in the technology used to deliver the course and if so is this relevant to the type of space apportioned within this planning tool?

- Adopting new technologies requires staff development and will be a limiting factor. Is this relevant then for consideration within a space planning tool?
- Does the course planning consider changing modes of delivery for the course and do different modes of course delivery have an impact on the space required and the design of a space planning tool?
- How does the effective evaluation of the performance of space factor in the distribution and development of space?

The literature review considers these questions as core themes through the investigation.

2.3.6 Space Planning Tools

Clearly the questions posed identify a complicated set of progressive and interdependent relationships that culminate in the assessment of the number of hours required across various types of space. Historical development of space management practice and procedure summarized by Downie (2004) has seen the establishment of tools such as space charging and the development of space norms as a means to measure and benchmark area distribution. AUDE (2010a), HEFCE (2006) and the Space Management Working Group continue to be frustrated by the low utilisation of space noted across the sector and reported through annual Estates Management Statistical Reports. This research suggests that this focus needs to change which is also noted as a key recommendation as suggested by HEFCE in their annual 2006 review of practice report.

Moving forward improvements to aid and facilitate better utilisation continue to focus on traditional areas of investigation such as understanding the impact of design on space efficiency, understanding out of sector approaches, reviewing good practice in utilisation surveys, updating space norms and using case studies. A penultimate, short paragraph suggests the methodology should also consider the learning and teaching impacts on space, almost as an afterthought. Clearly the scepticism associated with space management, ‘Wringing dollars out of campus space,’ (Biddison and Hier, 1998) seems to be prevalent from academics defending and managers squeezing university teaching and learning

accommodation allowances. This research proposes a new approach that shifts the focus to a 'contract' or 'partnership' between academics and managers that forward plans space progressively over time, prompting and factoring course development plans that consider future technology, staff development and alternative modes of delivery. This new approach suggests that sceptics will be encouraged to engage with this issue if a two way progressive contract can be developed that funds training, supports investment in technology and encourages diversification in the mode of delivery in return for better quality, reduced departmental space allocations.

Certainly this type of collaborative approach would foster course development and progression planning which has not been the major emphasis of space management practice to date. Testing this different approach to space planning is the focus of the research presented. Mindful however of the cynicism expressed by Lofthouse (1994) who describes change management experience as the introduction of a management culture that 'seduces teachers away from the excesses of individualism, yet still largely fails to capture the real potential of working in teams.' Space charging processes that penalise staff for ineffective use certainly establishes a defensive interaction at the outset however this type of new collaborative 'team' or 'partnership' approach is cited by JISC (2007) as best practice. JISC suggest to us through the managing transformation publication (2009) that effective curriculum change depends more on people than on technology so by developing space distribution planning tools that focus on effective management again seems to be supporting a different but potentially more effective methodology.

2.4 Theme 3: Impact of Learning Theory on Design of Space³



Attempting to develop a modified or fresh approach to space planning should place more emphasis on understanding learning theory to inform the new procedure. Thomas and Martin (1996) assess the impact of space on learning outcomes and identify a strong linkage between providing appropriate space as a prerequisite for a positive learning experience.

Bowring-Carr & West-Burnham (1997) concur with this and add that to treat the learning environment as a peripheral consideration expresses a disregard for what learning really is. Stoll and Fink (1995) and later Hargreaves (1997) consider that cultural change in an educational context can be achieved through the investment and development of space. Providing the optimum quantity and type of space to support learning is clearly a well-documented discussion forming the principles of the current space planning methodology however Meighan (1988) also places a stronger emphasis not on resources but the notion that meaningful learning can take place irrespective of teachers, buildings, rooms and equipment and focuses on the interaction as the learning mechanism.

Groat & Stern (2000) suggest that the focus in the future must place an emphasis on the 'social architecture', descriptors illustrating the interaction, rather than the physical environment. The complexities associated with understanding this are similarly described by Price & Alexander (2012) through discussions described as an 'intra-organisational ecology of social constructs'. The current methodology opposes this, placing emphasis on space with little guidance to encourage the user to think about the

³ **Learning Theory:** Discussions to understand how learning theory impacts on the design of a learning environment. Preparing the researcher to engage with a wider discussion associated with establishing an effective learning environment.

impact of the 'social architecture'. The trend over the last 30 years reflects disappointing improvement to organizational space utilisation (NAO, 1996) and perhaps the reason for that is property managers do not place enough emphasis on understanding the progressive learning theory academics consider to plan the delivery of the curriculum provision. Nagowah (2009) usefully reflects on dominant learning theories concluding that instructors must fundamentally understand the strengths and weaknesses of each learning strategy, planning and delivering the curriculum to play to the best practices of behaviourist, cognitivist and constructivist learning theory.

Nagowah (2009) illustrates this by recommending that spaces are designed to allow instructors to deliver a session led by the learning principle selected as being the most suitable for the students at that time. Early learning experiences may commence with the direct instruction of the behaviourist classroom encouraging repeat action as the learning mechanism followed by developing the students' thinking process in the cognitive classroom and the art of discovering learning through constructivism. Jarvis (2009) concludes that as teaching materials are prepared, the greater the understanding of the learning processes the more innovative it is possible to be. The learning theories introduced here impact not only on course design but equally impact upon the creation and distribution of learning space.

Meesing (2004) suggests behaviourists consider the process of learning as a repetitive copying of behaviour devoid of thought process. This principle is fundamental to classical learning theorists such as Pavlov (1927), Miller & Dollard (1941) and Bandura (1977). The design of a space predominately led by a practitioner following this principle will typically establish a space that is sterile in terms of its ability to generate creativity as knowledge provided by the practitioner is unquestionably absolute (Martin & Booth, 1997). Alternatively where cognitivism and to a greater extent, constructivism is the leading learning theory Rhodes and Bellamy (1999) suggest a traditional didactic teaching experience is replaced with abandoning the 'chalk and talk' approach to a learning experience that focuses on exploration, collaboration and experimentation

prompting space and technology investment that can contribute to this experience in a positive way.

The introduction of learning theories introduces very different approaches to course design (and space planning) warranting very different facilities. The current methodology prompts the space assessor to estimate average hours across a range of different spaces. Rather than an average assessment across generically defined space, perhaps the guidance notes should introduce the collection of data through a structured 'interview' whereby the space assessor starts to gather information about the learning principles to inform the distribution of hours across types of accommodation. This early notion illustrates one of the first reflections associated with the literature reviewed and the current space planning methodology.

A highly creative course led with the principles of constructivism may take the students away from a traditional classroom space and may use social space within the university to engender an atmosphere where a real life scenario or co-operative learning is encouraged. The current template suggests social space can be modelled by altering the standard pro forma however spaces such as this may not be formally timetabled and therefore formally 'secured' for the forthcoming planning period which in turn introduces a planning 'barrier' for the individual attempting to secure space. Considering learning theory first and using a qualitative process for gathering data in addition to the current quantitative process is a significant variation to the current methodology. The research suggests that this change will have a positive impact on space utilisation.

A further key learning point introduced by Nagowah (2009) is associated with how the age, ability and experience of the students relate to the three styles introduced. Through the examples presented by Nagowah (2009), maturity and developed expertise tends to see course development adopting different learning style, migrating from an initial behaviourist approach to the principles of cognitivism and constructivism. The

current space distribution methodology does not cater for any such progression. Generic space descriptors are consistently used however a fine art room for an undergraduate is different to a fine art room for a final year student and with this come differing space requirements.

Clearly property managers could benefit from collecting and recording data that is informed with a more meaningful interaction with course leaders however as Anderson (2003) notes that no topic raises more contentious debate among educators than the role of interaction as a crucial component of the education process. Perhaps it is too critical to suggest poor utilisation of space is a failing of property managers not understanding the learning theory.

McWilliam (2008, p.263) acknowledges that academics have un-learned the role of 'sage on the stage' as the dominant model of teaching to a 'guide on the side' effectively changing the focus of pedagogy from the teacher to the learner however she argues this is no longer sufficient for our times. The challenge she sets to her peers is to move to 'meddler-in-the-middle', describing a more interventionist role with a greater emphasis on an experimental culture of learning. McWilliam (2008, p.264) presents an immediate need for a fundamental and expeditious change, illustrating the plethora of differing opinion within academia concerning the role of 'interaction' as a crucial component of the learning process. (As noted previously, interaction is also a crucial component lacking in the current space planning methodology.)

It seems that McWilliam (2008) is using different language to describe the shift in pedagogy from a behaviourist and cognitive approach to curriculum delivery that bears relation to something a constructivist psychologist would introduce. The work is useful because it describes *how* academics are changing practice, incorporating the best practices of behaviourism, cognitivism and constructivism. The work by McWilliam (2008, p.263) typically suggests that academics should spend 'less time giving instructions, being a custodial risk minimiser, forensic classroom auditor and

counsellor in lieu of spending more time being a usefully ignorant co-worker, an experimenter, risk taker, designer, editor, assembler and collaborative critic.’

The changes in delivery described above by McWilliam (2008) translate learning theory development into descriptors of action. If the principles of the learning theory and the delivery methodology are understood, then opportunities to link theory and practice to the design and distribution of space for a course may become apparent. This is an important principle to note when developing a space planning tool because it should guide the line of enquiry and inform the selection of the research technique when opening a dialogue with course leaders concerning the definition of the ‘mix’ of space required. This is a very different approach from current practice defined within the AUDE (2010) space tool that prompts a simplistic estimation of the number of hours to allocate within different types of space, say the library, classroom or lecture theatre.

The current space planning tool has the ability to be flexible in recording the different types of space but to get real benefit from the tool the approach to gathering the data needs to be different. ‘How’ the course is delivered is a fundamental element impacting on space design and distribution. A stronger emphasis is required to achieve an improved understanding of space distribution.

Simplistic estimation provides a calculation of the net area required for the various types of space but gathering data based on an understanding of the learning theory provides opportunities to allocate space in ways that match the course requirement and allow progressive development for the lecturer reflecting on how to improve delivery through the use of different resources. As an example, the current methodology would gather data for say a law course and would document an average assessment of teaching time split between classroom and lecture theatre.

If the data gathered was on a qualitative basis initially, seeking to find out how the lecturer was planning to deliver the course now and in the future, then a different mix

of space distribution may be identified. Perhaps a different distribution based on discussions considering the mode of delivery, the future technologies anticipated and learning styles to be catered for in the course design.

2.4.1 Conflicting Priorities

At the start of this chapter the context of ‘more for less’ was discussed introducing an imperative for universities to manage space utilisation more aggressively than ever before as a consequence of financial pressure driven through economic circumstance. Developments in social cognitive based learning theories have been introduced that provide increasing evidence of the importance of collaborative activity as a fundamental element of learning informing space design and distribution. However universities are being pushed to adopt teaching methodologies that achieve ‘more for less’ from a cost as well as an educational perspective as illustrated through the rigorous reporting prompted by HEFCE (2002).

Universities report and are benchmarked by HEFCE on cost per student full time equivalent within annual estates management statistical returns. It is important to recognize this as this could have become a tension when trialling an alternative approach for gathering data for space allocation.

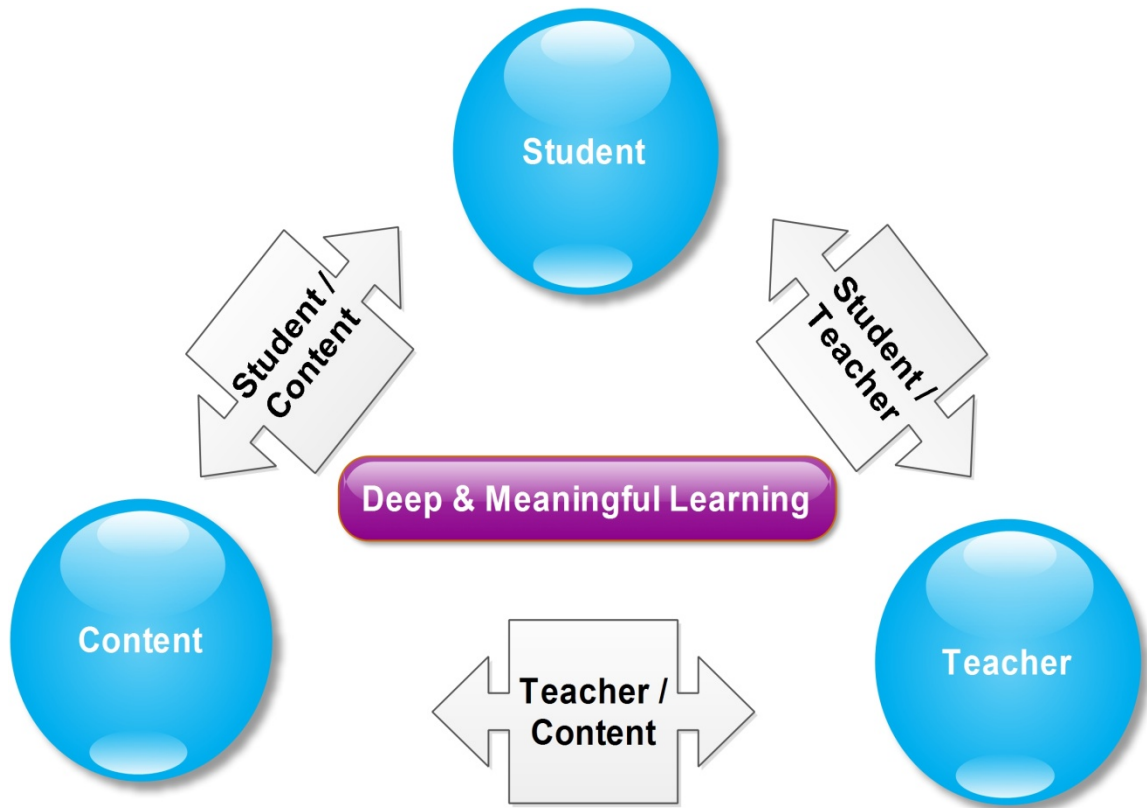
Achieving effective teaching and learning and being space efficient are not necessarily complementary, evidenced by high teaching standards within UK universities and low sector average utilisation (HEFCE, 2007). So whilst a different approach to space planning may provide opportunity to distribute accommodation more effectively, space planners will be keen to adopt teaching modes of delivery that optimize the estate and reduce built area as the primary concern whilst lecturers would generally focus on the quality of the delivery and the appropriateness of space as driving principles.

To help structure the new approach to space planning and to think about how this tension can be overcome, Anderson (2003) provides some useful theories concerning

modes of interaction suggesting a theoretical rationale and guide for instructional designers and teachers.

Figure 4, Anderson (2003, p.2)

Getting the Mix Right Again: An Updated and Theoretical Rationale for Interaction as cited in Anderson and Garrison, (1998).



Anderson (2003, p.6) concludes that there is a wide range of ‘need and preference for different combinations of paced and un-paced, synchronous and asynchronous activity’ He develops his work and presents an equivalency theory as set out in figure 4 above. Anderson suggests that deep and meaningful learning can occur as long as one of the three forms of interaction is present at a high level. The interaction can be student to teacher; student to student or student to content and that as long as one high quality interaction is received, the other two may be offered at minimal levels or even eliminated without degrading the educational experience.

Anderson does qualify this advice by noting that high levels of more than one of the three modes of interaction will likely provide a more satisfying educational learning experience however he acknowledges that this will be less cost and time effective. So in considering a new space planning tool the data gathering process attempts to prompt exploratory discussions with course designers regarding this principle.

If universities need to reduce the built area as a mechanism to reduce operating cost and if curriculum managers are being forced to deliver more for less from a staff cost perspective then high quality education may still be achievable within a reducing cost scenario by designing courses and spaces that limit the 'student to teacher' focus in lieu of a 'student to student' and 'student to content' experience. Clearly encouraging 'student to student' and 'student with content' learning has an impact on the quantity, design and distribution of space. The mix of university space would change requiring less formal teaching space however this would prompt the requirement for more private study and spaces that encourage social interaction. Overall the total built area of the estate would reduce in time as space norms per student full time equivalent generally demand less area for social learning space as opposed to formal teaching accommodation (AUDE, 2010a).

The current methodology does allow the space assessor to calculate and question the use of social space. However this is not promoted well in the guidance and is captured by a single column within the space assessment model entitled 'other' use. Rather than a quantitative record documenting space distribution the distribution of the accommodation should be informed by a significant qualitative input, initially assessing the impact of course design, now and progressively across a three to five year timeframe. This type of approach would certainly provide a level of data that would go far beyond a simplistic average assessment of time spent in different space. The planning tool developed for this research is therefore designed to provide a progressive planning framework that enables resources to be planned more effectively.

Limited capital investment (HEFCE, 2009a) could be focussed to provide impact over the planning period established. This would benefit the student and the curriculum planner who would in turn receive course improvement through the delivery of subject matter with new technology or from within different or modified accommodation. This type of progressive contract or curriculum transformation, (HEFCE, 2009b) may encourage acceptance of a space planning procedure if benefits for all can be demonstrated.

2.5 Theme 4: Changing Mode of Delivery as a Consequence of Technology⁴



Kolb (1984) summarized learning theory as the ‘process whereby knowledge is created through the transformation of experience’. Senge (1990, p.13) used the Greek work ‘metanoia’ meaning ‘a radical change of mind’ to describe this developmental progression.

Transformative learning or developmental ‘leap’ as discussed by Raiker (2009, p.315) occurs when ‘an individual’s understanding opens up a new vista of interconnected learning where the individual is increasingly able to solve abstract problems logically and to think critically of the self and others in social, moral, emotive and judgmental terms’. Universities have developed many initiatives to draw different experiential learning scenarios into programmes of study. Campoy (1992), Strommen and Lincoln (1992) and Matusevich (1995) describe the impact the introduction of technology has within a classroom environment. Specifically they summarise that generally:

- There is a shift from whole class to small group instruction.
- Coaching occurs rather than lecture and recitation.

⁴ **Mode of Delivery:** Understanding learning styles linking to technology preference to help inform the design of efficient learning spaces.

- Teachers work with weaker students more often rather than focusing attention on brighter students as in traditional settings.
- Students are more actively engaged.
- Students become more cooperative and less competitive.
- Students learn different things instead of all students learning the same thing.
- There is an integration of both visual and verbal thinking instead of the primacy of verbal thinking

To test the findings of Campoy (1992), Strommen and Lincoln (1992) and Matusevich (1995), a case study within the University of Gloucestershire was considered. Jenkins (2010) introduces interpretation of learning theories into a particular pedagogical approach. The approach adopted, defined as ‘active learning’ within the institute, was characterized through a case study that described flexible social learning spaces.

Jenkins (2010) described different ‘zones’ within the building providing a blend of highly serviced, creative space that was welcomed by staff and students alike. The case study concluded that the spaces developed provided an effective environment for experiential learning and also linked to many of the outputs described by Campoy (1992), Strommen and Lincoln (1992) and Matusevich (1995). As a consequence of this review, it is clear that it is important to understand in more detail the impact new technologies will have on learning spaces for the future and how this will inform a new space planning tool.

Today there are multiple ways technology can influence a learning experience. Most Universities will make use of a managed learning environment (MLE) which is a software platform that provides the structure for many forms of course materials used by the particular cohort. The following figure 5 provides an example of the Moodle application used for this current DBA study.

Figure 5, Examples of a managed learning environment software application

Course: DBA Doctorate In Business Administration (General Site)

The screenshot displays the Moodle interface for a course. At the top, the Moodle logo is on the left, and the user is logged in as Nigel Wichall. The breadcrumb trail shows 'My home > My courses > DBA_GENERAL'. The main content area is divided into several sections:

- Course Menu:** A sidebar menu with expandable sections: Information Resources, Course Content (with a 'Show only topic 2' option), Calendar, Site pages, My profile, and My courses.
- People:** A section with a 'Participants' link.
- Settings:** A section with a 'My profile settings' link.
- Welcome to Doctorate in Business Administration (DBA):** A central section with a list of links: General Forum, University research degree student information, Research degree handbooks, Research degree forms, Useful contacts for students, RD1 Process, and Guidance note to use sensitive personal data for research purposes.
- Information Resources:** A section with a list of links: Information Skills Tutorial, Learning Centre Catalogue, ebooks, eSearch, Journals, Online Databases, and Newspapers.
- Referencing & Attribution:** A section with a list of links: Referencing, APA referencing examples.
- Upcoming events:** A section on the right stating 'There are no upcoming events' with links to 'Go to calendar...' and 'New event...'.

<http://moodle.glos.ac.uk/moodle/course/view.php?id=1504#section-2>[9/26/2012 1:40:20 PM]

Kozma (1991). To explore this in more detail, Clark's (1983, p.4) metaphor would describe mobile technology as a mere vehicle that delivers instruction but does not influence student achievement 'any more than the truck that delivers our groceries causes changes in our nutrition.' He suggests that 'the choice of vehicle might influence the cost or extent of distributing instruction, but only the content of the vehicle can influence achievement'. This is an interesting point which is relevant to developing a new space planning tool. Should the new planning tool be interested in new modes of delivery of or just the content itself as a means of understanding the best distribution of accommodation in support of a course? The space planner must be aware of the opposing and at times radically different views if a successful discussion is to be developed. Clark's view is perhaps simplistic.

Learning media has changed significantly since the 1980's and very different technologies considered by Traxler (2010) concurs with Kozmas (1991, p.4) early assertion supporting the importance of the 'vehicle of delivery.' Traxler (2010) describes examples of effective learning where mobile learning technology has taken the learning experience out of traditional lecture room space. His case study describes a fluid interaction between lecturer and students and student to student. Traxler (2010) reflects on this work and notes that 'we need to correct the mismatch between what universities think is achievable, what they think they should be doing and what learners with mobile technologies would like them to be doing.' Clearly information technology is a 'game changer' (Oblinger 2012) that facilitates new models of delivery and choices for students.

McHaney (2012) is more specific. He reflects on student behaviours that are 'shaped by social networking and other forms of convenient, computer-enabled and mobile communication devices; by instant access to an over-abundance of information; by technologies that have conferred the ability to personalize and customize their world to a degree never seen before; and by time-shifting and time-slicing'. Price & Beard (2010) describe the need to form solo and collaborative reflective learning spaces to utilise this new technological input. McHaney (2012) suggests that emerging reflective learning spaces 'demand' that educators reconsider learning theories, pedagogies and practices and suggests that just adding technology to our

teaching practice will not suffice. If space planners can get the design solution right, then there are clear benefits. Behavioural mapping undertaken by Tibúrcio and Finch (2005) described how new ‘intelligent classrooms’ do positively affect the resultant behaviour. The new methodology presented through this research therefore seeks to find out if the design of the course has mobile technologies planned and apports resources based on the assumptions adopted. The space allocation tool prompts the space assessor to consult with the users in respect to their intentions, however in line with McHaney (2012), this is a subjective discussion that provides much variation.

This radical approach breaks the tension between managers and academics and introduces a different approach that generates the desired resultant output. Mobile technologies are however a singular consideration that impact on space design and usage. Saeed, Yang and Sinnappan (2009) reflect on wider technologies and identify that a major obstacle in the practice of web-based instruction is the limited understanding of the relationships between students’ learning styles and their preferences for instructional strategies. Saeed et al (2009) use the notion that learning styles provide an indication of learning preference and through action research present the following framework illustrating technology preferences for various learner styles.

Figure 7, Technology preferences for various learner types.

Saeed, Yang & Sinnappan. (2009). Emerging web technologies in Higher Education.

Learning Style	Technology Preference	Learning Style	Technology Preference
Active	Social bookmarks	Reflective	Podcast
Sensing	Email	Intuitive	Blog
Visual	Vodcast	Verbal	Podcast
Sequential	Podcast	Global	Blog

This type of framework is of use when planning a space allocation tool. A qualitative approach to gathering data about course development plans using a line of questioning that focuses on learning style and technology preference achieves a better 'fit' and ultimately leads to improvement in space utilisation. The interrelationships between the pedagogical approach to a course design and the resources required is complex and subject to much interpretation as noted within the case studies conducted by Jenkins (2010) and the debate following the Clark / Kozma long running discussion (1983).

New technologies summarized by Traxler (2010) introduce another dimension and complicate matters further. Shabha (2004) considers the effectiveness of e-learning on space planning and design and suggests the emphasis will shift towards a more time-flexible, space-flexible and location-flexible arrangement. To bring this cacophony of interdependencies into some sense of organization the literature review also considered research into effective evaluation models (Sharples 2009) and practices for technology supported learning spaces.

The literature review has identified that effective evaluation of space is not currently a consideration of the current space planning tool. If space is deemed to work 'effectively' from a teaching, learning and utilisation perspective, then this type of data would be useful to allow replication and improvement. The simplistic spreadsheet does not factor any such thinking. In addition to this observation, the Scottish Funding Council (2006) notes that there are few empirical studies available and as Temple notes (as cited in the JISC, 2007 report, p.5) that the role space plays in creating productive higher education communities is not well understood, and that 'a methodological study on evaluation, including costs and benefits, should be conducted'.

A literature review undertaken by JISC (2007) identifies just two studies offering evaluation frameworks for technology supported learning spaces. The first study by the University of Sheffield entitled 'Theory of Change Evaluation Process' published in 2007 is a general approach proposing, justifying and guiding educational innovation applied to learning spaces. The second framework provided by the Centre for Inquiry Based Learning in the Arts and

Social Sciences focuses more on learning design, an understanding of the identities of learners and teachers, and physical learning spaces. The JISC (2007) report draws on elements of both frameworks and presents an evaluation tool as depicted in the following figure 8.

The conceptual framework is set out in three sections. The first section considers why the evaluation is being undertaken and prompts clarity associated with what the impact of the evaluation would be. The second section to the framework prompts the review to consider the relationship of the learning space to the context, practice and design of the space. The framework provides definitions (appendix A) for each area of the evaluation and suggests a two stage review to allow the reflective development of the research data. The third section of the evaluation framework prompts the researcher to consider how the evaluation will take place ‘inviting an iterative, probing approach based upon practitioner self-questioning.’(JISC, 2007) The framework is an evaluation tool that has been developed to be used to review the performance of learning within technology rich space.

The limitations of the tool are that it is a retrospective process prompting the researcher to review all aspects of learning in a space that has been planned, developed and in operation, in effect a post occupancy or project completion review. The framework is useful though in the context of developing a space planning tool because it does sequentially draw together all the many (at times conflicting and competing) variables into a structured approach. The ‘What’ section draws together all the themes into a useful checklist that will be helpful in developing a new qualitative data gathering process that is emerging as the potential new space distribution tool.

The definitions for the JISC (2007) framework are included in appendix A. The ‘context’ discussions refer to the anticipated affordances of space in terms of learning and teaching objectives and provide a useful checklist for linking learning theory and space. The ‘design gestures’ section triggers questions that link built environment practitioners with pedagogy. This is useful if space utilisation is poor due to property managers not understanding the pedagogic approach to a course. The ‘practices’ section introduces a series of questions that

enquire how space was used and could be useful in agreeing with academic colleagues the most appropriate allocation of space. If the use of social space is going to be adopted for teaching and learning activity that focuses on active learning, then this type of questioning may help capture a more representative allocation of space.

Figure 8, JISC (2007) A Conceptual Framework for the Evaluation of Learning Spaces.

Why?	What?	How?
Intentions	Context	Procedures
Purpose	Interactions	Timescale
Users	Design gestures	Longitudinal
Policymakers	Curriculum	Quick gain
Policy	Maths	Initiated
	ICT	Internal
	...	External
	Non-specific	Conducted
	Process	Internal
	Scripted	External
	Open	Feedback
		Summative
		Formative
	Practice	Measurement
	Occupancy	Methods
	Interactions	Quantitative
	Academic Contract	Qualitative
	Effectiveness	Research Methods
	Participation	Practitioner research
	Processes	Academic research
	Products	Service level
	Physicality	evaluation
	Users	Operation
	Culture	Technical
	Learning styles	Human
	Affective conditions	Top-down
	Effective conditions	Bottom-up
	Ecology	

Designs	Tracking Use of space Journey of learner
Taxonomic Entrances Teaching spaces Learner Centres	Tools
Use Open Closed	Framework
Technology Mobile Connected Visual Supportive Specialist	Stages Consultation Pre-commission Post-commission On-going
Surfaces Reconfigurable Fixed Learner Created	Baseline Pre-commission Comparison
Infrastructural	Reporting

2.6 Conclusions Drawn from the Literature Review

Space utilisation improvement has historically not been achieved in line with expectation (SMG, 2004; Downie, 2004; HEFCE, 2006) and university estates are both extensive and expensive to run and maintain (AUDE, 2010a). Achieving improved space utilisation would reduce the financial burden for universities (NAO, 1996), which is particularly important for the sector as a consequence of the current economic and environmental circumstance described by Dearing (1997) Annand (2007) and Bradwell (2009). Current space distribution methodology is driven by property managers not academics (SMG, 2007), the principles of which focus on a quantitative process (AUDE, 2010a), allocating space based on simplistic

calculations multiplying student numbers by space norms for each type of activity. The literature review has identified opportunities to develop a space planning tool by noting the limitations of the current space model that in turn helps improve the space utilisation planning methodology for universities. This led to the development of the first research question that is considered in the later chapters. **Will a space planning tool that is designed to consider the variable concept of a learning interaction improve space utilisation?**

The focus of this research was to initially develop a modified planning tool and then trial the new arrangement to gauge effectiveness of the new methodology. The design of the new space planning tool has come as a consequence of this literature review. The current space tool places little emphasis on understanding the impact of course design including learning theory, mode of delivery and new technologies on the allocation of space (AUDE, 2010a). Consequently this causes cynicism (Lofthouse 1994) with academics that provide the core data which in turn undermines the quality of the space model developed through the space planning process.

Different learning styles prompt different needs and consequently spaces. (Meesing, 2004; Nagowah, 2009; & Jarvis 2009). This acknowledgment features predominately in the new planning framework presented in the later chapters. Understanding the learning interaction is important when planning learning resources (Meighan, 1988; Kozma, 1991; Groat & Stern, 2000; Price and Beard 2010; McWilliam, 2008; Saeed, Yang & Sinnappan, 2009). Similar levels of deep and meaningful learning can occur when the type of learning interaction changes (Anderson, 2003). Student to teacher interaction can be limited (for economic reasons) as long as alternative interaction is provided as described within Andersons (2003) theoretical framework.

Conflicting priorities were anticipated as a barrier for this new methodology. Space managers will continue to see new technologies and different modes of delivery as opportunities to plan reduced built area (HEFCE, 2002) whilst academics will focus primarily on new

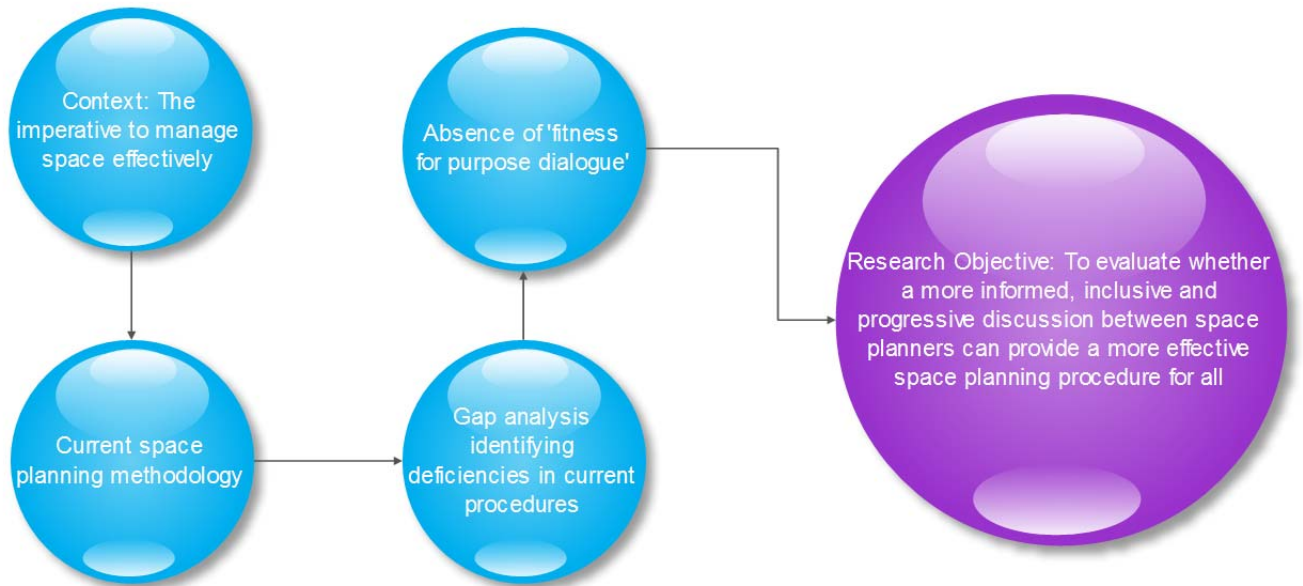
developments as a means to improve quality of the delivery of the curriculum (HEFCE, 2007; Jenkins, 2010).

Understanding the impact of learning styles, the mode of delivery and the effect that modern technology (Saeed, Yang & Sinnappan, 2009; Traxler, 2010) has on space and resources is difficult to interpret (Anderson, 2003). The interpretation within academia is subjective, at times contested (Clark, 1983; Kozma' 1991; McWilliam, 2008; Jenkins, 2010) and is rapidly changing making it difficult for property managers to understand. To explore this further through the design of the space planning tool further research questions were posed. **What is the impact of learning theory on the design and distribution of space? What impact does the changing mode of academic delivery have on space design and distribution of space?**

Limited evaluation frameworks (JISC, 2007) are available that help develop a more informed discussion and a revised space planning methodology, a methodology that is designed to develop the simplistic quantitative space planning process (AUDE, 2010a) to more collaborative, qualitative and quantitative framework. Current evaluation frameworks have been designed to review the effectiveness of investment for various technology rich projects. (JISC, 2007). However the criteria used can be developed to provide a modified approach that attempts to develop a progressive partnership (JISC, 2009) with academic managers to improve course planning and ultimately institutional utilisation. From this a further research question was presented in the form of: **How can evaluation frameworks guide the development of a new space planning tool?**

This is the focus of the study and the following chapter describes the methodological process designed to capture this wider data set. The following Figure 9 provides a summary diagram that sets out the key learning points from the literature review leading to the introduction of the central research objective.

Figure 9, Learning from the Literature Review



2.7 Learning Reflections: Literature Review

Literature review presented within four themes:

1. **Context:** Discussions surrounding the current operating context for UK based HEI's establishing the need for the research.
2. **Current Practice:** A review of the historical and current practice for managing space within HEI's resulting in the identification that current procedures adopt space norms and place little emphasis on understanding how space is used as a contributory factor linking to space distribution.
3. **Learning Theory:** Discussions to understand how learning theory impacts on the design of a learning environment. Preparing the researcher to engage with a wider discussion associated with establishing an effective learning environment.
4. **Mode of Delivery:** Understanding learning styles linking to technology preference to help inform the design of efficient learning spaces.

Chapter 3 Methodology

3.1 Introduction

This chapter presents the research philosophy, approach, design and methods used to address the central research objective introduced at the end of the last chapter. The literature review concluded with the learning that a space planning tool that is designed to consider the variable concept of learning interaction is may lead to improved space utilisation. Ultimately the central research objective is to evaluate whether a more informed, inclusive and progressive discussion between space users and planners can provide a more effective space planning procedure for all. The literature review previously conducted and summarised in figure 9 considers the strategic context surrounding the imperative to achieve effective space management and through a gap analysis considers the strengths and weaknesses of the current space planning methodology. The review suggests that there is an absence of dialogue between those using or planning the use of teaching and learning space and those responsible for the development and distribution of space. The review was further developed with the introduction of several broad themes characterised in figure 1. The first theme initially considered the operating context for universities. Later themes considered the influence learning theory has on space design and distribution and finally the impact of the changing mode of the delivery through the introduction of new technologies. Different learning styles prompt different learning spaces and different technological teaching resources enable the variable use of space.

The literature review concludes with the formation of various research questions as set out in section 3.2.

3.2 Research Questions and Objectives

Figure 10, Learning from the Literature Review



The literature review suggests that the two themes of learning theory and delivery influence space design and space efficiency and to understand the definition of the 'absent dialogue' asks the question how do we measure and evaluate the effective use of space? The review has identified a limited number of studies that introduce 'space evaluation frameworks' (JISC, 2009) that prompt the reviewer to assess the effective use of space from a wide perspective. The frameworks considered introduce numerous topics and demonstrate the variable concept of the learning interaction. The assessment criteria contained within the frameworks suggest

the ‘essence’ of the absent dialogue and act as a useful checklist, summarizing multiple ways effectiveness could be measured when considering teaching and learning space.

3.3 Designing the Research Methodology

The new approach to space planning evaluated in this study was designed incrementally through ten distinct stages. The chapter describes each of the stages and then draws the key learning points into a final summary chart at the end of the chapter. The summary table is presented as figure 16. This chapter describes the influence and learning achieved through each of the stages of development. The methodology was designed after reflecting on various frameworks as described within the following chapter.

3.4 Research Methodology: Design Stages: Ontology (stage 1)⁵

To develop the research and answer the research questions posed in section 3.2 a research strategy was developed and the starting point for this was to consider the ontological positioning of the work. To begin to define a research strategy this work initially considered the wider context of the paradigm. Grix (2004) warns that without this initial personal reflection, a study may be at risk of being conducted in ‘an unsystematic and inconsequent manner.’ To improve space efficiency the focus of the research considered the complex topic of understanding the learning interaction to achieve the optimum use and distribution of resources. Willis (2007, p.8) usefully defines a paradigm as ‘the general theoretical assumptions and laws, and techniques for their application that the members of a particular scientific community adopt.’ A paradigm is the framework that directs this research and practice in the field and typically consists of a comprehensive belief system or world view held by the research community.

Willis (2007, p.8) discounts individuals that suggest there are two paradigms defined within the context of quantitative and qualitative studies as an overly simplistic approach that places an emphasis on the foundation of data rather than principle beliefs and assumptions. There

⁵ The learning journey started by considering ontological form and where current space planning practice fits in with established paradigms.

are multiple world views, the boundaries of which overlap (Willis 2007, p.8). A generally accepted consensus of descriptors of social paradigms is introduced below by Guba & Lincoln (1994)

- Positivist
- Post positivist
- Critical theorist
- Scientific realist/critical realist
- Constructivist
- Interpretivist

Guba & Lincoln (1994) et al., are amongst many who usefully provide a commentary describing the key features of each paradigm. To further consider the positioning of this research within contemporary research paradigms one has to consider ones personal position in respect to a number of the fundamental practical considerations the research will explore. Grix (2004, p.74) suggests that understanding the meta-theory and explaining one's own personal positioning within a research paradigm is an important first step and a central feature in planning a social science enquiry. In taking this advice, various established paradigms summarized by Guba & Lincoln (1994) et al were considered. Personal views associated with the broad themes of the research were considered and a 'best fit' assessment was undertaken from within each of the frameworks or paradigms identified. The theorists introduced earlier summarise positivism as the 'received view' (Guba & Lincoln, 1994, p.108) that has dominated the discussion over a 400 year period across the physical and social sciences.

Over the last few decades post positivism has emerged to address some of the criticisms of the positivist approach. Critical theory is a general descriptor of a series of paradigms that encompass neo marxism, feminism, materialism and participatory inquiry, all focusing on a value determined line of enquiry. Constructivism is a further paradigm that provides a focus away from ontological realism to ontological relativism. To explore the differences between the respective paradigms a reflection on key practical issues such as the nature of knowledge relative to the research was considered.

3.5.1 Ontological positioning (stage 2)⁶

The figure below is taken from Onwuegbuzie, Johnson & Collins (2009, p.122) and presents in tabular form a summary of the underlying belief systems of contemporary research paradigms.

Figure 11, Underlying Belief Systems of Contemporary Research Paradigms

Paradigmatic Element	Post positivism	Constructivism	Critical Theory	Participatory	Pragmatism
Ontology	Social science inquiry should be objective	Multiple contradictory, but equally valid accounts of the same phenomenon representing multiple realities.	Virtual reality influenced by social, political, cultural, ethic, radical, economic and gender values that evolve over time.	Subjective-objective reality co-created by mind and given world order.	Multiple realities i.e. subjective, objective, intersubjective); rejects traditional dualisms e.g. subjectivism vs. objectivism; facts versus values); high regard for the reality and influence of the inner world of human experience in action; current truth, meaning and knowledge are tentative and changing.
Epistemology	Researchers should eliminate their biases, remain emotionally detached and uninvolved with the objects of study and test or empirically justify their stated hypotheses.	Subjective knower and known are not separable; Transactional / subjectivist; co-created findings /meanings.	Transactional / subjectivist; value-mediated findings.	Experimental, propositional and practical knowing; co-created findings.	Knowledge is both constructed and based on the reality of the world we experience and live in; justification comes via warranted assessability.

⁶ Reflections through the journey conclude with the adoption of a participatory paradigm for the research.

Paradigmatic Element	Post positivism	Constructivism	Critical Theory	Participatory	Pragmatism
Methodology	Time and context free generalizations are desirable and possible and real causes of social scientific outcomes can be determined reliably and validly via quantitative (and qualitative) methods.	Hermeneutical / dialectical; impossible to differentiate fully causes and effects; inductive reasoning; time and context free generalizations are neither desirable nor possible.	Dialogic / dialectical	Political participation in collaborative action research; emphasis on practical	Thoughtful / dialectical eclecticism and pluralism of methods and perspectives; determine what works and solves individual and social problems.
Rhetorical	Rhetorical neutrality, involving formal writing style using impersonal passive voice and technical terminology, in which establishing and describing social laws is the major focus; may include qualitative methods.	Detailed, rich and thick (emphatic) description, written directly and somewhat informally.	Critical discourse.	Use of language based on shared experiential context.	Use of impersonal passive voice and technical terminology, as well as rich and thick (emphatic) description.
Nature of Knowledge	Nonfalsified hypotheses that are probably facts or laws	Individual and collective reconstructions that may unite around consensus.	Structural / historical insights	Entrenched epistemological emphasis on practical knowing and critical subjectivity.	Intersubjectivity, emic and etic viewpoints; respect for normological and ideographic knowledge.

Paradigmatic Element	Post positivism	Constructivism	Critical Theory	Participatory	Pragmatism
Knowledge Accumulation	External hypotheses that are probably facts or laws.	Elaborate reconstructions; vicarious experience; internal statistical generalization; analytical generalization; case to case transfer; naturalistic generalization.	Historical revisionism; generalization by similarity; internal statistical generalization; analytical generalization; case to case transfer; naturalistic generalization.	In communities of inquiry contained in communities of practice.	Follows dynamic homeostatic process of belief, inquiry, modified belief, new doubt, new inquiry, in an indefinite loop, where the person or researcher constantly tries to improve upon past understandings in a way that fits and works in the world in which they operate; internal statistical generalization; analytical generalization; case to case transfer; naturalistic generalization.

On a similar basis to Guba & Lincoln, positivists and post positivists would summarise that knowledge accumulates by a process of ‘accretion,’ (Onwuegbuzie, Johnson & Collins, 2009 p.122) with fact serving as a sequential step adding to the growing ‘edifice of knowledge.’ (Guba & Lincoln, 1994, p.114) An alternative view expressed through critical theory is that knowledge grows and changes through a ‘dialectical process of historical revision that continuously erodes ignorance.’ (Guba & Lincoln, 1994, p.114) Onwuegbuzie, Johnson & Collins (2009, p.122) concur with this and suggest knowledge accumulation viewed through constructivism only occurs in a relative sense through ‘elaborate reconstructions and through vicarious experience.’

In reflecting on the different positions my personal view is that I could relate the historical development of space planning methodology to that of a design introduced from within a positivist paradigm in that the current methodology has been revised year on year with ever more sophisticated improvement and revising of space norms through the variation of spreadsheet analysis. I do however see ‘vicarious experience’ or experience in the imagination

as described by Onwuegbuzie, Johnson & Collins (2009) as being a significant issue when considered in the context of defining effective learning. The same learning interaction may be viewed as either a defining moment or inconsequential to two different students studying the same topic. Understanding this subjectivity and planning flexible learning resources that can change to relate to different learning theories is the different approach that was adopted for this new space planning methodology. The ontological position typically defined within positivism suggests reality is assumed to exist and is driven by immutable cause and effect natural laws. This basic posture of the paradigm is argued to be both reductionist and deterministic (Hesse, 1980). Opposing this Guba & Lincoln (1994, p.111) suggest that the ontological position for constructivism is described as ‘realities, apprehendable in the form of multiple, intangible mental constructions, socially and experimentally based, local and specific in nature and dependant for their form and content on the individual persons or groups holding the constructions.’ The participatory characteristic also described by Guba and Lincoln (1994) is described as ‘subjective’, with ‘reality co-created by mind’. Again this provides a closer correlation to my interpretation of how individuals view the complicated discussions surrounding the effective use of space.

Effective use of space is fundamentally concerned with the definition of what is an effective learning interaction (Jarvis, 2009; Nagowah, 2009). Understanding this and developing a space planning methodology derived from that understanding is the key to the development of a new space planning tool. The current methodology used for space planning is suggested as deterministic, linking space to class size, distributing space in a context free manner. The absence of the context undermines acceptance of the methodology and prevents planning progression.

One could draw a contrast between the different ontological positions adopted within the paradigms introduced earlier. Guba & Lincoln’s table (1994, p.112) suggests that the nature of knowledge as viewed from within a positivist paradigm relies on verified hypothesis established as facts or laws or non-falsified hypothesis that are probable facts or laws if a post positivist view is adopted. It could be considered that perhaps the current deterministic

methodological approach (Space Management Group Space Assessment Model, AUDE, 2010) could have been derived from a positivist or post positivist stance. A methodology that predicts and controls space as a consequence of established laws characterized within the current space planning tool. E.g. 20 students studying computer science can be multiplied by a space norm of 2.75m² per student therefore establishing the rule that the learning space should be an optimal 55m² in size.

The literature review introduced learning space evaluation frameworks that present the myriad of potential criterion that can be used to measure space efficiency (JISC, 2009). Understanding the individual reconstructions coalescing around consensus is a different methodology for determining space distribution. Introducing a modified, participative ontological perspective or world view within the research would encourage a focus on what the space is used for by academics and students and the learning forms and experiences that take place rather than statistical performance. The knowledge and learning from such research considers the perceived realities associated with that interaction, which in turn informs the design of the space planning applications. The modified methodology therefore still maintains the positivist approach to the area of space measurement, but it is argued that a wider world view is adopted that acknowledges that the essence of the object is multiple and consequently extends and develops the current methodology by considering the research questions posed from this alternative paradigm. In conclusion, the ontological position adopted for this research and ‘wider world view’ is both constructivist and participatory in nature.

3.5.2 Epistemology

Developing the philosophical context further, the epistemological stance adopted within positivism is defined as dualist and objectivist with the subject matter being completely independent of and unaffected by the researcher (Ritchie & Lewis, 2003, p.16). As a space manager who adopts the position of a constructivist (as defined by Guba & Lincoln 1994), one could argue that reality can never be independent of the person observing it. (Willis, 2007, p.112). The current difficult economic operating context for universities described by Bradwell (2009) as the ‘perfect storm’ requires action to address the more for less conundrum

and therefore it can be argued space planners have a significant interest in achieving a cheaper and more efficient outcome. The use of space will ultimately be deemed effective / ineffective based on the researcher's perspective and values, thus making it impossible to conduct objective, value free research. This again reflects the epistemological position described within a constructivist and participatory paradigm where the exploration is concerned with understanding the social interaction using both the participants and the researchers' understanding of an issue. (Ritchie J & Lewis J. 2003, p.17).

3.5.3 Research Purpose

The purpose of the research is to evaluate if and how a more informed, inclusive and progressive discussion between space users and planners can provide a more effective space planning procedure for all stakeholders. Specifically the aim of the research was to develop a collaborative space planning methodology that engenders academic commitment to effect space utilisation efficiency that in turn answers the research questions posed. Positioning oneself within a positivist or post positivist paradigm relies heavily on explanation, prediction and control. Opposing this, a view taken within a participatory world view at the reverse end of the spectrum would place emphasis on understanding the reconstruction of the space related scenarios to understand the meaning of competing constructions to form a progressive consensus moving forward. The reality of the requirement to improve space planning therefore suggests a participatory approach could help to inform the development of the new methodology. The current space planning methodology predicts and controls space use with a simplistic tool promoting a methodology that clearly has not provided the space utilisation improvement desired. (HEFCE, 2009) Understanding and developing a progressive dialogue in the form of a contract or partnership with academic colleagues is the direction of this improved methodology which in turn relies on understanding and reconstructing multiple competing variables linked to the definition of an effective learning interaction.

3.5.4 The Influence of Ontology and Epistemology on the Research Strategy

The ontological and epistemological position adopted for the research had significant impact on the methodological approach to the enquiry. (Grix, 2004). The methodology adopted

moved away from positivism's experimental methodology that attempts to prove a hypothesis. An example of this is as previously described with space being allocated through a formulaic process of distributing area based on student numbers. The design of this research strategy followed the generally accepted descriptors of a typical methodology defined within the participatory paradigm. Typically the methodology is 'thoughtful and dialectical in design,' considering the interpretation of the definition of an effective learning interaction through a pluralism of methods and perspectives that determine what works and solves individual and social problems. (Guba & Lincoln, 1994, p.112).

3.5.5 Justification of Research Paradigm

Understanding opposing beliefs of a positivist and a participatory world view has helped draw ideas together which in turn have structured the initial research questions posed. Reflecting on the ontological implications of the research has provided the opportunity to reflect on the key processes adopted within the current space management best practice guidance and how work has previously been conducted within this guidance. A review of the ontological arguments presented above identified the notion that effective use of space is fundamentally concerned with the definition of what is an effective learning interaction. This is quite different to the emphasis placed within the current methodology for space planning used in Universities and quite a different ontological position from the one personally adopted at the start of the DBA programme. This alternative view point is an intriguing personal realisation that is explored more in the later concluding chapter. The research design was very much focused on adopting the participatory paradigm as described by Guba & Lincoln, (1994).

3.6 Is this Fundamentally a Quantitative or Qualitative Inquiry? (stage 3)⁷

Through this early stage of planning the structure of the research methodology, time was spent reflecting on the different characteristics of quantitative and qualitative methods. This section summarises the key issues considered and sets out why a methodology that was primarily based on a quantitative investigation was discounted and deemed inappropriate for

⁷ Reflections through journey concluded that the research was primarily a qualitative assessment with elements of supporting quantitative data.

this particular study. The section opens by considering values held within the research. Values held by a researcher influence the design of the research methodology (Hatch, 2002). The current quantitative methodology used across the sector for space planning is suggested as being deterministic, linking space to class size, distributing space in a context free manner. The absence of the context undermines the acceptance of this methodology and prevents planning progression. Adopting this quantitative approach immediately would have set the boundaries for the research. Clearly how space is sub-divided is subject to stakeholder input through a design development process, however, this initial establishment of the boundary automatically makes assumptions about how particular courses will be resourced. This approach seemed to commence with space planning being done ‘to’ rather than ‘with’ staff. (Heron & Reason, 2006, p.144).

Adopting a value that allows a genuine open participatory discourse concerning space provided the foundation to achieve an effective plan. In terms of skills associated with developing a quantitative assessment based on the current methodology, the strategic parameters are set by the space planner who uses historical benchmarks to justify space norms. Analytical skills are required to understand this complicated data set along with the use of the space framework spreadsheet. This quantitative approach is therefore limited in that it could be considered by space users as being ‘arrogant.’ Perceived arrogance arises as the discussion opens with an area target that constrains creativity and introduces the solution ahead of meaningful consultation. Adopting this quantitative approach does provide a measurable output derived from the analysis of area and student numbers. This is useful for onward monitoring of space utilisation but is limited when discussing space, different learning interactions, new learning technologies and the multiple other factors that define an effective learning environment.

So to move the design of the research methodology forward this reflection suggested that the design of the methodology should be structured to enable numeric or other quantitative data to be collected and used as part of a study. However the research data would be flawed if the research methodology was not structured to capture all the qualitative data associated with

understanding the multiple experiences, learning styles, beliefs and values that combine to make a learning environment. To develop this thinking, time was spent on reflecting on the many variant qualitative methodologies used by researchers working within this area of interest. It became clear that a research strategy with a significant qualitative approach would hold very different values and would demand a different set of skills. This difference can be illustrated by developing the philosophical context further. The epistemological stance adopted within positivism is defined as dualist and objectivist with the subject matter being completely independent of and unaffected by the researcher (Ritchie & Lewis. 2003, p.16).

The alternative research strategy moves towards a participatory world view. The current difficult economic operating context for universities described by Bradwell (2009) as the 'perfect storm' requires action to address the 'more for less' conundrum and therefore it could be argued space planners have a significant interest in achieving a cheaper and more efficient outcome. The use of space will ultimately be deemed effective / ineffective based on the researcher's perspective and values, thus making it impossible to conduct objective, value free research. This again reflects the epistemological position described within a participatory paradigm where the exploration is concerned with understanding the social interaction using both the participants and the researchers' understanding of an issue. (Ritchie & Lewis, 2003, p.17).

The research strategy described under this scenario provides an appropriate solution in that it asks space users to contribute (and to contribute in a significant way) across an extremely wide set of assessment criteria that could be considered when measuring space efficiency. The skills required to implement this strategy required the researcher to prompt a discussion about improvements anticipated across all the different criteria that could be considered. This assumes the space planner knows what the issues and potentially what the solutions could be, to steer and facilitate the inquiry through the set of structured interviews. The success of this would be dependent on the space planner being very experienced in understanding learning theory and learning technologies to be able to facilitate a searching exchange. To document the exchange or agreement the analytical skills to allocate the resultant area were still required.

This research strategy, that is primarily a qualitative inquiry, moved away from the quantitative approach initially described at the start of this section and captured information associated with understanding the impact the use of different learning resources and different learning theories have on space design and distribution.

On that basis a qualitative, participatory primary research methodology was selected. The decision to adopt a qualitative participatory study (supported with some quantitative data) was a fundamental issue and so further reading was completed to understand what other researchers believed to be typical characteristics of qualitative research with the purpose of matching the descriptors identified against the direction and nature of the research proposed for this inquiry.

Work by Hatch (2002) was initially referred to that described the role of the researcher and the place the research would take place. The examples given described the qualitative research being conducted within the natural setting. The research was conducted within the learning spaces that formed the basis of the inquiry. Hatch describes the focus being on participants' perspectives, their meanings and their subjective views which in turn described the type of data that was required to understand the interactions within the learning environment. This initial reading led to work by Creswell (2007) who undertook a more extensive discussion on characteristics of qualitative research. Creswell (2007) provided a useful table categorising the characteristics described by LeCompte & Schensul (1999), Marshall & Rossman (2006) and Hatch (2002). The table is presented as Figure 12 below. The characteristics summarised within the table matched my early expectation of the intended dialogue and from this I was clear that I had selected the correct general approach for the methodology.

Figure 12, Creswell, (2007) Characteristics of Qualitative Research

Characteristics	LeCompte & Schensul (1999)	Marshall & Rossman (2006)	Hatch (2002)
Natural setting (field focussed), a source of data for close interaction	Yes	Yes	Yes
Researcher as key instrument of data collection.			Yes
Multiple data sources in words or images.	Yes	Yes	
Analysis of data inductively, recursively, interactively.	Yes	Yes	Yes
Focus of participants' perspectives, their meanings, their subjective views.	Yes		Yes
Framing of human behaviour and belief within a social-political / historical context or through a cultural lens.	Yes		
Emergent rather than tightly preconfigured design.		Yes	Yes
Fundamentally interpretive inquiry- researcher reflects on her or his role, the role of the reader, and the role of the participants in shaping the study.		Yes	
Holistic view of social phenomena.		Yes	Yes

3.7 What type of Qualitative Study is this Inquiry? (stage 4)⁸

3.7.1 Contrasting Characteristics of Qualitative Approaches

In following this advice it was considered that a case study approach may be a suitable methodology to progress the research. The limitations of this approach are noted by many authors when considering case, ethno and multi methodological approaches. Gerring (2007 p.6) in particular suggests that to some the different methodologies present ‘an ambiguous designation covering a multitude of inferential felonies’. This concern is countered by Patton, (1990, p.99); Stake (1983) and Merriam (1988) with the presentation of strong epistemological arguments for adopting a case study approach as a means to satisfy the desire to evaluate individualized outcomes specifically associated with educational resource planning. The ability to develop an individual outcome is an important point here as a tailored resource focused agreement with academic colleagues is the essence of the new proposed space planning methodology. Patton (1990) notes that adopting a case study methodology has worked particularly well within educational research citing multiple case studies where both qualitative and quantitative data has been combined including secondary data, direct fieldwork, project documents, interviews and observations to draw policy relevant conclusions from individual project case studies.

Robson (2002) suggests that qualitative research can be described as ‘descriptive’ or ‘exploratory’, devised to understand why phenomena occur, which again accords with the direction of the research. This work is focused on developing a space planning procedure as the resultant output and so considering the nature of the data and the context of the research, it was considered appropriate to take the advice of Patton et al and progress the research methodology using the case study approach.

Following on from Robson, the potential scale of the case study was considered. Gerring (2007, p.12) notes that often the strongest defence of a case study is that it is quasi experimental in nature, because the experimental ideal is often better approximated within ‘a

⁸ A Case Study approach finally adopted through the journey following reflection on descriptions of typical methodological approaches.

small number of cases that are closely related to one another, or a single case study observed over time, than by a large sample of heterogeneous units'. Following this advice it seemed appropriate to adopt a single case study approach would be appropriate as the design of the research was experimental in that it would consider how the creative combining of resources could improve the learning experience and do that whilst attempting to optimize space. Reaching this decision was a lengthy process. Selecting the approach was a significant challenge as the initial reading considered a number of other qualitative approaches that all seemed to display appropriate characteristics linked to the proposed inquiry.

Work was completed to understand whether a Narrative study as described by Clandinin & Connelly (2000) would be a useful model to follow. Phenomenological research as described by Van Manen (1990) was also noted as having similar characteristics to the form of inquiry proposed. To make matters even more confusing, 'Grounded Theory' as described by Glaser (1978) was also considered. This form described research where the intent was to move beyond description to generate or discover a theory for a process that is not off the shelf but 'grounded' in data from the participants. This seemed to make sense too!

Van Manen's work (1988) introduced Ethnography and it was considered if an ethnographic study that focused on an entire cultural group should be proposed. The options were bewildering and to make matters worse they overlapped in terms of how individuals interpreted characteristics. To overcome this issue Creswell's work (2007) was found to be extremely useful in structuring thoughts relative to the nature of the inquiry proposed. Creswell's table (2007, p.78) described the contrasting characteristics and this was used to position the approach. Through the reading it was thought a case study approach would be appropriate by matching the planned approach against the characteristics described. This was the process that structured a reasoned argument for the final selection. The chart is coloured to identify how the typical characteristics described were mapped through to match the direction of the planned inquiry.

Figure 13, Contrasting Characteristics of Five Qualitative Approaches

Characteristics	Narrative Research	Phenomenology	Grounded Theory	Ethnography	Case Study
Focus	Exploring the life of an individual.	Understanding the essence of the experience.	Developing a theory grounded in data from the field.	Describing and interpreting a culture-sharing group	Developing an in depth description and analysis of a case or multiple cases.
Type of problem best suited for design	Needing to tell stories of individual experiences	Needing to describe the essence of a lived phenomenon	Grounding a theory in the views of participants	Describing & interpreting the shared patterns of culture and sociology.	Providing an in depth understanding of a case or cases.
Discipline background	Drawing from humanities including anthropology, literature, history, and sociology.	Drawing from philosophy, psychology, and education.	Drawing from sociology.	Drawing from anthropology and sociology.	Drawing from psychology, law, political science, medicine.
Unit of analysis	Studying one or more individuals	Studying several individuals that have a shared experience.	Studying a process, action or interaction involving many individuals.	Studying a group that shares the same culture.	Studying an event, a programme, an activity, more than one individual.
Data collection	Using primarily	Using primarily	Using	Using primarily	Using multiple

Characteristics	Narrative Research	Phenomenology	Grounded Theory	Ethnography	Case Study
forms	interviews and documents.	interviews with individuals although documents, observations, and art may also be considered.	primarily interviews with 20 to 60 individuals.	observations and interviews, but perhaps collecting other sources during extended time in field.	sources, such as interviews, observations, documents, artefacts.
Data analysis strategies	Analysing data for stories, 'restorying' stories, developing themes, often using a chronology.	Analysing data for significant statements, meaning, units, textural and structural description, description of the 'essence'.	Analysing data through open coding, axial coding, selective coding.	Analysing data through description of the culture-sharing group; themes about the group.	Analysing data through description of the case and themes of the case as well as cross case themes.
Written report	Developing a narrative about the stories of an individual's life	Describing the 'essence' of the experience.	Generating a theory illustrated in a figure.	Describing how a culture sharing group works	Developing a detailed analysis of one or more cases.

3.7.2 The Nature of the Inquiry

The inquiry was focussed within the researcher's university and considered various room forms as described within the current space planning methodology. Room forms are defined as the different types of spaces where learning activity takes place. This can be formal teaching space such as classrooms, lecture theatres, workshops, laboratories or alternatively

social learning spaces such as the library. On this basis the case study was proposed that considered many of the different room forms available within the host university. The inquiry was designed on this basis to ensure representation across the majority of the current space planning room forms described within the current space planning methodology. A deep case study approach was proposed that considered different room forms as the output of the research was to specifically test if this alternative approach would improve space efficiency.

The case study would document how resource design and allocation could be developed collaboratively with the output of improved space utilisation. Certainly the targeted audience for the new knowledge is external in the form of resource and property managers within the educational sector. The scope of the research goals are broad and deep in that it attempts to establish a generic procedure and a specific outcome for each room form or scenario considered. The data sets are homogeneous in that it uses the same evaluation criteria to measure the effectiveness of a learning experience.

The research questions posed earlier in figure 10 seek to determine whether a space planning tool can be improved by considering a subjective and variable concept associated with the definition of an effective learning interaction. Ritchie & Lewis. (2003, p.29) note that evaluative research is concerned with issues surrounding how well the process works and in order to carry out an evaluation of the effectiveness of the new space planning methodology this process was developed to allow this position to be measured. The output of the research was to determine whether engaging through a progressive dialogue with academic colleagues can have a positive impact on space management and if so how this could be adopted as a variant space planning tool for the sector.

3.8 What type of data collection tool? (stage 5)⁹

3.8.1 Space Evaluation Frameworks

The previous stages of development for the research methodology focussed on positioning the philosophical approach and then established arguments for adopting a qualitative investigation. This next development stage records how the research methodology evolved to focus on the specifics of understanding how space and resources can be systematically considered in a new methodology. Structured interviews were initially considered as a useful methodology for capturing all the descriptive information that would come from the investigation but this was subsequently discounted as the method for this particular phase. The structured nature of the interview would allow the discussion to be focussed around the core themes of the study, namely to understand the impact the adoption of different learning theories and technologies have on space design and distribution. The down side of approaching the inquiry on this basis is that it was thought to be too dominant in that it leads the discussion.

To overcome this obstacle further reading was completed to understand the varied nature associated with the different types of criteria that impact on the design of a learning space. In doing this a model was identified that summarised all the key factors anticipated and it became clear how extensive the plethora of influencing factors were. The JISC (2009) space evaluation framework listed multiple influencing factors. This led to the learning that structured interviews where the principle researcher leads the discussion would be wrong. The principle researcher cannot be an expert in what is clearly a complex discussion so the research methodology must be developed where it encourages the true experts, the staff who use the space, to lead the discussion. To explain this further, the space evaluation framework provided a comprehensive checklist of all of the different potential criteria that could be considered for various learning environments and learning experiences. The intention of using this framework would be to draw information to understand how the curriculum

⁹ The learning journey developed to adopt a space planning framework as the data collection tool.

designer would wish to develop the course not just for the immediate planning period but over the next three years. The framework was used to help the researcher understand the potential changes in the methodology for the delivery of course subject matter and to ultimately develop a resourcing plan. (Three years is the anticipated duration of the course development plan.)

The JISC (2009) space evaluation framework identified within the literature review enabled the identification of the multiple complexities associated with room function and design. The framework was split into three sections and prompted the researcher to think about how the context of the space, the teaching practice and the specific resources currently available supported the learning experience. The themes prompted could help to achieve a consistent line of questioning but would also seek to either understand the current practice or act as a prompt for the researcher at the beginning of an investigation.

It may be the curriculum designer is clear about how to develop the pedagogy but is not aware of the potential technological options that could support the change in practice. The framework prompted questions on this aspect and was able to facilitate a more informed discussion about development opportunities. Record notes were planned to be reviewed and from that a course development plan conceived. This would set out the student numbers anticipated, but also prompt various resource related changes through the discussions that focus on learning theory, space and technological inputs.

In actual use the form presented in figure 14 was marginally modified and updated. The form was simplified to allow the document to be used as a data capture pro forma. The final set of pro forma used was as set out in later figures 18 to 21. The development plan may well identify investment which may come in the form of staff development, investment in teaching and learning equipment, development of new space or different timetabling arrangements for existing spaces. In terms of documenting the learning from the various exchanges, a draft space planning tool was developed as per figure 14 below. The assessment criteria contained within the first set of columns was extracted from the JISC (2009)

evaluation framework. The columns to the right were introduced for the purposes of the research and enabled the researcher to record current and proposed resourcing arrangements.

Figure 14, Draft Space Planning Tool

Draft Space Planning Tool 2010				
Elements of Framework extracted from JISC (2009)			Resourcing Contract	
	FACULTY			Business School Park
	DEPARTMENT			ICT, ICT facilities within the Waterworth Building consisting of 7 ICT suites & 1 general classroom
WHY?	INTENTIONS	PURPOSE	States purpose of Plan	Evaluation developed to plan resources and allocate space
		USERS	Describes all stakeholders	Learners, lecturing staff and support workers
		POLICY MAKERS	Describes key policy makers	Dean of Business School, Director of Estates, Head of department, Head of ICT
		POLICIES	Describes current policies, enablers and restrictions	SAM, Faculty budget and development plan, ICT & Estates Strategy, Academic Plan & Strategic Plan

<u>WHAT?</u>	CONTEXT	GUIDANCE NOTE	CURRENT ACTIVITY	PROPOSED ACTIVITY
-	INTERACTIONS	Describes the interactions actually happening	Generally collaborative learning, occasionally exploratory or case based learning	Exposition, reflective, performative, networked, community collaborative, tutorial, assessing, browsing, cross contextual, cross conceptual, case based, problem solving, inquiry driven, ludic, construction.

<u>WHAT?</u>	CONTEXT		GUIDANCE NOTE	CURRENT ACTIVITY	PROPOSED ACTIVITY
	DESIGN GESTURES		Links between built environment and pedagogy	General descriptions that comment on the design aspects or grouping of resources which accommodate or encourage learning and teaching interactions.	General suggestions to remodel the space, addressing criticisms raised.
	CURRICULUM			Specific domain based criticisms of current space.	Specific suggestions to remodel the space, addressing criticisms raised.
PROCESS		SCRIPTED	An indicator of the formality of the processes which are intended to occur within the space.	Describes the formality of the current arrangement	Describes the formality of the proposed arrangement
		OPEN			
	PRACTICE		Seeks to identify how the space has been used, conceptualised, and re-purposed in practice	Produces rich or thick descriptors of current use	Produces rich or thick descriptors of proposed use.
	OCCUPANCY		Measured use of space	headcount data	headcount data planned
	ACADEMIC CONTRACT		Notions of cultural acceptability within the space, disciplinary rules, pedagogical signatures etc.	Produces rich or thick descriptors of current use	Produces rich or thick descriptors of proposed use.
EFFECTIVENESS		PARTICIPATION	Describes student participation	Produces rich or thick descriptors of current levels of participation	Produces rich or thick descriptors of proposed levels of participation
PRACTICE		PROCESSES		Produces rich or thick descriptors of current processes enabling participation	Produces rich or thick descriptors of proposed processes enabling participation
		PRODUCTS		Produces rich or thick descriptors of proposed products produced	Produces rich or thick descriptors of current products produced

<u>WHAT?</u>	CONTEXT		GUIDANCE NOTE	CURRENT ACTIVITY	PROPOSED ACTIVITY
		PHYSICALITY		Produces rich or thick descriptors of current physical spaces enabling participation	Produces rich or thick descriptors of proposed physical spaces enabling participation
USERS		CULTURE	How likeable is the space	Describes how likeable the space is the current user	Suggest how issues can be addressed in the proposed suite of spaces
		LEARNING STYLES		Describes how the current learning theory works within the current environment	Describes how the proposed learning environment will work within the proposed environment.
		AFFECTIVE CONDITIONS		Specific domain based criticisms of current space.	Proposals to correct
		EFFECTIVE CONDITIONS		Specific domain based criticisms of current space.	
ECOLOGY					
DESIGNS		How the space operates in the wider ecosystem of other spaces		Produces rich or thick descriptors of current physical spaces enabling participation	
TAXONOMIC	ENTRANCES	Provides descriptors of the actual spaces being used			
	TEACHING SPACES				
	LEARNER CENTRES				
USE	OPEN	Describes if USE is enforced through policy or mediated informally through changing teaching & learning practice.			
	CLOSED				

3.8.2 Planning the Interaction

In developing the research strategy the previous section reflects on the use of a JISC framework to act as a data collection tool. This approach allows a much wider discussion to take place and is a major improvement that overcomes the limitations described in section 2.2.5 associated with the quantitative process currently adopted across the sector. The quantitative approach described was still considered to be limited when reflecting on the method of data capture. Interview questions were discounted on the basis that it was perceived to lead the discussion. The JISC framework introduced extensive assessment criteria that a space planner would struggle to become an expert in. It was clear that this would prompt a complicated inquiry with an academic team who clearly understood the issues in a much more comprehensive way.

To develop the methodology further reading of work by Lofthouse (1994) was completed around the topic of 'organizational power' to help inform the design of the methodology. Developing an open and trusting dialogue to facilitate change would still be difficult because the 'power' within the relationship could be deemed as one sided through an interview process. Ultimately the space planner is varying the technique to encourage a wider discussion. However, it is still introduced and guided by the space planner through the questions consequently posed. The 'power' through this proposed interaction sits very squarely with the space planner and could still limit the output of the research. The agenda is set by the researcher through the structured interviews which suggests the inquiry is to be steered in a particular direction. This could still be construed as an arrogant approach by a manager and the resultant cynicism (Lofthouse, 1994) could jeopardize the research output in its entirety. From a positive perspective, the strategy would tend to support a line of inquiry where there is a high degree of uniqueness surrounding the topic but it is still limited in that it constrains the discussion within boundaries set by the space planner. This qualitative research strategy was noted as a significant improvement on the current quantitative approach adopted within the sector and did represent early thinking around the proposed research methodology to be adopted. On reflection this approach was still very limited due the concerns raised above however it was decided to include this in the thesis as this represented a major learning

point. It is included here as it identifies for future space planners one of the pitfalls associated with opening a dialogue in a form which does not consider the power relationship. The fundamental design of the research acknowledges that the topic is concerned with multiple scenarios and objects and whilst the final methodology later described has a limited quantitative process to help triangulate and analyse the conclusions, this qualitative approach represents a very different approach to space management.

3.9 Developing the Research Strategy (stage 6)¹⁰

3.9.1 Action Research

The previous sections identify a case study approach to the research that moves away from a quantitative towards a qualitative process. This section begins to look in more detail at the specific design of the research process actually adopted. Reason & Bradbury (2006, p.1) usefully summarize Action Research as a ‘participatory, democratic process concerned with developing practical knowing in the pursuit of worthwhile purposes, grounded in a participatory worldview which we believe is emerging at this historical moment. It seeks to bring together action and reflection, theory and practice, in participation with others, in pursuit of practical solutions to issues of pressing concern.’ This description links to the ontological position adopted for the research as set out on p.53.

When this definition was considered it introduced the ‘language’ which was absent from the both the first and second research strategies described earlier. ‘Participation’ associated with the understanding of how the space was used was missing from the first strategy. It was introduced into elements of the second strategy but lacked a ‘democratic process’ which consequently overlooked the important dynamic of power and knowledge held by space planner and space user. As a consequence, this omission encourages cynicism and undermines the learning which can be achieved through the use of the research tool. A participatory world view is fundamental when considering the definition of a multiple object in the form of an ‘effective learning environment’.

¹⁰ Forms of qualitative inquiry were considered through this part of the journey concluding with the adoption of Action Research.

This is absent from the current procedure adopted within the sector and was introduced in a limited way through the first attempt of designing a quantitative research strategy. 'Reflection' as a critical element of 'participation', was limited through the structured interview methodology initially proposed. To help address the limitations of the first attempt at designing the research strategy, work by Schön (1983) was considered. In particular, themes associated with the widening gap between social science research and theory and social science based professional practice. Schön (1983) introduced an example of both practitioners and researchers facing the choice of 'sitting on the high ground where they can solve relatively unimportant problems' or 'descend to the swamp of important problems.' Schön's work suggested that action research could be a useful mechanism for overcoming the issues set out within the scenario stated.

On a similar basis Argyris, Putnam & Smith (1985) suggested Action Research has been described as 'an attempt to bridge the gap between social research and social practice by building theories which explain social phenomena, inform practice and adhere to the fundamental criteria of a science'. The descriptions of Action Research by Schön et al introduce a methodology that addressed the limiting factors described within the current space planning process and the first attempt in developing an alternative strategy. To assess whether action research would be appropriate for this type of inquiry, work by Friedman (2006) was also considered, which suggested there are four distinguishing features of action science and this framework was used to help test if this was appropriate for this work.

3.9.2 Creating Communities of Inquiry within Communities of Practice.

The goal of Action Research is to 'create conditions of inquiry under which practitioners can test theories of practice.' According to the principles of Action Research there should be no division of labour between those who produce knowledge (the academic teams using space) and those who use the knowledge (space planners) (Friedman, 2006, p.132). The goal derived from this approach helped the discovery of the tacit choices available concerning space design and space use thereof. The fundamental assumption of this methodology was that by gaining

access to these choices, space users can find the sources of ineffectiveness in their own reasoning and behaviour and with this new 'leverage' produce change.

3.9.3 Action Research: Building Theories in Practice

According to Argyris and Schön (1978) human behaviour is guided by theories of action which people hold in their minds. This is relevant to the way space is currently allocated with the theories-in-practice being represented by the formulaic space norm method of distribution. The work of Action Science involves constructing and testing such theories and reasoning by inquiring into the practitioner's behaviour and the reasoning behind it. People and organizations are often unaware of the theories that drive their behaviour and Action Science therefore helps practitioners understand theories of action from observed behaviour so critical appraisal and change can happen (Argyris and Schön, 1996).

3.9.4 Action Research : Intrerpreation

Combining Interpretation with Rigorous Testing

Action Research attempts to combine the context rich, descriptive interpretative approach with the rigorous testing of validity seen in the first positivistic approach considered earlier. It attempts to understand the critical distinction between theories in use and as described by Schön (1974) 'espoused theories,' which record what practitioners, think they do. The rigorous testing which is a described characteristic of Action Research was an important factor considered in selecting this approach as work derived from this new approach would still need to be measured against historical space norm assumptions. So whilst the approach is very much led through the principles of Action Research, the overall research strategy introduced triangulation in the form of a quantitative assessment of the areas allocated using the current sector space need framework.

3.9.5 Action Research: Change Management

Creating Alternatives to the Status Quo and informing Change in Light of Values Freely Chosen.

Action Research aims at improving or helping practitioners 'transform their world.' (Argyris et al., 1985). This social experimentation claims no prior solution but does introduce

procedures for discovering or inventing them. Change from an Action Research perspective is more about the on-going process of learning which links well with the space planning theme. A space plan for a faculty will be in constant change subject to the different emphasis placed upon the multiple inputs presented in the form of the pedagogy adopted.

3.9.6 Action Research: Values and Skills

Certainly the distinguishing features of Action Research lend themselves to supporting this specific line of inquiry posed. However the skills required for this type of research are noted by Friedman (1996) as being particularly challenging. Friedman suggests that the researcher would need to develop complex skills of reasoning and behaviour which demand considerable time, effort and commitment. Of more importance, he also warns that a special set of conditions need to be established 'which rarely exist in academic settings.' Friedman's sobering descriptions of the commitment required from both researcher and practitioners questioned whether this was a wise strategy to adopt. Action Research certainly introduced a methodology which satisfied a number of the criticisms linked to the first two methodologies initially considered but the deliverability of such a research methodology was noted by Friedman as a real challenge.

3.9.7 Action Research: Co-operative Inquiry

The principles of Co-operative Inquiry described by Heron & Reason (2006, p.145) introduced a research methodology that focused research 'with rather than on people.' The co-operative relationship suggested that the space planner or researcher work together with space users as 'co-researchers.' The description of this relationship seemed to overcome some of the obstacles described by Friedman when considering the limitations of other research methodologies. The radical or 'extended epistemology' suggested that 'knowing will be more valid if ways of knowledge were congruent with each other. (Heron and Reason, 2006). The economic imperative to manage space in a radically different way requires true innovation to establish the fundamental change.

Incremental improvement has been the output of the space management effort across the sector for the last decade. (HEFCE, 2009) Placing change opportunity within a learning set of co-researchers, who understand the pedagogical issues, have experienced the current obstacles and understand the potential provided by future technological opportunity, provided the framework for establishing the improvement demanded within the sector. This approach overcame the entrenched cynicism (Biddison and Hier, 1998) associated with space planning that has been prevalent as a consequence of the current adopted methodology. The approach provided a setting where the true experts were asked to reflect on the topic of effective use of space and the multiple variant forms of criteria that impact on this output. The 'co-researchers' would reflect on their experiences and use this as the foundation to introduce discussion. This changes the balance of 'power' within the research methodology and stops the need for the space planner to covertly introduce perceived solutions.

The inquiry skills for adopting this co-operative practice were noted as being very different than the two preceding quantitative and qualitative approaches considered. Heron (2006) described facilitation skills and used descriptors such as being present and open, empathetic, participative. Of more significance were the skills described such as 'emotional intelligence' used to describe the ability to manage emotional status in various ways. Heron (2006) described keeping action 'free from distortion' due to 'formative conditioning'. If Co-operative Inquiry is the adopted future methodology for a new space management tool across the sector, then this will prompt the need to develop a difficult skill set for space managers and technicians.

To expand on this, Heron described the importance of timing and not leading on the introduction of possible solutions. A space planner will have an agenda and it would be tempting for a pragmatic individual to undermine the culture within the Co-operative Inquiry circle by leading the discussion in a particular direction rather than letting the experience of the users form views. Overall this presented the need for a very different skill set and a significant risk to reflect upon when space managers plan the implementation stages.

3.10 Design Advice for the Novice Action Researcher (stage 7)¹¹

Whilst the requirement for different skills has been introduced above, the topic of roles, politics and ethical implications was also considered in the design of this research strategy. Shani and Pasmore, (1985) propose a ‘systemic design based framework’ to help novice Action Researchers. The framework they proposed introduced four key features and using this framework helped the development of the space planning framework now presented as the new space planning tool. The following reflections were considered associated with the design of the data capture tool.

A systemic design based framework, Shani and Pasmore (1985)

3.10.1 Context.

The framework suggested the Action Research strategy should draw out the context whereby the context is concerned with environmental, organizational and individual characteristics; interpersonal dynamics and the strategic purpose for the research. The first draft of the space planning tool prompted the intentions and the context by asking ‘Why and What’ however the framework was consequently strengthened by reflecting on this advice.

3.10.2 Inquiry Mechanism

The inquiry mechanism referred to the formal and informal arrangements. For example, the structures, processes, procedures, rules, tools, methods and physical configurations. The first draft of the space planning tool introduced the headings to prompt discussions around this criterion and so had a basic inquiry mechanism. Through the process of contrasting the first draft of the space planning tool against this framework it became clear that the first draft needed to be re-ordered and simplified.

¹¹ Frameworks considered through this part of the journey to help develop stages within Action Research. The output introduced co-operative inquiry as the methodology.

3.10.3 Inquiry Cycle

The inquiry cycle referred to the four main phases of diagnosing, planning action, taking action and evaluating the action. The first draft of the space planning framework anticipated much of this data and identified a method of capturing current and proposed action however it became clear that it wasn't appropriate to capture a cyclical inquiry. Contrasting the Shani and Passmore (1985) framework against the proposed first draft of the space planning framework highlighted this oversight. A further version of the space planning framework was devised that factored the four main phases and again is presented in chapter 4 as an update.

3.10.4 Outcomes

The outcomes section described the actionable knowledge that was created through the work of the learning set. The first draft of the space planning tool had anticipated the need to document such data however it was not structured to allow more than one cycle. The developed space planning tool was updated to allow multiple cycles to take place before the development plan was finalised. This was again a learning point as a consequence of reflecting on the work by Shani and Passmore (1985).

3.11 Research Design: Adopting a Role within the Action Research (stage 8)¹²

With the basic structure of the research methodology now improved as a consequence of further reading, the design of the research methodology focused on the roles the researchers would play out, the political challenges and ethical considerations that would need to be considered through this activity. Schein (1999) introduced a framework where he argues that there are three 'helping' models, 'doctor-patient', 'purchase' and 'process' consultation. Schein described an initial 'doctor to patient' relationship where under this scenario the space planner prescribes the corrective action to the space user. He continues by introducing a 'purchase' consultation where the space user 'buys' in the skills of the expert space planner to effect a solution. The relationships presented in the first two forms between space planner and space user are similar to the current methodology used for planning space. A methodology that has

¹² Frameworks considered through the learning journey that helped the researcher plan how to conduct the interaction.

previously been noted as being ineffective across the sector. (HEFCE, 2009a). Opportunities present themselves as a consequence of approaching the issue from within a different paradigm, and to explore this further Schein's alternative 'process' model was considered.

This model develops a relationship with the space user that permits the 'client' to perceive, understand and to act on process events that occur within the project. Adopting this model establishes the form of the relationship but it was not clear in terms of the role the space planner should adopt. The process model followed the co-operative nature of the research introduced by Shani and Pasmore (1985) but further investigative work was completed to understand the form of role the researcher should adopt. Rusaw (2001) listed common roles for Action Researchers, initially 'experts, brokers, gatekeepers' which through the titles chosen suggest that they place the 'power' within the activity with the space planner. Adopting this role would go against the co-operative principles of the research. Rusaw also describes 'liaisons, stakeholders and champions.' Adopting a 'liaison' or 'stakeholder' role seems to move away from a person whose role it is to propose and direct to someone who raises a question for reflection. This would complement the co-operative nature of the Action Research proposed. In developing the new space planning methodology and contrasting the role the space planner would adopt against the co-operative form of the research methodology, it is clear that the approach by the space planner is fundamental. In designing the research strategy it has become apparent that future users of this new methodology must be provided with a clear guidance note on how to present oneself and act when using the new framework.

In developing the design of the research methodology, Shani and Pasmore's framework was used to inform the concept. The work by Rusaw has guided the general approach of the role to be adopted by the space planner however Schein's later work introduced further learning associated with the subtle differences of approach within this form of Action Research.

Schein (1999) introduced a variant framework (typology of inquiry) for the action researcher which introduces 'pure inquiry' whereby the action researcher or space planner encourages

the discussions surrounding what is taking place and listens and reflects neutrally. Schein also describes ‘exploratory diagnostic inquiry’ which suggested the action researcher would begin to manage the process of how the data would be assessed. The assessment is conducted by the other researchers and consisted of exploring, reasoning, reflecting on actions and emotional processes. The third facet to Schein’s framework is ‘confrontive inquiry’ which was perceived to be a more insistent approach where the action researcher would share ideas and challenges others to think about the issue from a different perspective. Space planning through an Action Research based methodology is a significant shift away from current sector practice. The problem with developing this new methodology is in the understanding of how neutral or insistent the novice Action Researcher or space planner should be. Schein’s work illustrates the subtlety of approach within the typology of inquiry but at this design stage it was not clear whether Pure Inquiry or Confrontive Inquiry would provide the most effective set of results.

To find the answer to this the research methodology was designed to allow one research inquiry to be delivered with a neutral approach following the principles of Schein’s Pure Inquiry.

3.12 Research Design: Understanding the Political Dimension (stage 9)¹³

Buchanan and Boddy (1992) considered Action Research and suggested that management action could be categorized into two roles. They suggest the Action Researcher will be engaged in ‘performing’ and ‘backstaging’ activity. ‘Performing’ involved the public performance role of being progressive in managing the change process prompting the need of the project. The ‘backstage’ role involved the work required to gain the support to enable the project to progress and typically calls for skills that allow the researcher to intervene in political and cultural systems within the organization.

¹³Frameworks used through the learning journey to help the researcher consider how best to manage the political context within the organisation.

Typical skills include influencing, negotiating and justifying. So this was an important point considered when reflecting on the design of this new Action Research based space planning methodology. Through the early stages of the research, the researcher should be prompted to think about what the political barriers would be for implementing the change project proposed and then how the project could be progressed by anticipating and managing this complex aspect.

Coghlan and Shani (2005) suggest the Action Researcher should be prepared to ‘work the political system’ and be prepared to ‘work the key power relationships’. On this basis the design of the research methodology started by ensuring that the work had high level support within the organization. The space planner must then continue to monitor the political arena in accordance with the direction of the investigation. The new space planning methodology therefore needed to be designed to prompt the novice researcher into establishing formal and informal ‘checkpoints’ so that support was fostered. The ‘checkpoints’ needed to prompt the space planner to gain initial project support and to also establish mechanisms whereby project issues could be quickly communicated with the aim of generating further support. Coghlan and Shani (2005) suggest that Action Research has a ‘subversive’ quality about it and used language such as ‘incites’ action and ‘abets’ reflection which illustrates well how some stakeholders within the hierarchy perceived the work to be a political threat.

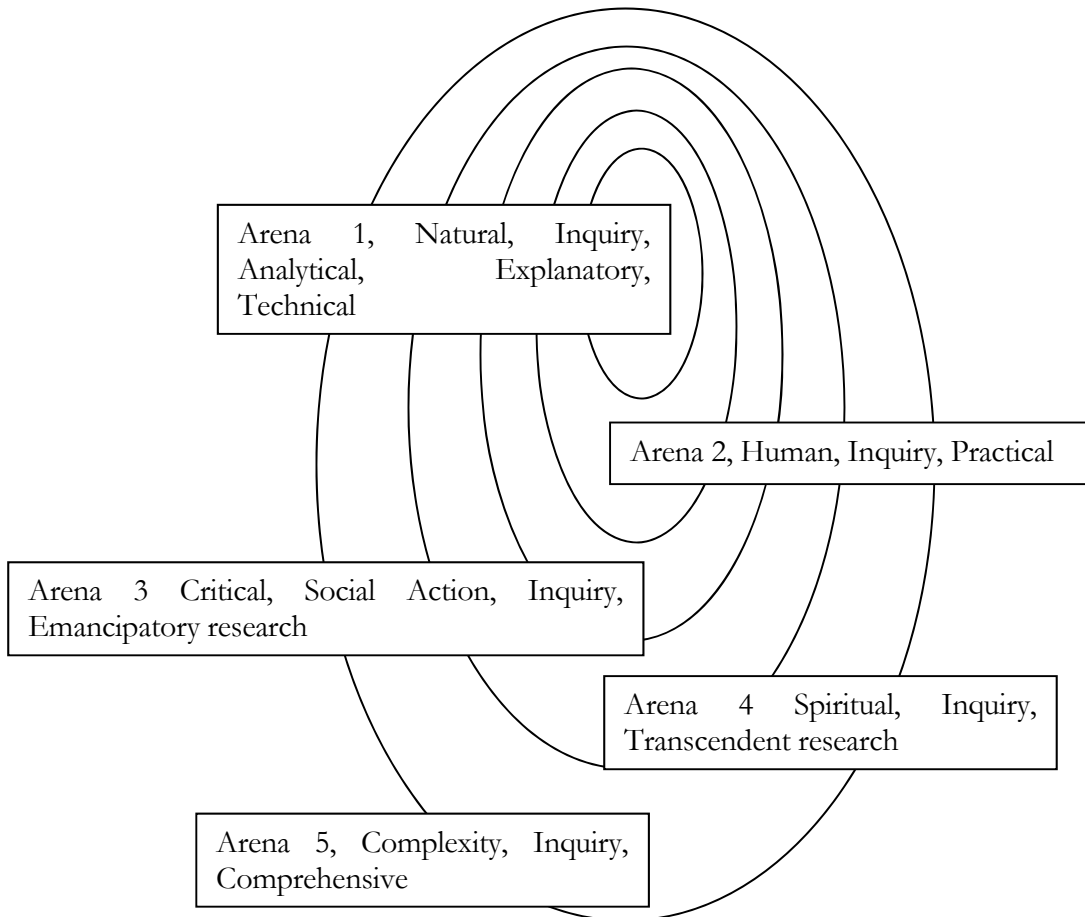
3.13 Research Design: Ethical Implications (stage 10)¹⁴

A space planner who is attempting to implement a project by following this new Action Research based planning process could easily under estimate the importance of understanding the ethical implications. According to Coghlan and Shani (2005), Action Research is an unfolding, emergent process which evolved through cycles of action and reflection. A space planner could be forgiven if they interpreted that this subjective cyclical co-operation between the researchers to be so fluid and random making it impossible to map out a detailed anticipation of ethical issues.

¹⁴Frameworks used through the learning journey to consider how best to manage ethical considerations through the research.

Adopting this position is naïve as there have already been several examples of ethical issues coming forward within the design of this new methodology (values, power within relationships). The output was to establish a development plan and as Morton (1999) warned that action researchers should not promise beyond what they can reasonably deliver. This new methodology did carry this risk in that it promotes innovation. The action researcher therefore held the dilemma that potential space efficiency would be identified through the action cycles however it would only be agreed at the cost of over promising access to other forms of resource. Initial thoughts on this issue were to consider how it would be possible to articulate some ethical principles into the process to guide the space planner. To help develop the design of the research strategy the work by John Rowan (2000) was considered. Rowan usefully developed Collen's (1998) framework (figure 15), concentric circles of research that described ethical issues in different forms of research psychology. The framework as set out in the following figure helped position ethical matters within this form of research.

Figure 15, Arne Collen (1988), Concentric Circles of Research



In figure 15, the first circle represented Natural Inquiry in which researchers or space planners engaged in research described within a positivist paradigm. Typically the interaction would see the space planner and user engage through a limited single point agenda. The space planner would attempt to quantify student numbers to calculate an area allocation based on a space norm. Rowan (2000) reflected on the ethics of this one sided interaction and suggested that the typical focus is on ‘doing good, not doing harm and respecting the person’. He suggests ‘participation observation’, often involved disguising the purpose of the researcher’s involvement, which does lead to a form of deceit. The space planner would potentially have a job description that focuses action on maximizing space efficiency and so this vested interest could be the ethical ‘deceit’ referred to by Rowan (2000) when working within this paradigm.

Placing the current space planning procedure within this first circle is too judgmental. On reflection one would hope most space planners acknowledge that the space user is a space user and not just the holder of student data.

The Human Inquiry described within this second circle considers hermeneutics and placed an emphasis on empathy, identification, trust and non-exploitive relationships. This is a more representative positioning of the work carried out by a traditional space planner. Rowan (2000) identified a major shift in the third circle or arena. In the previous arena the space planner could be described as meeting the space user at a carefully 'stage managed point' illustrated through the discussions and interaction where the current space needs framework is populated.

The third arena suggested the space planner involved the space user in planning the research and in processing the results. This arena described Action Research and Rowan (2000) suggested that the ethical considerations here concern not just the individuals but would extend to the wider community. Self-understanding, 'social vision' and 'un-intended consequences' are a deliberate focus. The ethical considerations of 'power' are significant and consequently the design of the research methodology anticipated this complex interaction. Using Collen's framework (1988) and reflecting on Rowan's (2000) interpretation of the concentric circles provided direction in terms of designing the methodology adopted. The framework positioned the various forms and allowed contextual judgements to be drawn associated with the quality of the relationship between the space planner and the space user within the different settings. The framework helped direct the ethical behaviour in which this action research was positioned. The approach described a democratic, participative process that prompted the co-operative researchers to set the direction of the research.

At the start of this chapter (section 3.3, p.49) the design of the research methodology was introduced as being an output of incremental learning across ten stages. The following figure 16 provides a summary of stages, the literature and the frameworks that has influenced the development of this strategy.

Figure 16, Mapping the Development of the Research Strategy

Stage	Influence	Frameworks	Reflections	Outputs
1	Guba & Lincoln (1994) Cupchik, (2001); Ritchie & Lewis (2003); Grix, (2004); Walliman (2006); Willis (2007), Onwuegbuzie, Johnson & Collins (2009.)	Introducing Paradigms; Positivist, Post positivist, Critical theorist, Scientific realist/critical realist, Constructivist, Interpretivist	Reflections on current space planning methodology	Limitations of current sector method linked to a procedure with characteristics of a methodology driven by a positivist or post positivist paradigm.
2	Guba & Lincoln et al.	Paradigms	Reflections on new space planning methodology	Discussion adopts a participatory paradigm for the research.
3	Heron & Reason (2006), LeCompte & Schensul (1999), Marshall & Rossman (2006) and Hatch (2002), Creswell (2007), Ritchie & Lewis (2003), Willis (2007), Bradwell (2009)	Is this fundamentally a quantitative or qualitative Inquiry?. Creswell's (2007) Characteristics of qualitative studies.	Understanding where the research would take place, reflections associated with 'power' through the interaction. Design of the research strategy, the balance between qualitative and quantitative data. Reflections identifying the research needs to consider multiple constructions associated with the definition of an effective learning space	Quantitative research identified as a secondary procedure to enable validation back to current space procedure. Primarily the research consists of a qualitative inquiry.
4	Stake, (1983) Merriam, (1988)	What Type of Qualitative Inquiry is	Reflecting on characteristics of	Single case study approach adopted developing on an in

Stage	Influence	Frameworks	Reflections	Outputs
	Patton, (1990) Robson, (2003) Gerring, (2007) Creswell (2007)	this? Descriptions of typical methodological approaches commonly adopted within the differing paradigms. Creswell (2007) Contrasting characteristics of five qualitative approaches.	different forms of qualitative research in relation to proposed research, Narrative Research, Phenomenology, Grounded Theory, Ethnography, Case Study	depth description / analysis of a case within a university faculty. Using multiple sources of data. Analysing data through the description of the case.
5	JISC (2009)	A framework was introduced that illustrated the complexity of the multiple variables that comprise of a learning environment.	Provided a useful checklist for a researcher to use to prompt discussions about various aspects of a learning environment	Provided the basis of the first data capture pro forma or 'tool'.
6	Schön (1983), Argyris, Putnam & Smith (1985), Heron & Reason, Bradbury (2006), Friedman (2006)	Friedman's framework used, 'Creating communities of inquiry with communities of practice.'	Benefits and limitations of action research considered	Action research adopted as the overriding research methodology. Specifically co-operative inquiry argued as the best fitting methodology for this research.
7	Shani and Pasmore, (1985)	Propose a 'systemic design based framework' to help novice action researchers.	A framework that sets out the four key stages of the co-operative research. Context, Inquiry Mechanism, Inquiry Cycle, Output	The space planning framework was revised on the basis of this reflection. Revised to capture the 'context' of the research through inquiry cycle 1. Revised to prompt the researcher into being aware of the complexity of the discussion and updated to provide a development plan as

Stage	Influence	Frameworks	Reflections	Outputs
				the output.
8	Shani and Pasmore, (1985), Schein (1999) & Rusaw (2001)	Schein's Typology of Inquiry introduces subtly more aggressive intervention through the inquiry cycles. Pure Inquiry (neutral position), exploratory diagnostic (evidence of management intervention) and Confrontive Inquiry (more insistent)	Neutral or 'Pure Inquiry' argued to be the best approach	The use of the space planning framework. It was decided not to share the framework with co-researchers but to use it to act as a data collection tool and prompt for the principal researcher.
9	Buchanan and Boddy (1992), Rowan (2000), Coghlan and Shani (2005)	'Backstaging' and 'Performing' as described by Buchannan and Boddy. (1992)	The frameworks described the importance of managing the political considerations for this form of research.	The learning from this stage structured the opening research process by seeking in principle approval for the research through the University Executive.
10	Collen. (1998)	Collen's (1998) framework, concentric circles of research that describe ethical issues in different forms of research psychology.	Research is positioned within the framework's third arena suggesting the space planner involves the space user in planning the research and in processing the results.	The ethical behaviour adopted within the research describes a democratic, participative process. Influenced the approach of the co-operative inquiry.

3.14 Learning Reflections: Methodology

Research Methodology presented within ten stages:

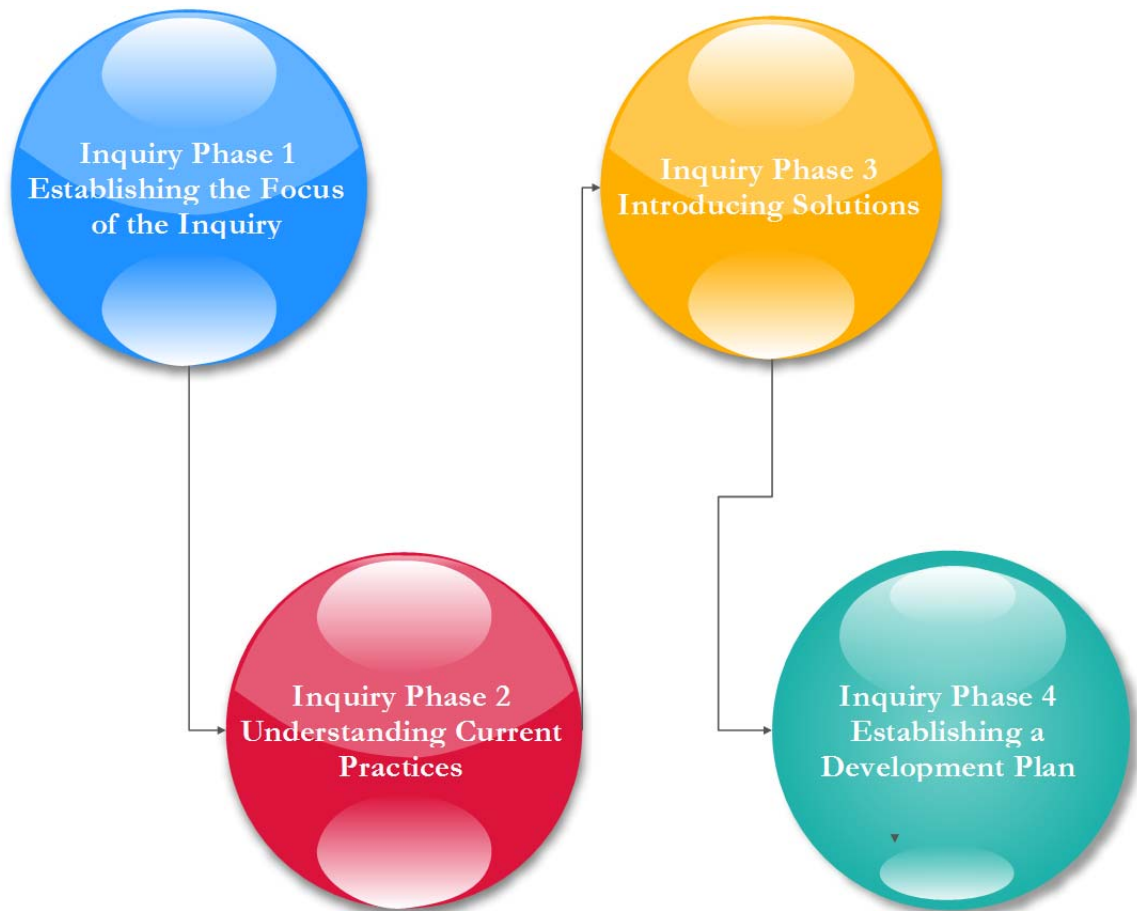
1. The learning journey started by considering ontological form and where current space planning practice fits in with established paradigms.
2. Reflections conclude with the adoption of a participatory paradigm for the research.
3. Reflections on the type of inquiry concluding that the research is primarily a qualitative assessment with elements of supporting quantitative research.
4. A case study approach adopted following reflection on descriptions of typical methodological approaches.
5. The merit of using a space evaluation framework was debated as the data collection tool.
6. Forms of qualitative inquiry considered with the learning that Action Research would be the most appropriate research methodology.
7. Frameworks considered that help develop stages within Action Research, specifically introducing co-operative inquiry.
8. Frameworks considered that helped the researcher plan how to conduct the interaction.
9. Frameworks used to understand how to manage the political context within the organisation.
10. Frameworks used to help the researcher consider how best to manage ethical considerations through the research.

Chapter 4 Methods

4.1 Co-operative Inquiry Cycles

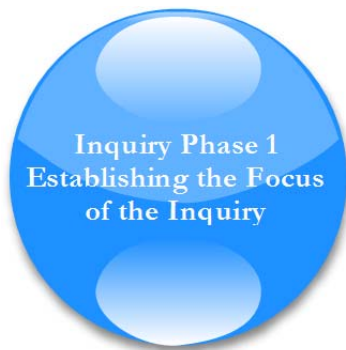
The framework described within Heron and Reasons (2006) co-operative inquiry provided an approach that satisfied the short comings identified within the earlier methodologies considered. To take this framework and to use it within the context of this research, the actual research methodology undertaken introduced a series of inquiry ‘cycles’. Each cycle had four distinct phases as described.

Figure 17, Co-operative Inquiry Phases



The methodology adopted saw the formation of a small inquiry group consisting of co-researchers who were lecturing staff from the Landscape Architecture department and support staff from the Estates department. The Landscape Architecture team were responsible for teaching and learning across different room forms within one of the university faculties based at Francis Close Hall. Through the course of the research the research group was extended to include students. This variation occurred at the end of phase 2 and is documented in the next chapter as a record of the actual research done. The consequences of this are also reflected upon within the latter analysis, chapter 6. The following figure presents the phases of the inquiry.

4.2.1 Co-operative Inquiry Cycles Phase 1



Ahead of forming the research group, work was completed to ensure that the research proposed was agreed by the management team. Support for this potential experimentation would need to be gained from the university executive so that changes to rooms and learning resources and capital investment were supported.

This is important as the research changed the existing ‘organisational rules’ and consent therefore needed to be established to enable this experimentation. The formation of a management group named as the Space Management Working Group was the mechanism for setting out the approval process for the agreement of the objectives and methodology proposed for the research. Terms of reference were presented and discussed to ensure that the management team were comfortable with the parameters of the investigation. This process and approach is described in detail in the opening section of the next chapter which documents the research in the form of the case study.

In phase 1 the group described above, now referred to as ‘co-researchers’ came together to explore the topic of space management within the working environment. The individuals were volunteers who wished to see improvement within their faculty and who were seen to express a desire to explore new ways of using the resources available. The initial objective was

to agree on the focus of the inquiry and then develop together a set of questions or propositions that would form the focus of the inquiry. Following this the group was prompted to plan a method for exploring this topic in action, relying on their practical experience to lead the train of thought. Finally in this initial phase the group agreed how this data would be recorded. The record sheets described through this chapter were designed as a consequence of the learning from the literature review and were introduced as pro forma record sheets. The record sheets helped note and record the interactions associated with the learning environment that either complemented or distracted teaching. In designing the approach it was noted that it could be tempting to lead the discussion within this initial phase by introducing all the quantitative, historical data which sets out how many rooms the faculty occupied and the average utilisation. In effect a summary of all the resources currently available to the faculty. This would have been a mistake and would have been attempting to push the discussion in a particular direction. The intention was to observe and facilitate but not lead the discussion in a particular direction.

The draft space planning tool (figure 14) was useful but it was used primarily as a research data gathering tool and a prompt for when guidance was sought on a particular point of detail. The framework was occasionally used as a point of reference in accordance with the earlier methodology, but not used to dictate a precedence that would have been perceived as a 'suggestive action.' Co-researchers could have considered that the methodology was potentially 'leading' the discussion in a predetermined way if it had been used on that basis.

The space tool was used therefore primarily as a recording document. It was used to record all of the rich descriptors exchanged through the various inquiry cycles and was not used through the inquiry cycle by co-researchers. The design of the framework now included the four key features as described by Shani and Pasmore (1985) of context, inquiry mechanism, inquiry cycle and outcomes. The first and second phases of the methodology helped the space planner draw out the focus of the inquiry and establish the current practice. The third phase is the true inquiry mechanism where the co-operative exchange debates and tests how improvements were identified, tested and developed. The final fourth phase drew ideas

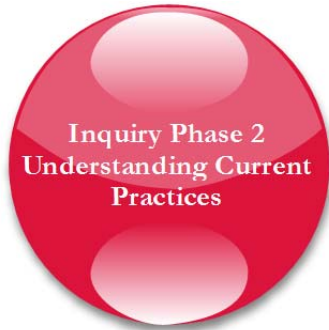
together into an outcome. It should be noted that the phases presented here capture and group the key processes through the stages of research. The actual research undertaken and described in the next chapter documents many meetings and exchanges that happened through each distinct phase of inquiry.

The following figure introduces the first stage data gathering pro forma that was developed from the JISC (2009) space planning tool. The key concern here was to establish the focus of the inquiry with the co-researchers.

Figure 18, Space Planning Tool, Inquiry Cycle 1: Focus of Inquiry

Estates Department Space Planning Framework	
Inquiry Cycle 1: Focus of Inquiry	
Faculty	Specifies the university faculty
Department	Describes which department
Context	
Purpose	Describes the purpose of the co-operative inquiry
Users	Establishes the interested stakeholders
Policy Makers	Describes the key policy makers
Policies	Describes current policies, enablers and restrictors

4.2.2 Co-operative Inquiry Cycles Phase 2



In this second phase the co-researchers now also became the co-subjects and engaged in discussions prompted by the second stage pro forma as set out below. Initially the individuals were just thinking about the learning interactions within their working and learning environment and from that identified themes that detailed how the resources complemented or frustrated the learning activity.

The researchers simply observed and reflected on the impact the learning environment had on the student experience whilst they went about their business of facilitating the learning interactions. Of particular interest were the reflections that identified how practice did or did not conform to the current ‘rules of the organization’. The space planning tool was adjusted from the earlier version to provide a record framework as per figure 19 below. Again the pro forma was intended not to be shared with the co-researchers but was used as a prompt for the space planner to guide discussions to seek an understanding of current practice.

Figure 19, Space Planning Tool, Inquiry Cycle 2: Current Practice

Estates Department Space Planning Framework		
Inquiry Cycle 2: Current Practice		
Activities		
Interactions	Describes the interactions actually happening	
Design Gestures	Links between built environment and pedagogy	
Process	Scripted: An indication of the formality of the processes which occur within the space	Open:
Practice	Seeks to identify how the space has been used, conceptualized and re-purposed in practice	
Occupancy	Frequency of Use	Occupancy Use

Academic Contract	Notions of cultural acceptability within the space, disciplinary rules, pedagogical signatures.	
Effectiveness	Describes student participation	
Learning Styles	Describes learning styles observed	
Designs, Taxonomic		
Entrances	Provides descriptors of how the space is actually used	
Teaching Spaces		
Learning Centres		
Use	Open: Describes if use is enforced through policy or mediated informally through teaching and learning practice	Closed
Technology		
Mobile	Describes the technologies deployed in the space	
Connected		
Visual		
Supportive		
Specialist		
Surfaces		
Reconfigurable	Describes the furniture and physical components other than technology that support the function of the space	
Fixed		
Learner created		
Infrastructural	Describes the aspects of the space that influence the environment, e.g. air conditioning	
Timescale	Describes the timeframe of the resourcing consideration	

4.2.3 Co-operative Inquiry Cycles Phase 3



The third phase was the opportunity where creativity and experimentation was anticipated and received. The co-researchers came together within the learning set and through the use of the stage 3 pro forma were encouraged to suggest or even change the factors they had observed. This phase generated the ideas that would create the proposed changes that are documented in the final fourth phase.

Individuals were encouraged to challenge organizational ‘rules of working’ and to use space in the ways they wanted to use it rather than how they were bound. The scale of the research was initially planned to be contained to four individuals within the Estates and Landscape Architecture team however this was extended by agreement as described in the next chapter when the actual research was undertaken. In designing this approach many interesting ideas were generated by the co-researchers which included cross university implications associated with challenging existing rules associated with space use. This is set out in the detail of the following case study.

From a practical point of view it was anticipated that this could disrupt matters in terms of current rooming and resourcing arrangements so the scale of the research was contained to ensure the level of disruption was managed. The facilitation skills required by the space planner demanded flexibility so that potential new experiences associated with changing ‘the mix’ (Anderson 2003) of learning resources could be practised.

Figure 20, Space Planning Tool, Inquiry Cycle 3: Introducing Solutions

Estates Department Space Planning Framework		
Inquiry Cycle 3: Introducing Solutions		
Activities		
Interactions	Describes the interactions that could happen	
Design Gestures	Links between built environment and pedagogy and how this could improve	
Process	Scripted: An indication of the formality of the processes which are intended to occur within the space	Open:
Practice	Seeks to identify how the space could be used, conceptualized and re-purposed in practice	
Occupancy	Frequency of Use, potential targets	Occupancy Use
Academic Contract	Notions of cultural acceptability within the space, disciplinary rules, pedagogical signatures.	Potential changes required
Effectiveness	Describes aspirations for student participation	
Learning Styles	Describes new emphasis for learning styles	
Designs, Taxonomic		
Entrances	Provides descriptors of how the space is required to be used	
Teaching Spaces		
Learning Centres		
Use	Open: Describes how we want to use the space either enforced	Closed

	through policy or mediated informally through teaching and learning practice	
Technology		
Mobile	Describes the technologies required to be deployed in the space	
Connected		
Visual		
Supportive		
Specialist		
Surfaces		
Reconfigurable	Describes the furniture and physical components required in the new space other than technology that support the function of the space	
Fixed		
Learner created		
Infrastructural	Describes the aspects of the space required to influence the environment, e.g. air conditioning	
Timescale	Describes the timeframe of the resourcing consideration	

4.2.4 Co-operative Inquiry Cycles Phase 4



The fourth phase of the inquiry cycle brought the individuals back together as a learning set to share presentational and propositional forms and as Shani & Pasmore's (1985) framework provided the process of drawing 'outcomes' together. The learning set was encouraged to reflect on the practical and experimental interactions gleaned through the previous three stages.

The group posed new questions that extended & modified the direction of the original inquiry by introducing external spaces into the discussion and seeking the support from students. The group concluded the current exploration based on the objectives described within stage 1 ‘focus of the inquiry’ having been met. The process of the repeating cycles through the phases helped question the validity of the research data identified. The verbal interactions described by the co-researchers were again recorded on the space planning framework. The following figure sets out the pro forma used through the research to prompt discussion and record the meeting exchange.

Figure 21, Space Planning Tool, Inquiry Cycle 4: Development Plan

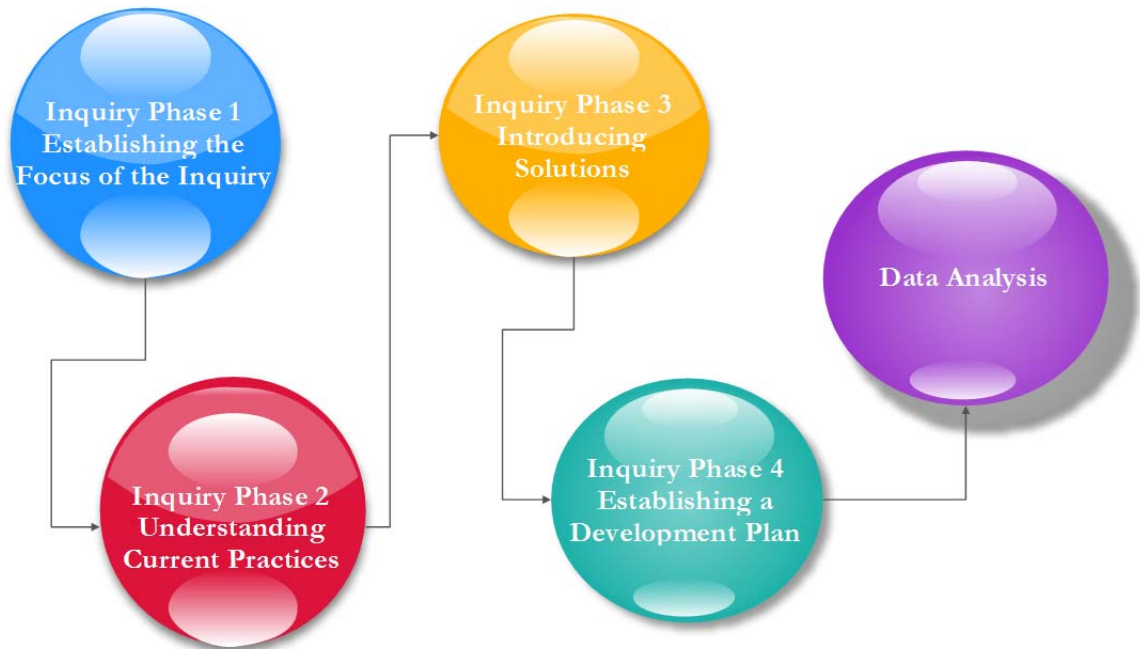
Estates Department Space Planning Framework		
Inquiry Cycle 4: Development Plan		
Activities		
Interactions	Describes the interactions that are planned	
Design Gestures	Links between built environment and pedagogy and how this is planned to improve	
Process	Scripted: An indication of the formality of the processes which are planned to occur within the space	Open:
Practice	Seeks to identify how the space will be used, conceptualized and re-purposed in practice	
Occupancy	Frequency of Use, stated targets	Occupancy Use
Academic Contract	Notions of cultural acceptability within the space, disciplinary rules, pedagogical signatures.	Potential changes required

Effectiveness	Describes aspirations for student participation	
Learning Styles	Describes new emphasis for learning styles	
Designs, Taxonomic		
Entrances	Provides descriptors of how the space is required to be used	
Teaching Spaces		
Learning Centres		
Use	Open: Describes how we will use the space either enforced through policy or mediated informally through teaching and learning practice	Closed
Technology		
Mobile	Describes the technologies planned to be deployed in the space, setting out investment plans anticipated.	
Connected		
Visual		
Supportive		
Specialist		
Surfaces		
Reconfigurable	Describes the furniture and physical components required in the new space other than technology that support the function of the space. Describes costed plans to support the plan.	
Fixed		
Learner created		
Infrastructural	Describes the aspects of the space required to influence the environment, e.g. air conditioning	
Timescale	Describes the timeframe of the resourcing consideration	

4.3.1 Data Analysis

The intention of the research was to satisfy the central research question posed within the introduction. To evaluate whether a more informed, inclusive and progressive discussion between space users and planners can provide a more effective space planning procedure for all. At the end of the inquiry cycles the co-researchers provided a significant number of rich descriptions of interaction describing how the use of rooms and resources complemented or frustrated the learning interactions the individuals were concerned with. Transcripts in the form of the space planning tool were produced to record the reflections and resultant actions. The final phase saw the production of a development or resourcing plan for the faculty as the concluding output for the co-operative inquiry. Data analysis takes place in two stages. Initially it takes place within the case study as part of phase 4 with a resultant plan being developed. Data analysis also takes place outside of the case study in chapter 6. The analysis here places a focus on *the process adopted* within the case study rather than the detail of the case study itself. The analysis in chapter 6 is represented by the purple figure as described within figure 22 below.

Figure 22 Data Analysis within the Case Study



The data analysis section was presented in the form of a development plan that adopted the learning of the co-operative inquiry and brought together the ideas, plans and descriptions of resources required and set the proposals out into a structured planning document. The term development plan is currently used within the department to describe an investment and planning document so this term was used to maintain synergies with current departmental procedures.

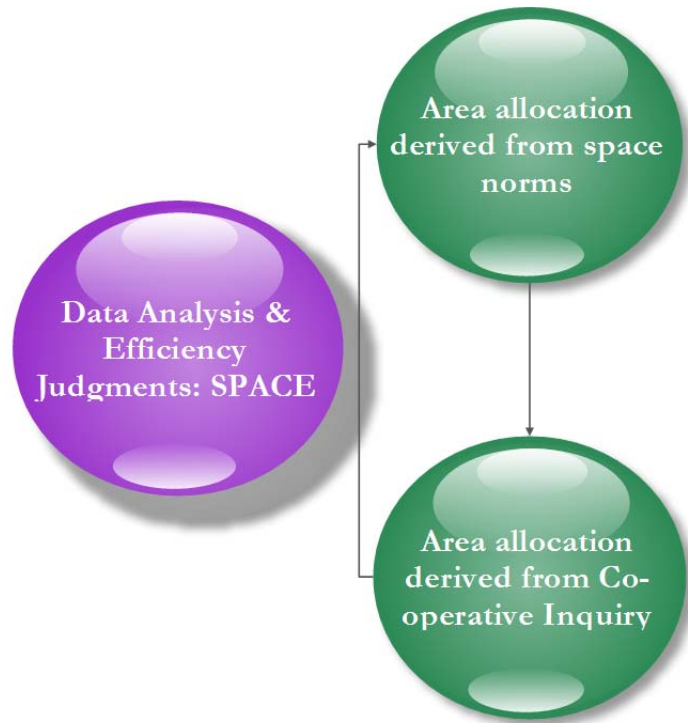
The resourcing plan described and allocated a suite of rooms and proposed how the changes identified would be funded across a phased plan for the benefit of the faculty. The significant changes associated with the major refurbishment of facilities proposed within the case study draws directly into the existing academic planning process described within the Universities Estates Strategy. Through the early stages of preparing the method of research it was thought that the resultant development plan would be documented within the space pro forma. In reality the pro forma provided a useful data capture tool through the phases but was too limiting to be used as the framework for the final resultant plan. The development plan includes cost plans, drawings and programmes that from a presentational perspective do not work effectively within a tabled structure that is the pro forma.

4.3.2 Validation

The development plan presented used two forms of validation to benchmark the benefit of the research. The first judgment was made on the basis of space allocation measured against the number of staff and students multiplied by established space norms. The second judgment was made on the basis of expert feedback on the benefits of the process.

The suite of rooms proposed within the development plan were recorded on a space needs framework (figure 3) which as a reminder is the current space planning record sheet that assesses efficiency based solely on area and space norms achieved. A comparison was made between the faculty's current space target established as a consequence of this research and the space needs framework that estimates space based on a simplistic space norm. Space efficiency was tracked by comparing the two area outputs as set out in Figure 23 below.

Figure 23 Validation

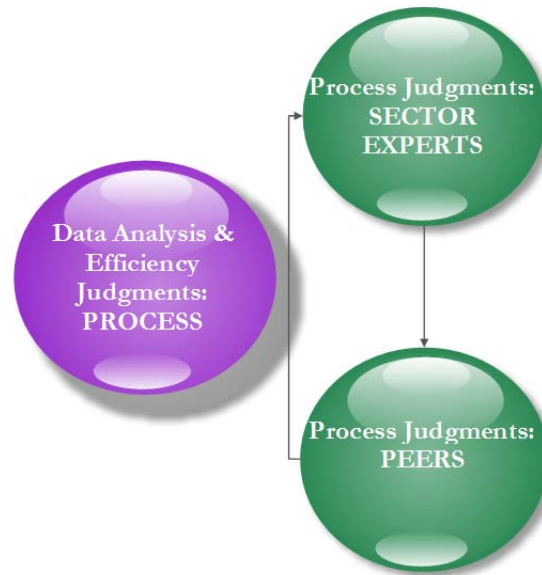


The development plan however described a much wider set of improvements and benefits as set out in chapter six. The analysis was therefore not bounded by determining whether the research was successful based on whether the area finally allocated exceeded or reduced the amount of space the department finally received. The analysis reflects on the improvements noted by the co-researchers through the operation of the new facility which in due course will impact on the quality of the student experience.

4.3.3 Validation: Process

The second method of validation is therefore described in figure 24 below. At the end of the co-operative inquiry the research methodology was presented to sector experts, specifically Sian Kilner, Kilner Planning and Matt Fulford, Head of Space & Asset Management at the University of Bristol. (Kilner Planning contributed to the work of the UK Higher Education Space Management Group and the ten subsequent publications developed to guide the sector.)

Figure 24 Validation: Process



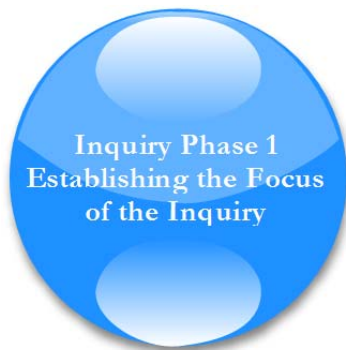
In addition, three managers with space management responsibilities within the university estates department were interviewed to receive feedback on the process adopted. The sessions consisted of an initial presentation of the research, describing the objectives and the methodology adopted. The results were discussed and feedback documented in respect to the viability of the process for onward use. In terms of the benefit to the Higher Education sector, it is intended that this method of co-operative inquiry should be adopted as the variant space planning tool that provides space planners with specific guidance about how to approach capturing a far wider data set. The next chapter documents the research undertaken using the method described.

4.4 Learning Reflections: Methods

Four distinct phases of co-operative inquiry

1. Phase 1 places focus on the nature and scale of the inquiry.
2. Phase 2 draws out a detailed understanding of current practice.
3. Phase 3 encourages the inquiry group to develop ideas and solutions.
4. Phase 4 channels the group to form development plans.

Chapter 5 Action Research

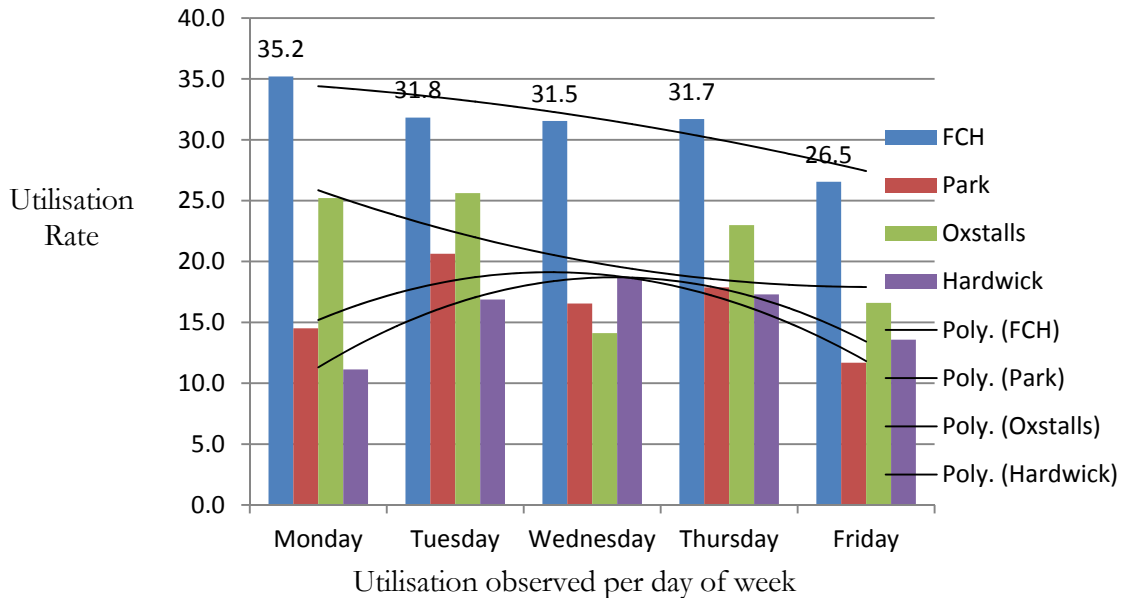


5.1 A Case Study at Francis Close Hall

The University estate comprises of 88 buildings split predominately across Cheltenham, with one campus located in Gloucester. The University Estates Department undertakes annual space utilisation surveys across each campus to understand the pattern of demand which in turn helps with strategic planning and resource allocation discussions.

The Estates Strategy has set out an aggressive plan that reduces space overall as a mechanism to achieve an affordable estate. Through 2010 / 2011 this strategy has been delivered by pursuing a plan that reduces accommodation in Cheltenham. Specifically the plan now delivered described the closure of the Pittville campus and the consequential relocation of the faculty to the Park, Francis Close Hall and Hardwick sites. The annual space survey conducted through the autumn of 2011 provided the university with a snap shot of the consequences of the closure of the Pittville site. The survey identified to the management team that the Park Campus utilisation had increased to levels anticipated through the capacity planning exercise. On a similar basis activity at Hardwick and Oxstalls was generally in line with the anticipated utilisation levels predicted. The anomaly identified was associated with the activity observed at the Francis Close Hall site. Utilisation levels were recorded above the predicted level and feedback from staff and students also illustrated that the competition for space had escalated to a point of concern. The following diagram is an extract from a report produced by the researcher, developed for the management team to understand the results of the latest space utilisation survey. The chart presented in figure 25, sets out the intensity of use of space across each of the four campus sites.

Figure 25, Space Utilisation Survey Results October 2011



The poly lines presented set out the space utilisation trends across a typical week. The survey identifies a much higher utilisation at the Francis Close Hall site (FCH). This visual representation of the site survey represents why the management team were interested in developing a solution on this site. Whilst the diagram presents high utilisation at FCH, the management team were concerned about the consequences of this. Competition for space had been raised through a number of channels including the annual business planning cycle.

To improve space efficiency, specifically at Francis Close Hall, a corresponding objective was established within the current Estates departmental business plan. This real business need provided the opportunity and stimulus to develop the research and was the reason the enquiry was proposed for the Francis Close Hall site in Cheltenham. This case study records the work undertaken in one of the many departments that are located on this campus. To effect the improvement across the whole campus this methodology is proposed to be adopted for the all the departments based at FCH. This work however encompasses discussions held within one faculty, the faculty of Media, Art and Design, specifically one department within the faculty, Landscape Architecture.

5.2.1 Research Approval and Ethical Considerations¹⁵

To establish a co-operative inquiry group it was recognized that the contribution from the co-researchers was to be entirely voluntary. This in itself presented a risk as personal circumstances change and this could have had a direct impact on the completion of a particular piece of research. This did not present itself as an issue through this particular piece of work. Contributing to a future inquiry group could be a relatively quick and simple task or it could end up requiring a substantial time contribution.

Bearing in mind the earlier advice from Rowan (2000) associated with power relationships and ethical considerations, some initial planning work was developed to ensure that the direction of the research was agreed by the university middle and senior management team. The principles of the research were set out in a paper to the University Executive Group. This group is the established senior team working with the Vice Chancellor (CEO) and for a significant project that would have an impact in respect to resources (both human and physical) across the institution, approval at this level was required. The paper to the group set out the need for such an initiative at Francis Close Hall, as a consequence of the statistical analysis of utilisation presented in the previous figure. To address this need the paper proposed the formation of a Space Management Working Group (SMWG). The mode of operation was supported through the approval of a set of principle objectives and terms of reference. The objectives of the group and terms of reference are presented in figure 26 below.

Figure 26, Space Management Working Group (SMWG) Terms of Reference

5.2.2 Objectives

- To be responsible for the effective allocation of all university space.
- To improve space utilisation to at least sector average through:

¹⁵ Stage 9 of the research methodology associated with managing the politically context within the university.

-Introducing management reporting procedures to explain current and proposed targets.

-Identifying opportunities to balance teaching across a standard and extended working week.

-Identifying opportunities to increase the average class size.

- Identifying opportunities to improve the 'fit' between group / room size.
- Reviewing and optimising the allocation of space between functional uses, i.e. allocation of space between staff, academic and circulation use.
- Establishing a clear management policy for determining occupancy levels for academic and administrative activities.
- Reviewing timetabling policy and procedures and recommending improvements.
- To be responsible for the prioritisation and development of space planning to support faculty and strategic resource plans.

Composition and Reporting Arrangements

- Director of Estates (the author of this research), Campus representatives (campus manager and heads of department as required, timetabling team).
- Meetings monthly or as required.
- Quarterly progress reporting to the Estates Working Group.

Responsibilities

- Managing Staffing Space
- To accept requests from the University Management Group (UMG) for all staffing accommodation changes.
- To review faculty and departmental annual development plans to identify future staffing space requirements.
- To review cross campus rooming opportunities, identify, select, communicate and implement appropriate move plans.
- To record all associated move costs against capital expenditure plans.
- Review and publish space norms as part of a space management policy for full time and fractional academic / support staff.

- Advise UMG in respect to office and departmental planning.

Managing Academic Space

- Lead on the co-ordination of the university annual space utilisation survey, setting survey schedules, identifying student or staff surveyors, establishing a surveying brief and drawing survey data together for analysis.
- Preparation and circulation of the annual space utilisation report.
- Review room use frequency rates and identify to campus Dean's usage trends and opportunities to change timetabling to increase room frequency use.
- Review room occupancies and identify to campus Dean's occupancy trends and opportunities to change timetabling to increase the matching of group size to room size.
- Review room functional use and publish a space management policy and procedure reflecting on space norms and occupancy levels for all teaching spaces.
- Establish specific, measurable and realistic campus based utilisation targets with campus Deans. Review progress and through SMWG group work improve utilisation rate to at least achieve sector average (27%) utilisation by November survey 2012.
- Review circulation space cross campus and identify opportunities to change the use of redundant space to useable accommodation. Link opportunities to the annual capital planning process.
- Establish an overall estates area target based on the academic plan.
- Review Estates Management Statistical (EMS) returns prior to submission to HEFCE.
- Review timetabling software packages adopted and timetabling procedures. Identify opportunities to improve reporting and utilisation.

Supporting Academic Planning

- Review annual faculty plans to identify the changing pattern of demand for specialist learning resources.
- Identify space solutions for new course provision.

- Prepare a ‘zoned space plan ‘setting out accommodation provision for each school / department and update annually.
- Link new course space plans to annual capital planning cycle and oversee the implementation of estates projects.

5.2.2 Research Approval

The Executive Group approved the formation of the group to deliver the plan which established as objective 1 the requirement for the group to be responsible for the effective allocation of space. Invitations were sent to invite the heads of department to the meeting. Representatives from Education and Media, Art & Design were in attendance along with the campus manager. The heads represented the faculties and professional departments who either reside at Francis Close Hall or who have an interest in the teaching and learning that takes place at the campus. The group convened for the first time in November 2011 with the first meeting focusing on the space issues currently causing concern at the campus and the terms of reference proposed. The formation of the SMWG was a pivotal development for the research as it provided the framework that formally recognized the work of the project. The group acknowledged that space utilisation was a problem across this particular campus and through this mandate became empowered to investigate and take action to change the current practice.

Subsequent meetings of the group introduced the current methodology associated with managing space and time was spent reviewing the current space needs framework for various departments across Francis Close Hall as previously set out within Figure 2. To introduce the proposed research, the context was explained using much of the current data introduced through literature review set out in chapter 2. The discussions were developed by explaining the context associated with the sectors’ desire to improve space use. The focus of the group was sharpened by reflecting on our current financial predicament associated with the new funding methodology now presented to Universities which demands the efficient running of space. The group noted HEFCE’s (2006) concern about the lack of improvement across the last decade. With the context established the new methodology was presented to the group. The principles of the new methodology were described, setting out what happens through the

various stages of the inquiry. The SMWG were asked to reflect on the proposed new methodology and identify volunteers to work within a first pilot. The SMWG was established with a mandate from the Executive Group to work to improve utilisation at Francis Close Hall. The group consisted of the heads of all departments and therefore provided the supporting structure for the proposed research to progress.

5.2.3 Research within a University Faculty¹⁶

Through the work of the Space Management Working Group the Deputy Dean for the Faculty of Media, Arts and Technology introduced the Landscape Architecture department as an area that had many space related problems. The department runs an initial honours degree in Landscape Architecture with the option to progress through the 4th year to a Masters or Post graduate Diploma. The course leader was keen to engage in the work due to high utilisation of space within the department, poor facilities but also due to the relevance of the research to the department. Spatial planning forms elements of the current course and so this research was of particular interest to the Landscape Architecture department. The department consisted of 5 student cohorts. The 11/12 student intake recorded that there were 28 students on the conversion course, 37 students studying the diploma, 23 1st year undergraduate students, 17 second year students and 24 final year students. The department had 129 students in total. The following table was extracted from the university timetable to provide context associated with how the department operated within its allocated accommodation. The timetable identified that the department operated primarily from the Clegg building at Francis Close Hall and from across 3 base rooms. In addition students accessed the library main facility, the ICT laboratory and room TC114. Subjects consisted of drawing that required access to Apple Mac computers within a workshop environment and a number of subjects as listed that were delivered from lecture rooms.

¹⁶ Preparatory works ahead of stage 1 that set the focus of the inquiry.

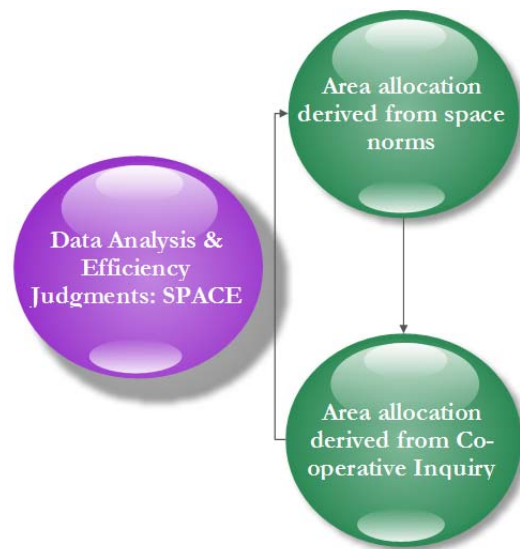
Figure 27, Timetable Landscape Architecture

Module Code	Module Name	Event	Day	Week(s)	Start	Finish	Room(s)	Module Capacity
AD4007 /A11 wks. 7-12	Drawing	Workshop	Mon	7-12.	9:15	12:15	FC CL253	25
AD4601 /A22	Professional Practice: Digital Communications 1	Lecture		17-26, 30-31				25
AD4601 /B22	Professional Practice: Digital Communications 1	Lecture		17-26, 30-31				25
AD4602 /A11	Cultural Context: Appraising Landscapes	Lecture	Thu	1-12.	9:15	12:15	FC CL253	40
AD4603 /A22	Cultural Context: Historic & Contemporary Landscapes	Lecture	Thu	17-26, 30-31	9:15	12:15	FC CL253	40
AD4604 /A12	Sustainable Technology 1	Lecture	Thu	1-12, 17-26, 30-31	13:15	16:15	FC CL253	40
AD4605 /A12	Design Projects 1	Lecture	Mon	1-12, 17-26, 30-31	13:15	16:15	FC CL253	40
LAA201 /A22	Urban Landscape Design	Lecture	Tue	17-26, 30-31	9:15	12:15	FC CL253	35
LAA202 /A11	Landscape Planning	Lecture	Tue	1-12.	9:15	12:15	FC CL253	35
LAA203 /A12	Sustainable Technology 2	Lecture	Tue	1-12, 17-26, 30-31	13:15	16:15	FC CL253	35
LAA204 /A12	Design Studio 2	Lecture	Friday	1-12, 17-26, 30-31	9:15	12:15	FC CL132	20
LAA205 /A22	Design in the Community	Lecture	Friday	17-26, 30-31	13:15	16:15	FC CL132	20
LAA206 /A11	Field Week	Lecture	Friday	1-4, 6-12	13:15	16:15	FC CL132	20
LAA301 /A12	Professional Landscape Practice	Lecture	Tue	1-12, 17-26, 30-31	9:15	12:15	FC HC105	20
LAA302 /A12	Theory & Philosophy of Landscape	Lecture	Mon	1-12, 17-26, 30-31	13:15	16:15	FC CL132	20
LAA303 /A12	Sustainable Technology 3	Lecture	Mon	1-12, 17-26, 30-31	9:15	12:15	FC CL132	20

Module Code	Module Name	Event	Day	Week(s)	Start	Finish	Room(s)	Module Capacity
LAA304/A12	Dissertation	Independent Study	Friday	1-12, 17-26, 30-31	21:15	21:30	FC No room required	35
LC401/A12	Professional Practice for Landscape Architects	Lecture	Wed	1-12, 17-26, 30-31	13:15	16:15	FC CL132	25
LC403/A12	Place & Meaning	Lecture	Tue	1-12, 17-26, 30-31	13:15	16:15	FC CL132	25
LC422/A12	Landscape Design Studio	Lecture	Tue	1-12, 17-26, 30-31	9:15	12:15	FC CL132	25
LC423/A12	Landscape Planning Studio	Lecture	Wed	1-12, 17-26, 30-31	9:15	12:15	FC CL132	25

5.2.4 Space Assessment Using Current Methodology

To place context on the volume of space the department was accessing, the space needs framework currently adopted across the sector was used. The assessment determined how much space the department should occupy using a space norm calculation.



The timetable information noted above was noted so as to identify the various groups and the contact times scheduled. The course provision was based on 12 hours per week contact time. The following spreadsheets present the space assessment estimated for the conversion course, the 1st year, 2nd and final year programmes.

Figure 28, Space Need Framework: Conversion Course

	Student numbers	Average no. of events per week	Student hours per week	Core timetabled week	Minimum no. of workplaces at 100% utilisation (planned size)	Target frequency of use %	Target occupancy of space %	Target utilisation rate %	No. of workplaces at scheduled utilisation rate (planned numbers)	Projected area per workplace m2	Area predicted m2
Defaults				40		0.8	0.7				
Teaching & learning UG and PGT centrally timetabled space											
Lecture											
Seminar											
Tutorial	28	1	28	40	0.7	0.7	0.7	0.49	1.43	2.25	3.21
Workshop	28	12	336	40	8.4	0.7	0.7	0.49	17.14	4.00	68.57
Studio											
Computer lab											
Lab											
Private Study	28	27	756	40	18	0.7	0.7	0.49	38.57	3.00	115.71
Subtotal	28	40	1,120								187.50

Figure 29, Space Need Framework: Diploma Course

	Student numbers	Average no. of events per week	Student hours per week	Core timetable d week	Minimum no. of workplaces at 100% utilisation (planned size)	Target frequency of use %	Target occupancy of space %	Target utilisation rate %	No. of workplaces at scheduled utilisation rate (planned numbers)	Projected area per workplace m2	Ancillary allowance if needed	Area predicted m2
Defaults				40		0.8	0.7					
Teaching & learning UG and PGT centrally timetabled space												
Lecture												
Seminar												
Tutorial	37	1	37	40	0.93	0.70	0.70	0.49	1.89	2.25		4.25
Workshop	37	12	444	40	11.10	0.70	0.70	0.49	22.65	4.00		90.61
Studio												
Computer lab												
Lab												
Private Study	37	27	999	40	24.98	0.70	0.70	0.49	50.97	3.00		152.91
Subtotal		40	1,480									247.77

Figure 30, Space Needs Framework, 1st Year Course

	Student numbers	Average no. of events per week	Student hours per week	Core timetabled week	Minimum no. of workplaces at 100% utilisation (planned size)	Target frequency of use %	Target occupancy of space %	Target utilisation rate %	No. of workplaces at scheduled utilisation rate (planned numbers)	Projected area per workplace m2	Area predicted m2
Defaults				40		0.8	0.7				
Teaching & learning UG and PGT centrally timetabled space											
Lecture											
Seminar											
Tutorial	23	1	23	40.00	0.58	0.70	0.70	0.49	1.17	2.25	2.64
Workshop	23	12	276	40.00	6.90	0.70	0.70	0.49	14.08	4.00	56.33
Studio											
Computer lab											
Lab											
Private Study	23	27	621	40.00	15.53	0.70	0.70	0.49	31.68	3.00	95.05
Subtotal	23	40	920								154.02

Figure 31, Space Needs Framework, 2nd Year Course

	Student numbers	Average no. of events per week	Student hours per week	Core timetabled week	Minimum no. of workplaces at 100% utilisation (planned size)	Target frequency of use %	Target occupancy of space %	Target utilisation rate %	No. of workplaces at scheduled utilisation rate (planned numbers)	Projected area per workplace m2	Area predicted m2
Defaults				40		0.8	0.7				
Teaching & learning UG and PGT centrally timetabled space											
Lecture											
Seminar											
Tutorial	17	1	17	40	0.43	0.70	0.70	0.49	0.87	2.25	1.95
Workshop	17	12	204	40	5.10	0.70	0.70	0.49	10.41	4.00	41.63
Studio											
Computer lab											
Lab											
Private Study	17	27	459	40	11.48	0.70	0.70	0.49	23.42	3.00	70.26
Subtotal	17	40	680								113.84

Figure 32, Space Needs Framework, Final Year

	Student numbers	Average no. of events per week	Student hours per week	Core timetabled week	Minimum no. of workplaces at 100% utilisation (planned size)	Target frequency of use %	Target occupancy of space %	Target utilisation rate %	No. of workplaces at scheduled utilisation rate (planned numbers)	Projected area per workplace m2	Area predicted m2
Defaults				40		0.8	0.7				
Teaching & learning UG and PGT centrally timetabled space											
Lecture											
Seminar											
Tutorial	24	2	48	40	1.20	0.70	0.70	0.49	2.45	2.25	5.51
Workshop	24	12	288	40	7.20	0.70	0.70	0.49	14.69	4.00	58.78
Studio											
Computer lab											
Lab											
Private Study	24	26	624	40	15.60	0.70	0.70	0.49	31.84	3.00	95.51
Subtotal	24	40	960								159.80

5.2.5 Space Demand Estimated

Figures 28 to 32 present the estimated space demand using the current space planning tool. The frameworks identify core contact time, tutorial and private study times and in total identify a space need of some 615m²

Conversion course	187m ²
Diploma	247m ²
1 st year	154m ²
2 nd year	114m ²
Final year	160m ²
Subtotal	862m²

In addition to the core space the current space planning tool suggests support space is calculated by allocating a space norm per student FTE. The space norms proposed in the guidance note are set out as follows.

Figure 33, Space Assessment Models and User Guide (2010), Table 6

Support space category	EMS 2009 data		
	25%	50%	75%
Total support space per student FTE (NIA m2)	1.6	2.2	3.0
Library/learning centre space per student FTE (NIA m2)	0.5	0.7	0.9
Catering space per student FTE (NIA m2)	0.2	0.3	0.4
Non-academic support office space per student FTE (NIAm2)	0.4	0.7	0.9
Balance of support space per student FTE (NIA m2)	0.4	0.5	0.8

For the purposes of the assessment the upper 75% quartile was used to calculate support space. This decision was made based on the nature of the drawing activities observed and the

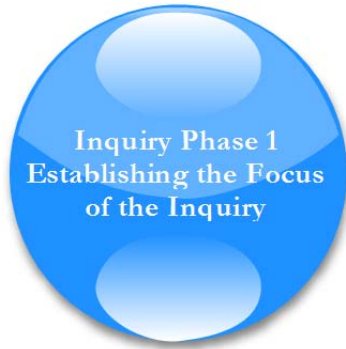
large quantity of equipment used by the students. The assessment includes an area allocation for the library space but does not factor wider space need associated with catering and general circulation space.

The area allocated for library accommodation based on the student FTE is therefore assessed as follows.

Figure 34, Total Area Estimated Using a Space Needs Framework

Course	FTE's	Teaching m²	Library (0.9m²/ FTE)	Total m²
Conversion Course	28	187	25	212
Diploma	37	247	33	280
1 st Year	23	154	21	175
2 nd Year	17	114	15	129
Final Year	24	160	22	182
Total Area Allocation				978m²

5.3 Co-operative Inquiry Cycle Phase 1: Focus of Inquiry



An initial meeting was scheduled on the 1st December 2011. The meeting lasted for approximately two and a half hours and provided the opportunity to share thoughts about the focus of the work and the formation of the inquiry group. The idea of forming an inquiry group with repeat cycles was introduced and a general timeframe agreed. Initial ideas were exchanged concerning what aspects would feature within the inquiry.

The group initially consisted of five members details of which are recorded within the space planning framework. The ideas were noted and also subsequently recorded on the following planning framework, figure 35. The meeting concluded with a tour of the spaces in question. The group agreed to meet again as an inquiry group later that month. Record photographs were taken and presented as part of inquiry cycle 2 to introduce the spaces occupied by the Landscape Architecture department.

The group spent an hour or so discussing the purpose, who would be involved and the onward procedure but were keen to view the spaces and get into cycle 2 discussions about current practice. Clearly I had called the meeting and as a consequence, tended to lead the discussion in terms of establishing an understanding of the process. The pace of discussion moved quickly to sharing current practice and describing what the issues were. This was prompted by the Landscape Architecture team members. The discussion was tentative and defensive when the discussion moved to the number of rooms and the amount of space the department had. There was clearly a cynicism associated with the output of the process at this introductory stage. Notes of the meeting were taken and recorded on the space planning framework. The subject group leader received and reviewed the notes. The cynicism was clear in his email acknowledgement received on the 6th December 2011 saying ‘the document makes interesting reading. Not sure whether it makes us look inefficient in space use?’

Figure 35, Landscape Architecture: Inquiry Cycle 1: Focus of Inquiry

The following figure demonstrates the planning framework used for the first cycle of research. The figure captures the initial core data to describe the key stakeholders and fundamental purpose of the enquiry.

Estates Department Space Planning Framework	
Inquiry Cycle 1: Focus of Inquiry	
Faculty	Media, Arts & Technology
Department	Landscape Architecture
Context	
Purpose	A co-operative inquiry to investigate how the current spacial arrangement and resources provided satisfy the requirements of the Landscape Architecture department. Anticipated outputs will provide a development plan with short term (summer 2012) and longer term development opportunities.
Users	The key stakeholders were recorded as co-researcher 1, Subject Group Leader, co-researcher 2, PG Programme Director, Landscape & Environment, co-researcher 3, lecturer and co-researcher 4, Senior lecturer in landscape and design, co-researcher 5, Campus Manager.
Policy Makers	The meeting reflected on the key policy owners, namely, The Faculty Dean, the Head of Learning and information Systems and the Director of Estates.
Policies	The current timetabling policy was noted.

The following record photographs were taken to record the spaces viewed through cycle 1.
Figure 36, Cycle 1 record photographs

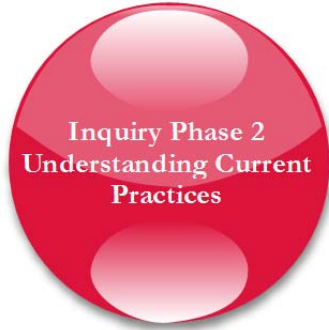
Room CL220



Room CL253



5.4 Co-operative Inquiry Cycle Phase 2: Understanding Current Practice



The second part of the discussion on the 1st December 2011 focussed on current practice. The exchange started in the Group Leaders office but ended up as a continuing discussion back in the teaching spaces. The space planning framework was completed as a follow up to the meeting and again was circulated to the research team.

The framework was not used through the course of the discussion but was used as a preparation tool prior to the meeting. Each of the headings acted as a prompt for the discussion, a prompt to think about space from an alternative perspective¹⁷. Following the meeting the framework was used to document the exchange. The following Figure 37 presents the research information documented. Much more detail was shared this time as documented in the framework.

Figure 37, Landscape Architecture: Inquiry Cycle 2: Current Practice

Estates Department Space Planning Framework	
Inquiry Cycle 2: Current Practice	
Activities	
Interactions	The group noted that activities were viewed across 3 areas within the building. Staff offices CL206, 207, 208, 210 (70m ²). Individual and shared offices (inadequate storage noted for drawing and core documents.) Teaching spaces CL132 9113M ²). A formal teaching space shared with other users. Room CL253 (108m ²) consisting of formal taught sessions on the second floor and private study activity on the third floor (55m ²). Room CL220, established as a private study studio with students working

¹⁷ An example of adopting a participatory paradigm within the research (stage 2 research methodology)

	independently on case study work.	
Design Gestures	<p>CL220 (143m²): Good light in room complementing drawing activities but room cold. No wireless connectivity. Student's deskbound due to Ethernet connectivity. Group split across separate floor levels.</p> <p>CL253 (108m²): Large open space with taught and private study activities combining upstairs and downstairs x135 (62m²). Distracting space due to flow of different groups. Flip top drawing boards providing dual room functionality. Cramped storage space with drawing cabinets obstructing the fire route in part.</p> <p>CL132 (113m²): General shared lecture space. Good light in room but glazing leaks, no wireless connectivity. Layout inflexible. Kitchenette present. Absence of dedicated teaching space with IT equipment such as a digital projector. It was noted that CL132 was set up as a dedicated teaching space with such facilities however pressure on rooming has forced the team out of this space.</p>	
Process	<p>Scripted: The teaching in CL253 was very informal, forced to be that way due to the shared use with other groups using the space as a study room.</p>	<p>Open: Students were working on laptops and drawing boards but would travel to the 1st floor IT room TC114 (280m²) for access to specialist software and to the library for access to the book stock supporting the programmes.</p>
Practice	<p>The space was not set up to support the 3D modelling requirement for the course. There was no personal storage for large scale forms and limited resources.</p>	
Occupancy	<p>Published Utilisation October 2011 headcount survey: CL132: Frequency of Use, 88%, Occupancy 53%, total utilisation</p>	<p>Utilisation CL253: Frequency of Use, 100%, Occupancy 34%, total utilisation 34%</p>

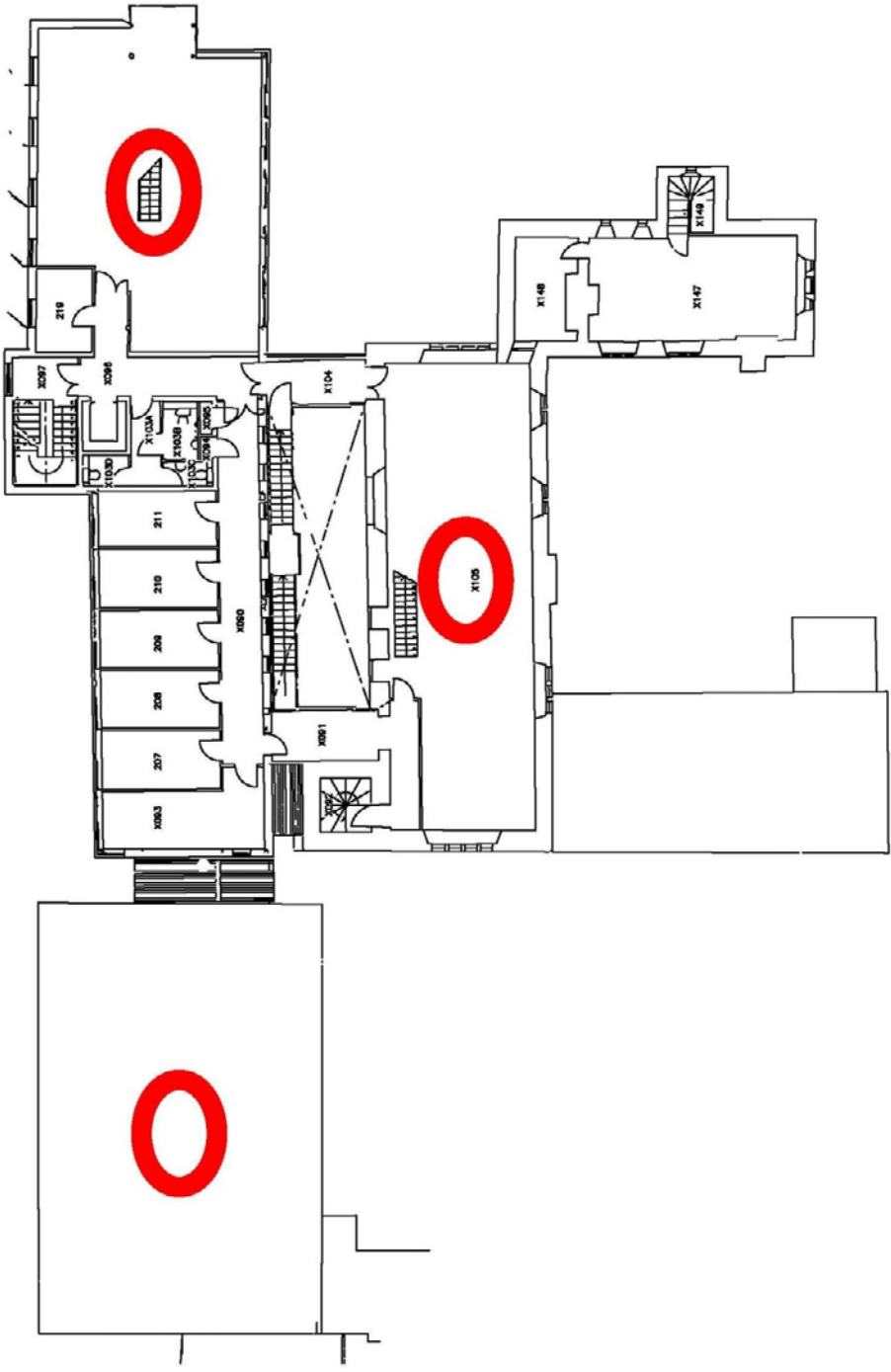
	46%	
Academic Contract	A relaxed atmosphere with groups of students from all 5 courses interacting across two large spaces.	Informality perhaps leading to security issues and consequently limited resources present.
Effectiveness	Individual working within group work room CL220. Little evidence of group interaction. Workstations appearing insular, no space to relax and reflect. No 'social' space however basic kitchenette facility formed in CL253 which was used by staff.	
Learning Styles	A combination of didactic teaching viewed in CL253 with little equipment or technology, (noted as a drawback by David Booth) Students working singularly but no evidence of group or shared learning.	
Designs, Taxonomic		
Entrances	Nothing seemed to directly interlink. Teaching is undertaken in CL253 & CL132, individual study is pursued through the use of room CL132. Library access is via the quad facility, access to plotters and specialist software is through room TC114. Social interaction is limited to the SU bar, refectory and in a limited fashion to within CL132. No real sense of entering the Landscape Architecture department. A series of rooms dotted around the Clegg building with various other support rooms made accessible to the team.	
Teaching Spaces	One teaching space CL132 shared with other study activities. Distinct lack of a good quality teaching space. Could have been any other general teaching classroom, clinical in its use as multiple different groups accessing the space which prevents ownership. Limited stimuli for students, due to lack of space and storage. The department was occupying 5 spaces with a total net internal area of 481m ² . Staffrooms (4) adjacent to teaching spaces also used as tutorial spaces. Cramped offices approximately 70m ² in area across the two spaces.	

Learning Centres	Split access and not dedicated. Book stock available but no clear sense of a LAA section. Bookable space onto TC114 computers at rear of facility however several students seemingly competing for access. The students share the library space but do not have any dedicated access. On this basis it was assumed for the special assessment that the 129 students would have access to 116m ² of space as per the allocation described in the previous table 25. The total space allocation for the department, including teaching space, tutorial space and library accommodation therefore equates to a total allocation of 686m².
Use	Open / Closed Use was formally timetabled across rooms CL206, CL207, CL208 and CL210. Dedicated spaces were all booked through syllabus plus. The group believed that this was a limiting factor and that having no access to informal break out space was causing problems within the department. Examples of different groups vying for space were used to explain the situation that currently exists.
Technology	
Mobile	No mobile technologies actively supported. The group discussed the use of tablet and smart phone equipment within the context of students undertaking research through discussion sessions. Benefits were described if a more structured arrangement could be introduced.
Connected	The group noted that students were generally using equipment that was hardwired to the university network in room CL132. Moodle was the virtual learning environment platform in use as the data repository however this was generally restricted to listing course materials rather than a repository for interactive material.
Visual	The group noted the lack of wireless or shared interactive whiteboard, data projection equipment.
Supportive	The group noted that PC machines were supported in TC114 but lack of

	IT support was noted as a barrier to progress curriculum development.
Specialist	Flip top drawing boards in CL253 however the size of the units restricted effective alternative use of the accommodation.
Reconfigurable	Chipboard flip top drawing boards in adequate condition. Presentation space for end of year shows very limited with mobile units needed but obscuring day to day activity in CL253. Fixed staircases in CL220 & CL253 provides a dead spot within the workroom.
Infrastructural	Design of CL132 is dated and ineffective. The double height space provides significant glazed area which was presumably designed to provide good quality light for drafting. The course is much more data and digitally orientated now and the requirements have therefore changed. The design provides a poorly insulated space which is compounded with a dated and ineffective heating system. Out of hours access and security may be a problem.
Timescale	Immediate actions required to resolve heating and acute lack of space issues. (January 2012) Longer term development plan to be agreed through cycle 3.

The discussions focussed on spaces within the current department. The following floor plans help illustrate the rooms discussed. The areas marked red are highlighted as the teaching spaces.

Figure 38, Floor Plans and Area for the Department: Current Arrangement
Landscape Architecture Floor 2. (Teaching spaces marked red)

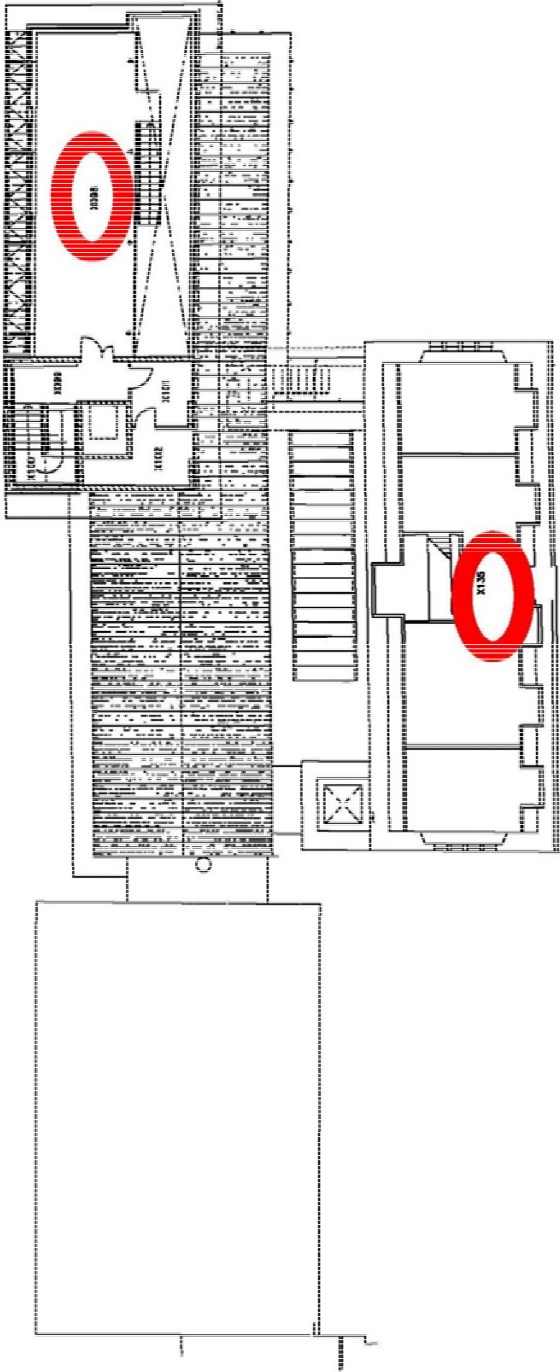


The following summary presents the spaces used by the department. Overall the department occupies approximately 686m² of accommodation.

Room	Function	Area	Total
CL206, 207, 208, 210	Tutorial / Offices	70m ²	
CL132	Teaching	132m ²	
CL253	Teaching	108m ²	
CL253 upper mezzanine	Teaching	62m ²	
CL220	Teaching	143m ²	
CL220 upper mezzanine	Teaching	55m ²	
TC114	Private study	116m ²	686m²

Of particular note was the difference between the space requirement assessed as a consequence of using the current sector methodology providing a space demand estimated at 978m² (figure 34) and current space used by the department assessed at 686m². Overall the department is operating from approximately 70% of the space that would be allocated from a traditional approach.

Landscape Architecture Floor 3 (Teaching spaces marked red)



5.5 Co-operative Inquiry Cycle Phase 3: Introducing Solutions



5.5.1 Meeting 1 research data

The third cycle of meetings was the process where creativity and experimentation was anticipated. The first meeting through this phased approach was held shortly after the data within the second cycle was documented. The co-researchers were all interested in the content and corrected various minor inaccuracies.

Again the discussion for this meeting was relaxed and was not structured with any particular agenda. Clearly individuals had reviewed cycle 2 current practice record notes and the discussions focused on much of the critical descriptions. Not all the areas were covered through the exchange and on reflection it may have been better to keep cycle 2 notes as an agenda. The following figure records the output of the discussions.

Landscape Architecture, Cycle 3 Introducing Solutions

Meeting 1

Estates Department Space Planning Framework	
Inquiry Cycle 3: Introducing Solutions	
Activities	
Interactions	<i>Describes the interactions that could happen:</i> The discussions opened by describing how the department could benefit from a establishing a new accommodation identity. The staff were aware of other discussions within the university concerning the future of the Chapel building on campus that was poorly used due to the inflexible nature of the building. Fixed pews and a heritage listing made the space difficult to use. Discussions opened with that building in mind. Staff were interested to know what the current plans were for the site and various ideas associated with the removal of the pews were pursued. Potentially

	<p>the building would be large enough to establish exhibition space for end of year shows for the Landscape Architecture department and some interesting ideas developed associated with forming an additional lecture space that would see a significant change of use for a problematic building. Staff discussed interactions where the department occupied a singular larger space rather than a series of interconnecting rooms. Discussions surrounding the types of activity where explored. Ideas were raised where social time, tutorial and private study where interlinked within the same space around a more formal taught programme. A wider vision for the department was discussed however resourcing constraints led the discussion to focus on solutions within the immediate Clegg building. Discussions were recorded as follows:</p>
<p>Design Gestures</p>	<p><i>Links between built environment and pedagogy and how this could improve:</i> Rooms CL220</p> <p>The group discussed if room 220 could be changed to become a more effective space. The co-researchers again mentioned the cold nature of the room and noted that the aged heating system was a real barrier to sustained use through the winter months. The discussions progressed to see if the room could be altered to insulate the space, heat it more effectively and to possibly extend the 1st floor plate by removing the 1st floor staircase. This would provide a much larger space downstairs and would allow the lower ground of 220 to be re-organised. The 1st floor space has a separate first floor access so this would be a reasonably straight forward solution. The absence of WIFI technology was an issue that if resolved would help private study within the area. Extending the first floor space after the staircase was removed would allow more formal taught sessions to be held in this area which was seen as a benefit. The current open plan space shared between two</p>

	<p>floor levels makes this difficult as the open plan nature of the space causes distraction. The good quality light was something the team wanted to retain however the prevalence of glazing was a problem in the winter when building heat loss was being considered.</p> <p>Room CL253</p> <p>The use of this room was discussed, in particular the way the upper mezzanine was currently used. The upper mezzanine was a useful space however taught sessions were difficult as there was a constant stream of students accessing the upper floor. It was suggested that the upper mezzanine floor could be extended and the void in-filled into the window space. The upper extended room could then be used for the taught sessions and the self-study work could progress from the ground floor without disrupting the taught session upstairs. An interesting proposal but clearly one that calls for some significant investment.</p> <p>Room CL132</p> <p>It was suggested that this room become a dedicated room to the department. The current space was timetabled just Tuesday's and Wednesday's at the moment and more extensive access to the space would ease timetabling problems and would also allow the department to 'brand' and sell the space.</p>
Process	<p><i>Scripted / Open: An indication of the formality of the processes which are intended to occur within the space.</i> The intense use of the space prevented groups using the spaces as a private study working environment. The team wished to see a facility where the students could combine private study and taught provision within the department.</p>
Practice	<p><i>Seeks to identify how the space could be used, conceptualized and re-purposed in</i></p>

	<p><i>practice:</i> The group discussed how the CL253, and CL220 could be extended to provide additional floor space and workstations. The addition of CL132 was seen as a benefit of the room could be classed as a dedicated area. The rooms were proposed to be reconfigured and subject to planning work by the estates space planning technician. The spaces would establish a defined mix of informal and formal teaching spaces which was seen as an improvement to the current random grouping of various events.</p>	
Occupancy	<p><i>Frequency of Use</i>, potential targets. The group wanted to ensure that the frequency of use statistic shared as an output of cycle 2 was reduced. Such high frequency of use rates (88 to 100%) were difficult to manage and were placing stress on staff and student cohorts. The group wanted to ease this rather than fundamentally reduce the operating frequency.</p>	<p><i>Occupancy Use</i></p> <p>The group wanted to ensure that the rooms matched the group size and the individuals thought that the formation of the two new spaces in CL220 and CL253 would help position smaller groups and groups undertaking private study.</p>
Academic Contract	<p><i>Notions of cultural acceptability within the space, disciplinary rules, pedagogical signatures.</i> Extra space was the fundamental theme through the discussion. Space was severely controlled through timetabling. Groups were scheduled with clinical precision with taught provision taking precedence. Pedagogical discussion focussed on the need to have a facility that enabled the rules of use within the area to be relaxed so a balance between taught, social and private study could be combined. All believed this was absent and was a limiting factor for the various courses. This was a particular issue for the final year students who were involved in project work that required peer interaction.</p>	

Effectiveness	<i>Describes aspirations for student participation:</i> Absence of a social learning space for the students within this department was noted. The group would like to see the establishment of a social learning space where formal and informal learning exchanges could take place. The space would need to be large enough to allow a whole cohort to congregate but also designed to a point where small group working could take place. The space would need to have soft easy seating and some more formal furniture. Network access should be prevalent so that various forms of media including course information through Moodle can be accessed. The room in the CEAL building was discussed as an example and it was noted that the room was potentially underutilized. The group asked whether this room could be considered, re-purposed and allocated to the department.
Learning Styles	<i>Describes new emphasis for learning styles:</i> A shift to support student to student interaction was seen as a positive step moving forward. The absence of such resources was noted as a barrier.
Designs, Taxonomic	
Entrances	<i>Provides descriptors of how the space is required to be used:</i> The group wanted to form an experience where it was clear that you were entering the Landscape Architecture department. The department needed to establish a new identity. Potentially grouping spaces together would help form a resource nucleus that would help the department to brand, promote and operate to improved levels of efficiency.
Teaching Spaces	The void space adjacent to CL253 was discussed and it ideas associated with infilling this area with a further mezzanine was considered. The extension of CL253 into this space would provide the grouping of rooms and would go some way to providing the experience described by the team.

Learning Centres	Some specialist software and printing facilities is accessed through the library space TC114. This is remote from the department and it was thought that this core resource would be better utilized if it was located within the immediate faculty base rooms.
Use	<i>Describes how we want to use the space either enforced through policy or mediated informally through teaching and learning practice.</i> Could a base room be established with such additional IT resource and printing facility? If it could a barrier to this would be to gain technician support. The faculty did not have such a post within its establishment and this would be a requirement if such a facility was developed.
Technology	
Mobile	<i>Describes the technologies required to be deployed in the space:</i> The group described the requirement for wireless technology and the need for faster, more up to date computer infrastructure. The co-researchers believed that providing access to the technology would draw the students away from being reliant on group study, progressing at the same pace and would improve engagement with the intended output being autonomous learners focussing less on peer to peer competition. Accessing the Moodle website and developing project related work at one's own pace would mean the lecturing team could focus on supporting the less able students within the cohort which in turn would see smaller group teaching.
Connected	Group communications, peer to peer and with tutors was discussed and the use of smart telephone application data was considered. The group wanted to encourage group discussion through this median, noting the prevalence of students using iPhone or smartphone technology.
Visual	The co-researchers wished to ensure the course content was extended

	<p>so that the overall experience was less focussed on verbal thinking. The course is very much about visual design and the researchers wanted to develop visual learning skills as this remains a key skill set for practitioners in the professional environment. Access to external space was raised by the group. The group believed that all external spaces were owned by the central Estates department and that consent would be required if external spaces on campus were to be used by the Landscape Architecture team. The group explained how the course includes teaching associated with developing and implementing annual site maintenance plans that would establish a management strategy for a particular site. The group believed it could use this expertise across the university campus sites if consent was provided by the Estates department.</p>
Supportive	<p>Support for the MAC technology needed to be improved. It was felt that the technician support needed to be increased to enable response times to be improved for issues as they were reported.</p>
Specialist	
Surfaces	
Reconfigurable	<p><i>Describes the furniture and physical components required in the new space other than technology that support the function of the space:</i> The group felt the spaces currently occupied were tired and in need of general decorative improvement. A change in the storage arrangements was discussed. A solution for the drawing cabinets was sought and the discussions associate with forming extending workstations in rooms CL253 and CL220 was thought to be a way of repositioning the database.</p>
Fixed	
Learner created	<p>The group discussed in some detail whether external spaces could also be considered through this discussion. Landscape Architecture</p>

	<p>as a taught degree is clearly focussed on developing external space and yet access to external campus space was thought to be quite limited. The students were restricted to surveying at the Hardwick campus with little activity being undertaken at the Francis Close Hall site. Ownership of external space was seen as being the responsibility of the central Estates Department and ‘off bounds’ to the team. Gaining access to creative practical space was discussed as being a real opportunity to help improve the overall presence of the Landscape Architecture department. The group discussed whether the inquiry could consider adopting external space not just for routine surveying practice but also for more practical teaching experience. Weather permitting the group described the merits of holding open air student sessions. It was thought that a visual external statement of some form would enhance the existence the Landscape department and would help improve the branding and appearance.</p>
Infrastructural	<i>Describes the aspects of the space required to influence the environment, e.g. air conditioning</i>
Timescale	<i>Describes the timeframe of the resourcing consideration</i> The group agreed to meet again the following month.

5.5.2 Co-operative Inquiry Cycle Phase 3, Introducing Solutions

Meeting 2



The same group met again through the summer 2012. Again the pro forma was used to record the general discussions that took place. The output of the exchange is presented below.

Estates Department Space Planning Framework	
Inquiry Cycle 3: Introducing Solutions, meeting 2	
Interactions	<i>Describes the interactions that could happen:</i> The group met again at Francis Close Hall and through this meeting the focus of the discussion was associated with opportunities associated with external space. The group wanted to explore whether the inquiry group could be extended to include a student cohort. The intention would be extend the group and seek student views on how the external spaces around the campus could be used to promote the department but also consider through design how spaces could be developed to form practical teaching and learning accommodation. The group explored which spaces in particular could feature in the inquiry and discussed how the work could benefit the students by becoming part of their practical course project work. The group discussed an internal courtyard at Francis Close Hall which is adjacent to the Landscape Architect department, is a focal point for the university and from the photographs below is clearly in need of redevelopment. The course leader asked if I would be prepared to introduce Magnolia Court as a development opportunity for the students. We agreed that would be in order and we

	<p>then discussed the time frame for the students to join the inquiry group and the arrangements required to brief the students on this aspect of the project. We discussed extending the group to include another member from the Estates team as the larger inquiry group would include approximately 18 students. We agreed details associated with the briefing and set a November date to welcome the students and introduce them to the Inquiry.</p>
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Figure 39, Magnolia Court, Francis Close Hall



5.5.3 Co-operative Inquiry Cycle Phase 3, Introducing Solutions

Meeting 3

The next meeting took place on the 5th November 2012. The meeting was quite different due to the scale of the group. The Inquiry Group now included an additional eighteen student members in attendance which changed the dynamic of the small inclusive group that previously existed. The meeting took place in the open air at Magnolia Court. Members of the initial Inquiry Group introduced Magnolia Court as the focus of the conversation. The group discussed the constraints and opportunities associated with how the current courtyard currently operated. The group discussed the concept that the space could become a feature for the department in terms of providing a practical social learning space and also as an important branding opportunity to raise and position the profile of Landscape Architecture at the Francis Close Hall campus. The session was productive, the students departed and some

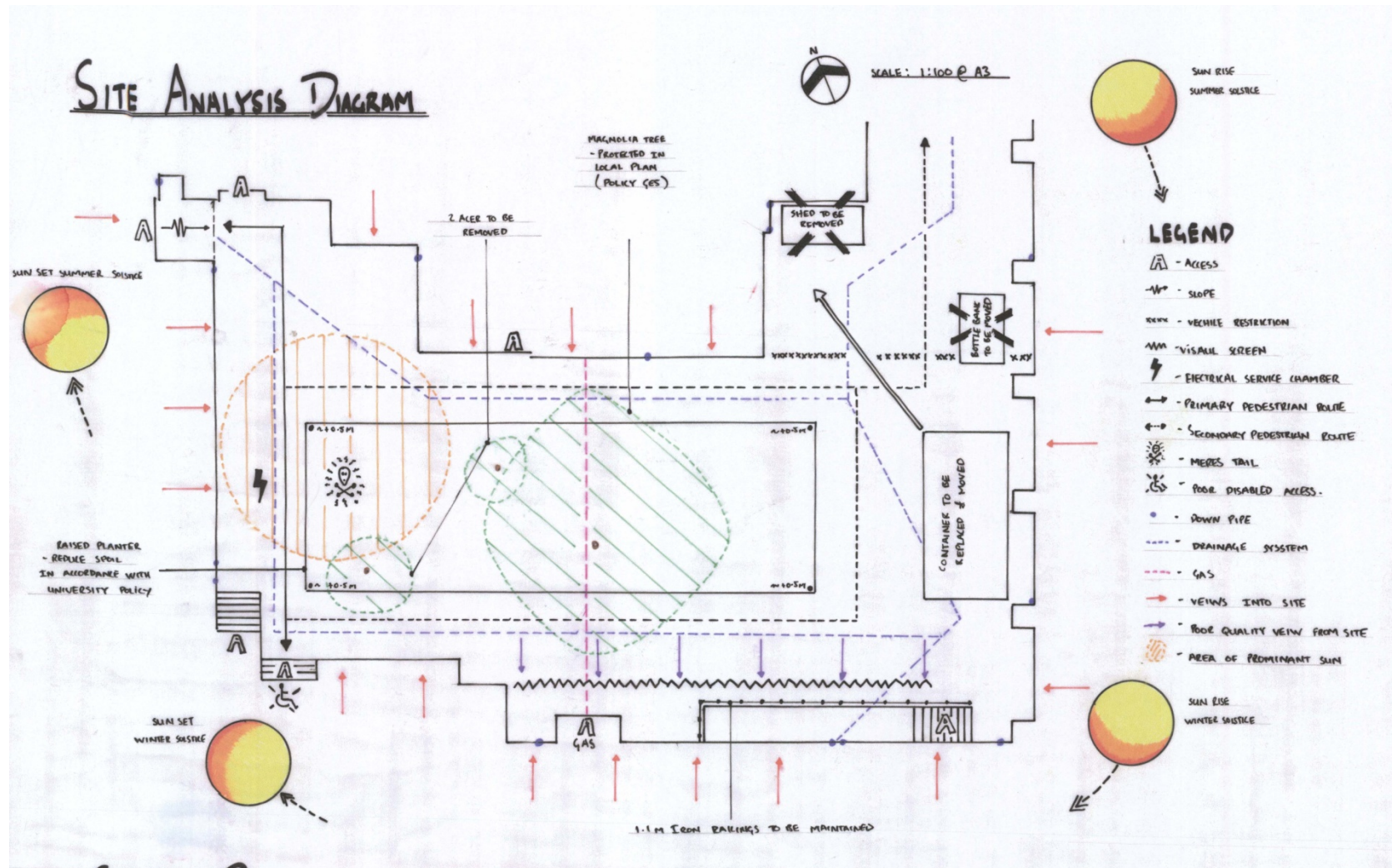
weeks later their interpretation of the meeting was received through the following submissions as set out in chapter 5.5.4. The students started work by reflecting on what was happening within Magnolia Court and what core activities would be required to continue in the space. All the students put considerable effort into documenting their work and demonstrated expertise in assimilating the complex interactions that were happening within the courtyard.

5.5.4 Co-operative Inquiry Cycle Phase 3, Introducing Solutions

Meeting 4

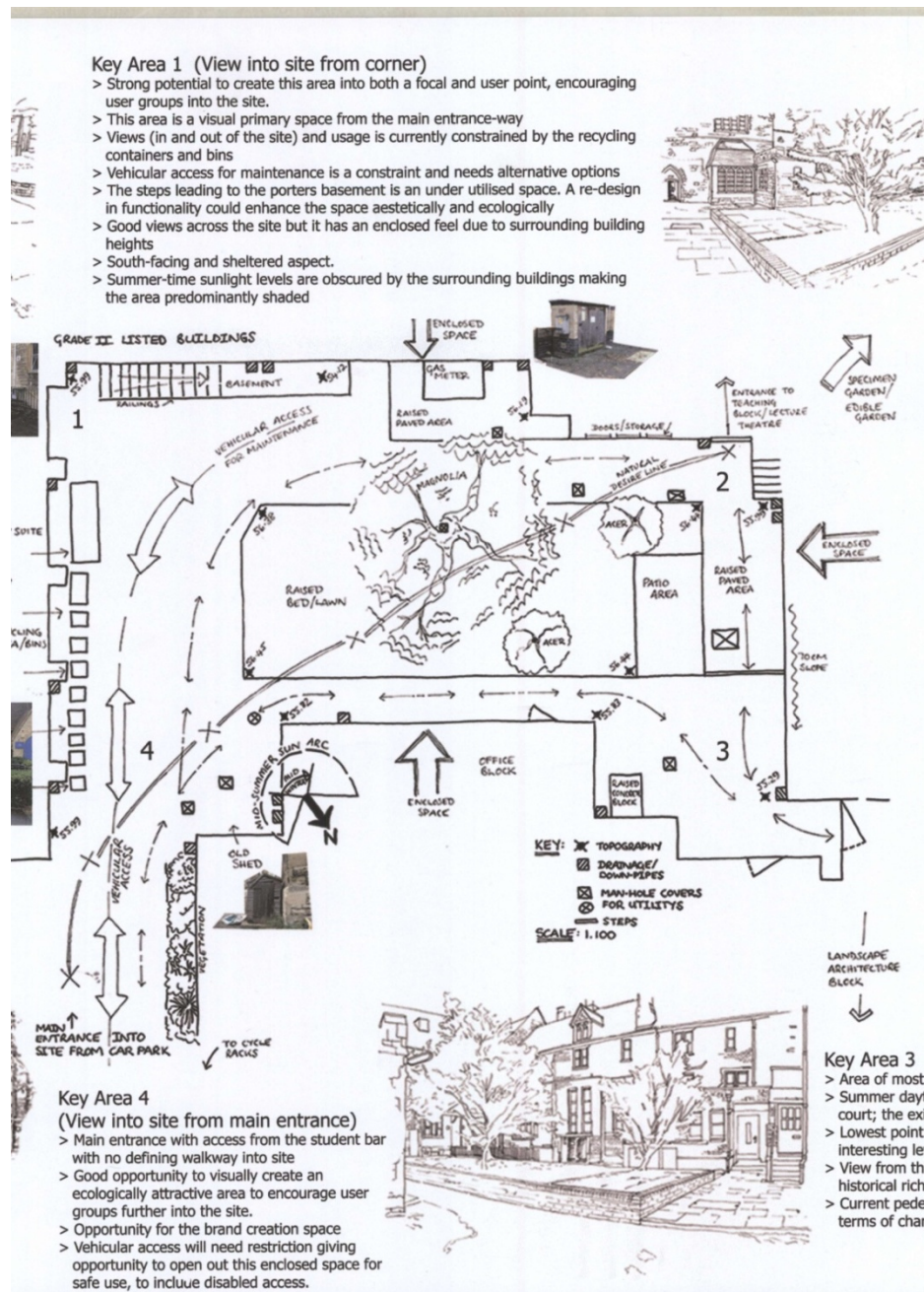
Student 1, Matt

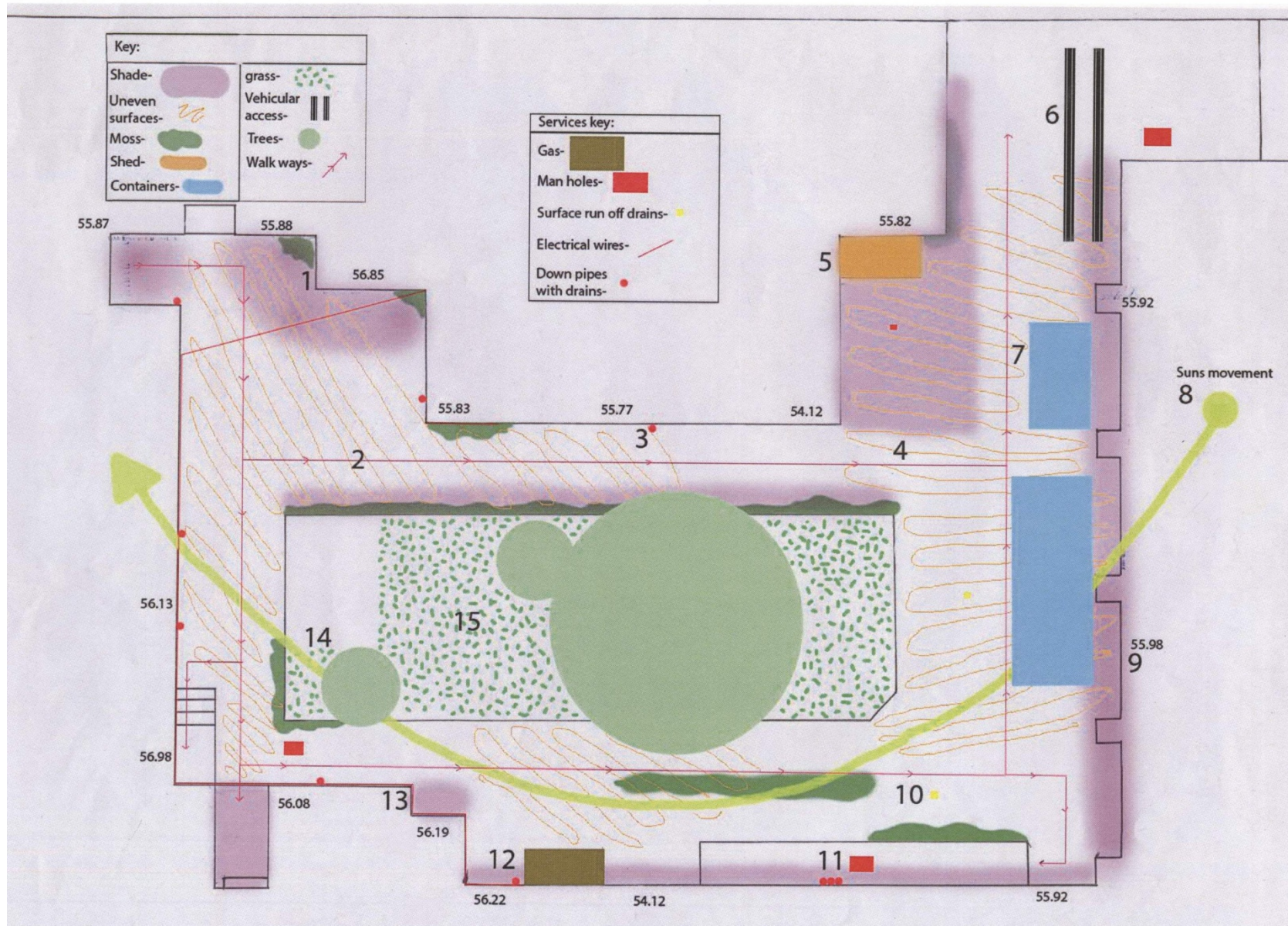
Matt produced a site analysis diagram to begin with that provided a scaled diagram of the space. He had completed a survey of the courtyard and his diagram shows all the utility connections. He was interested to know how the sun and daylight would influence design and he spent time considering this aspect as a pre-design issue.



Student 2, Bridgette

Bridgette approached the initial analysis in a similar manner however had taken time to hand draw elevations within the courtyard. Her work demonstrated that she had considered the various other users for the site and had begun to think about building orientation and material precedents adopted by the different buildings that bound the space.





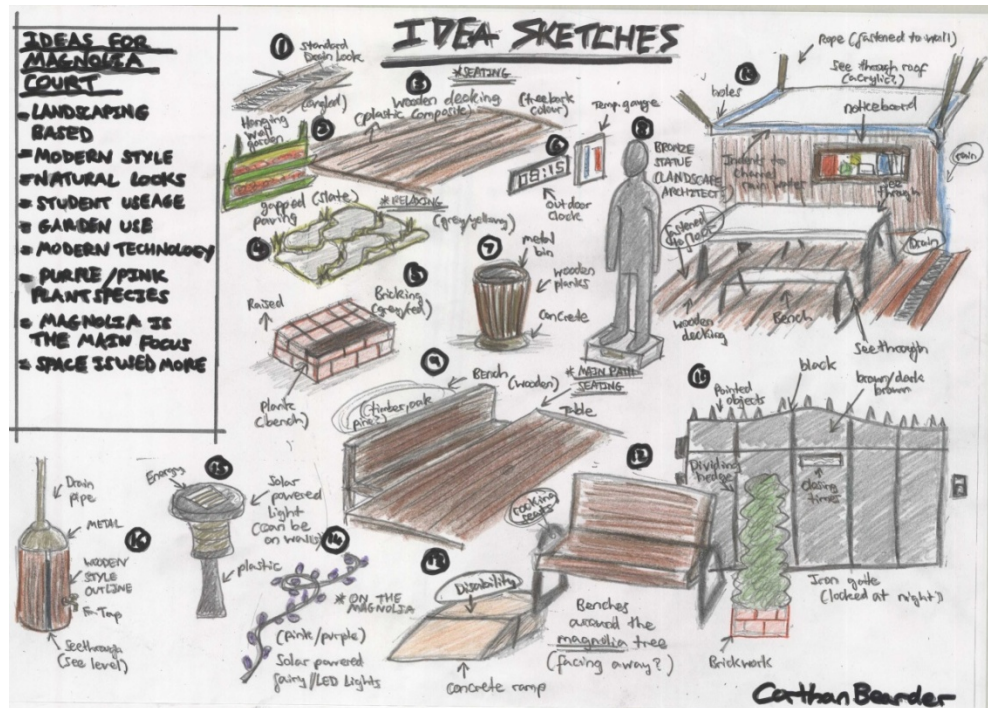
5.5.5 Co-operative Inquiry Cycle Phase 3, Introducing Solutions

Meeting 5

In summary all students had completed works to appraise the opportunities and the constraints associated with developing Magnolia Court as a form of social learning space to complement and enhance the learning resources and visual identity of the Landscape Architecture department. The dialogue continued with the students / co-researchers. Meeting 5 records intermediate progress where ideas and conceptual thinking was exchanged associated with how the space should be developed. Examples of the exchange are presented below.

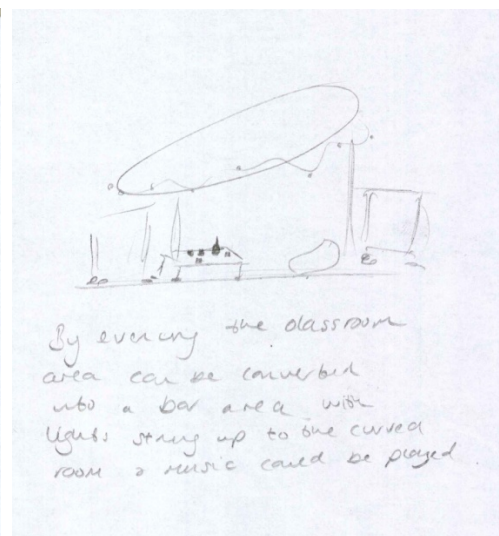
Student 5, Corthen

Corthen talked to the group about his ideas by showing us the following sketch. The discussion started by thinking about basic needs such as seating and visual barriers to obscure some of the services within the courtyard but his work did develop to think about how the space would be used for learning. He spoke about modern technologies and began to think more about social learning spaces.



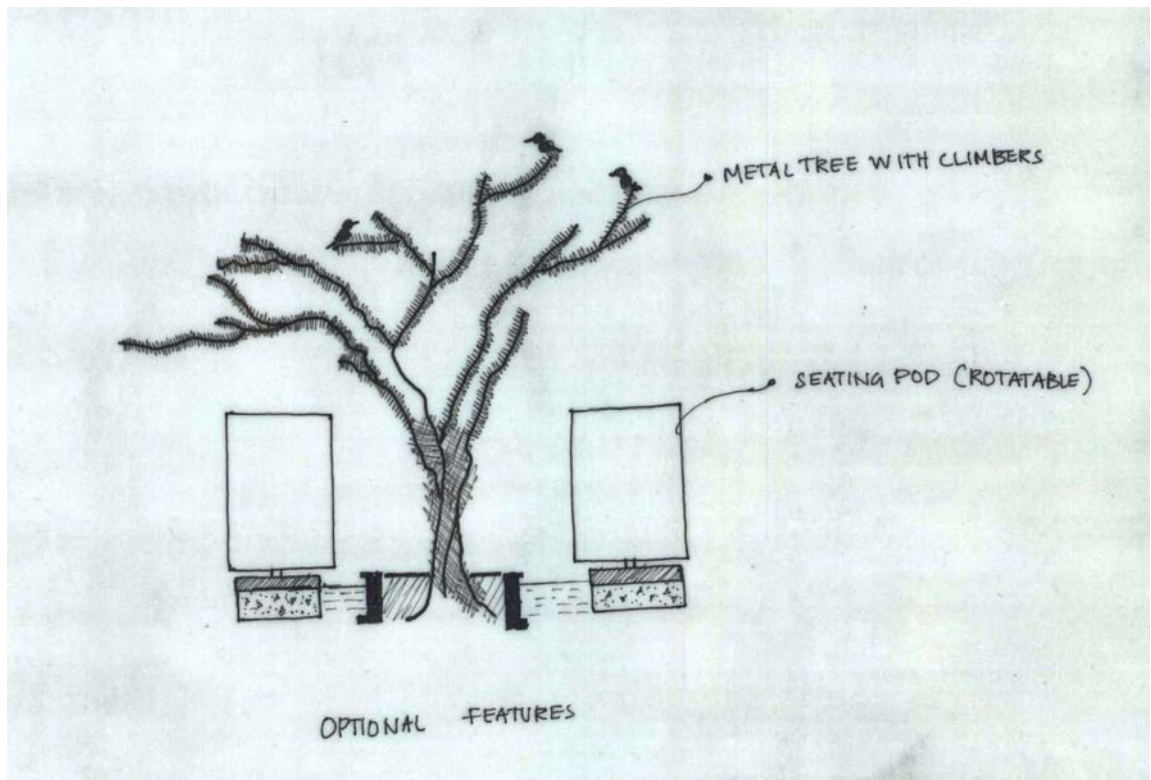
Student 6, Sharon

Sharon was interested in the concept of the outdoor classroom and showed the group photographs of examples she had found. She talked about the summer outdoor classroom, different types of seating and the notion that the space could be used not just as a learning space in the day time but as a student bar in the evening. Her photographs and sketch ideas are presented as follows.



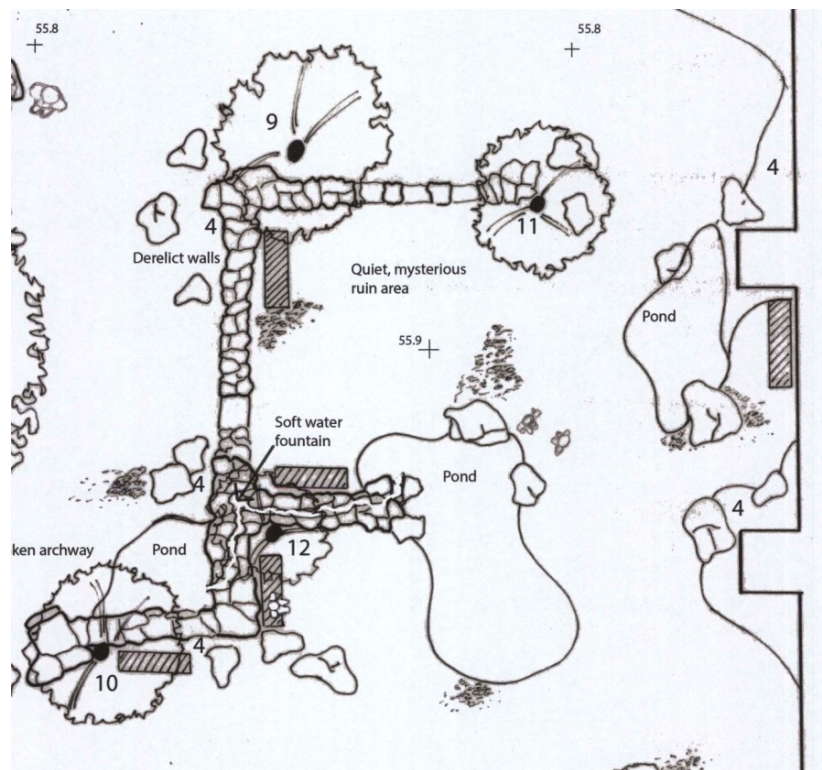
Student 7, Prasanna

Prasaana believed the concept of the external social learning space could be achieved by developing 'learning boothes' that allowed small groups of people to interact together in a discreet exchange. She discussed access to wireless technologies and described rotating seating pods that would provide the basis for the meeting space. She also suggested that we fell the feature Magnolia and construct a metal replacement as described below.



Student 8, Gethin

Gethin was interested in the concept of providing a serene space to encourage reflective thinking and constructive dialogue through an externally hosted learning interaction. He talked to us about the concept of a space that was themed 'back to nature' and was interested in the heritage of the buildings. He presented pictures of historical ruins and described a 'quiet, mysterious place with water features that he believed would provide the inspirational environment that would promote the Landscape & Architecture department.



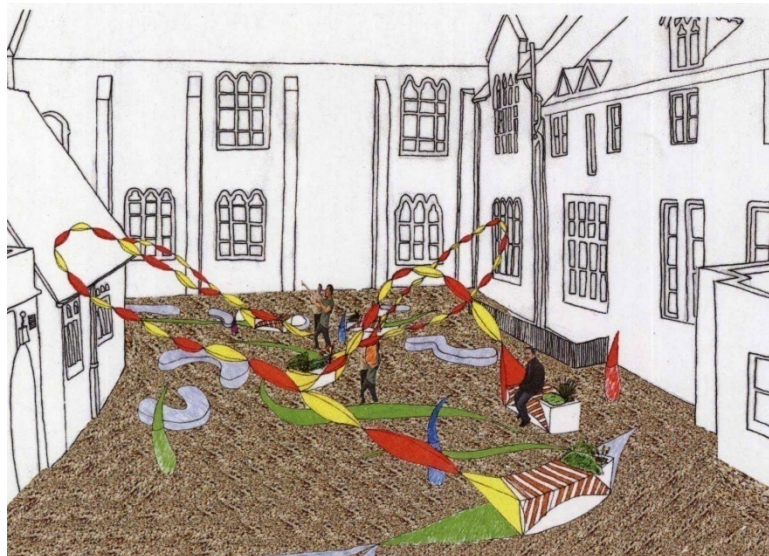
5.5.6 Co-operative Inquiry Cycle Phase 3, Introducing Solutions

Meeting 6

The ideas presented were discussed with the students and co-researchers and the group agreed to meet some weeks later. The next Inquiry Group meeting was a more formal discussion. The students were asked to reflect on the feedback provided through the previous meeting and then develop their final proposals for the Magnolia court. The students were asked to present their plans and this following section describes the most interesting outputs from that process.

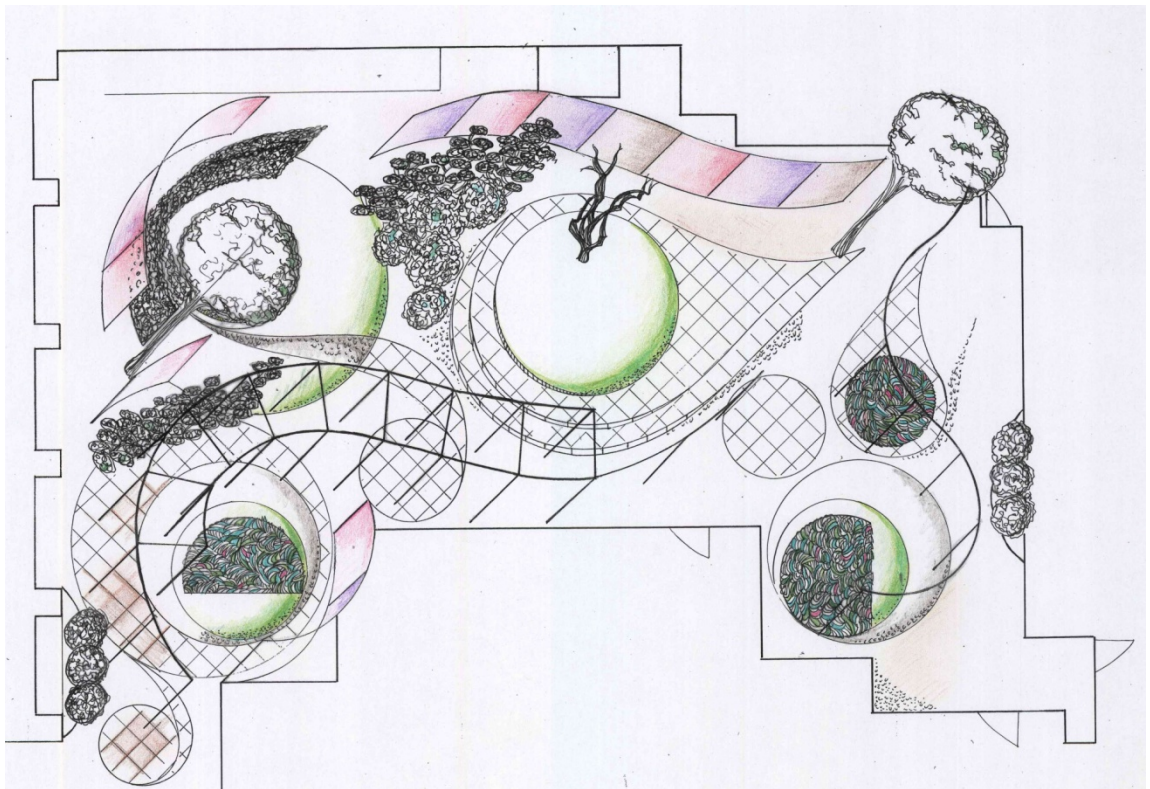
Student 4, Luke

One of the most unusual proposals presented was by Luke. His early site assessment was undertaken in a pragmatic fashion that presented a clear and accurate assessment of the strengths and weaknesses linked to developing Magnolia Court as a learning environment. His proposal however was quite different, extremely creative, perhaps questionable in whether it presents a practical solution but interesting as a conceptual idea. Luke encouraged us to think about the three dimensional aspect of the space and described a seating and social space that was supported by an extensive metal structure. The work is described in the following diagram.



Student 9, Nancy

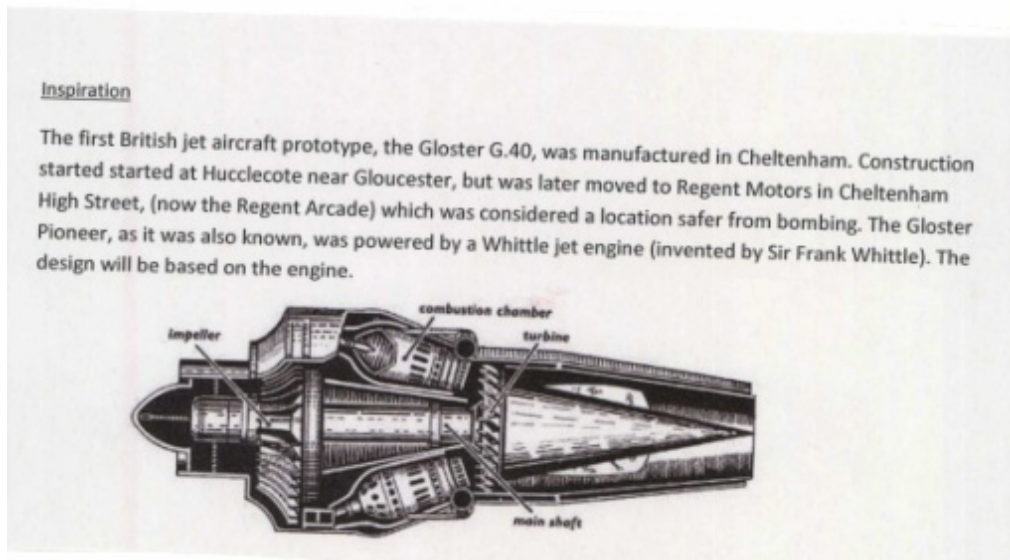
Nancy presented a social learning environment that consisted of concentric circles that allowed small groups to meet and interact. The overall scheme presented a solution that encouraged multiple users of the space and on that basis a group could potentially be located through the summer within the courtyard and could interact on a discreet basis.



The design would allow the user to flow across the courtyard and was developed with thought associated with how the planting schemes would mature and fill the vertical space in years to come.

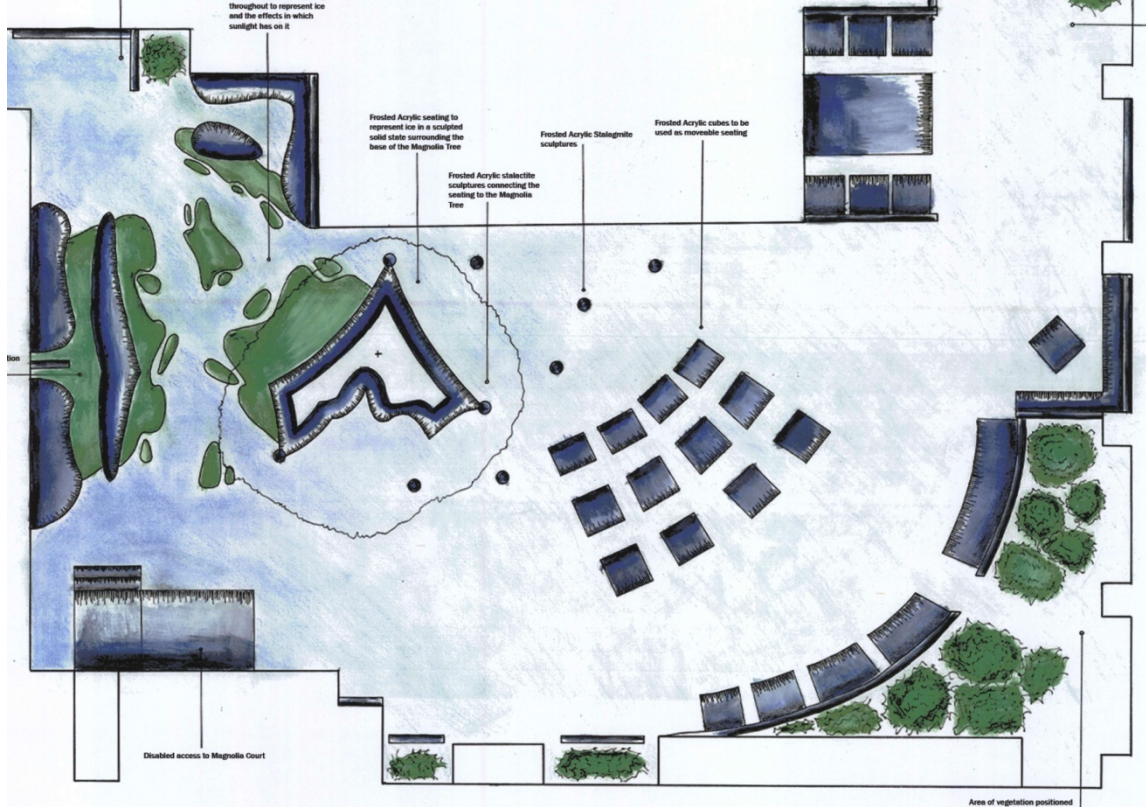
Student 10, Rachel

Rachel's scheme was interesting as she wanted to promote inspiration within the learning space and she achieved this through the design of the planting scheme that surrounded the proposed learning environment. Rachel had taken inspiration from a Cheltenham based manufacturer Sir Frank Whittle who developed the first British jet aircraft.



Student 11, Danny

The proposal presented by Danny presented a similar arrangement akin to a Greek amphitheatre.



5.6 Co-operative Inquiry Cycle Phase 4, Development Plan Proposals



The fourth phase of the inquiry progressed by developing the groups ideas introduced through the 3rd phase into the first set of specific proposals. Through the planning of this methodology it was originally anticipated that resultant ideas would be presented on the following pro forma.

However this was not practical considering the nature of the data received, particularly the drawn materials provided by the students. The figure below records the key elements that would form the proposed development plan. The time between phases 1 through 3 was relatively short, just a few months, however the timeframes between the third and fourth phase was considerably more because of the time needed to reflect and analyse the data the group had developed. Maintaining momentum with the team was problematic between this phase and ensuring timely communication is a learning point reflected upon within the later concluding chapters.

The development plan proposal presented below draws together the ideas shared within the inquiry group and has provided the Estates team with a summary document that acts as a client briefing document. The output is not a full development plan that can stand up to full scrutiny but a proposal document that guides the development of a full business case. It introduces all the key criteria that would need to be considered in a formal plan and in doing so records all the key improvements the group believed would be necessary to provide accommodation and resources that would be considered fit for purpose. The research was concluded at this stage as the objective was to identify if this new methodology could provide the means to establish an effective space allocation procedure. The university has established project management procedures within the Estates department to develop ideas or a client brief such as this into a measurable development project. Further inquiry cycles would begin to develop the ideas generated here into a formal project business case so the group agreed that the following plan would be the end point for the co-operative inquiry.

Figure 40, Inquiry Cycle 8; Development Plan Proposal

The following figure presents the framework developed through the 4th phase.

Estates Department Space Planning Framework	
Inquiry Cycle 8: Development Plan	
Activities	
Interactions	<i>Describes the interactions that are planned:</i> The ideas introduced through the 3 rd phase suggested that department’s accommodation should provide an interconnected suite of facilities that complement different teaching and learning experience. The discussions within the inquiry group suggest that the development plan proposal moving forward should investigate if internal remodelling of the existing accommodation could be considered as a solution. The team wished to bring together private study work spaces alongside the departments formal teaching accommodation so that students could interact with the department staff and share experience with peer groups. The discussion picked up on the lack of departmental ‘identity’ through the third cycle and to address that the development plan proposal suggests a rebranding of the department which currently occupies floors 2 and 3 of the Clegg building. The proposal within this development plan is to develop a departmental branding that provides signage in the entrance ways to the Clegg building and the introduction of a corporate scheme for furniture and decorations. The earlier ideas to use the Chapel as a space to hold the end of year presentational shows of student work was thought to be a sound proposal that would be supported. This would reduce the conflict within the studios and would help year-end concluding arrangements.
Design Gestures	<i>Links between built environment and pedagogy and how this is planned to improve:</i> Aligning the private study rooms adjacent to the formal teaching space would allow the groups to interact. Much of the student work was noted as


being project related, developed on AutoCAD software, and this private study was developed with the support of specific taught modules. Access to this type of space and accommodation to position three dimensional models would improve the design discussions. To achieve this, further space would be required and this development plan proposal suggests the extension of the current facilities. Current space allocated within the department was assessed as being at approximately 70% of the accommodation that could be allocated using space norms. The development plan proposes to extend the floors in two rooms. The feasibility of extending room CL220 would provide an additional 88m² of space and a similar extension in CL253 would provide an additional 46m².

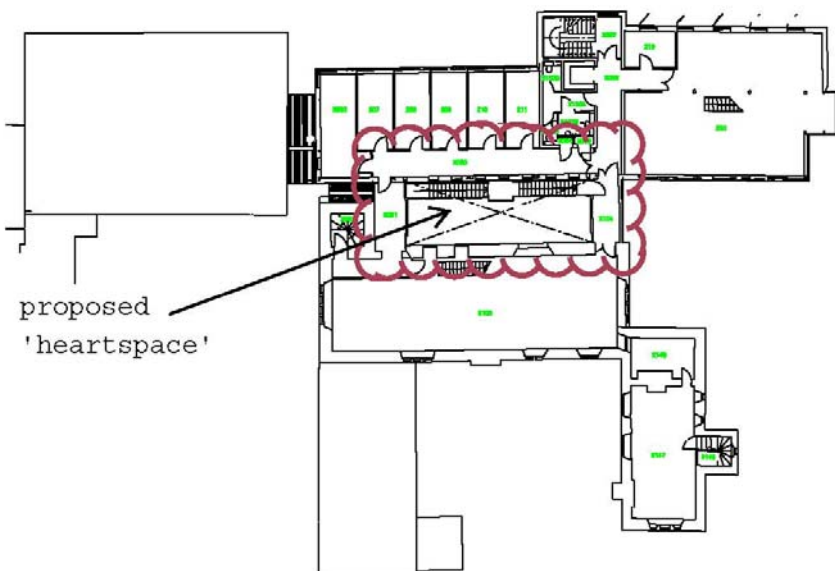


Overall the net space allocated to the department would increase from 686m² to 820m² which is still significantly less than the areas proposed through the space norm assessment (978m²).

Process

Scripted / Open: An indication of the formality of the processes which are planned to occur within the space. The floor space extensions noted above would allow timetabled and scheduled teaching to take place in a coherent manner but

	<p>the private study would still be taught in the adjacent building TC114. This plan looks to develop informal private study space within the department and to achieve that this plan proposes to develop further accommodation within the department adjacent to CL253. The plan would mean that the department could potentially relinquish space in TC114 (116m²) and use replacement accommodation in the adjacent Clegg building (120m²). The proposal would be to infill the Clegg atrium space at second floor level and provide a new facility that provides the informal study space currently lacking. Net teaching area would change to 820m².</p> 
<p>Practice</p>	<p><i>Seeks to identify how the space will be used, conceptualized and re-purposed in practice.</i></p> <p>The use of the spaces will change under the guidance of this development proposal. The sketch below proposes the new infill within the Clegg central atrium. The space formed provides the basis for the initial 'heart space' for the department. The space is the first major room that is encountered on entering the department. It is proposed to be used as a social meeting space and an area for private study. The space provides the opportunity to establish identity for the department.</p>

	 <p style="text-align: center;">Sketch Plan Landscape Architecture</p>
Occupancy	<p><i>Frequency and Occupancy of Use:</i> The development plan provides increased space and as a consequence the additional accommodation will provide opportunities to reduce the high utilisation levels identified through inquiry cycle phase 2. An initial assessment identifies that utilization levels will reduce below 46% to circa 35% which is much closer to the median standard and target set.</p>
Academic Contract	<p><i>Notions of cultural acceptability within the space, disciplinary rules, pedagogical signatures:</i></p> <p>Increasing the floor space by extending the two teaching spaces CL220 and CL253 will enable year groups to establish ownership of the rooms. Current practice and pressure on timetabling has meant year groups have to a certain degree been transient and have not had the benefit of a dedicated workspace. The introduction of a base room will significantly improve the student study experience. The proposed new heart space will be controlled to a much lesser degree. The space will become a focal point as well as a space for private study. Peer group interaction will be promoted as different course groups share and interact. The staff office and tutorial space overlooks the</p>

	heart space which is thought to be an important as it provides the mechanism to check appropriate rules of use.
Effectiveness	<i>Describes aspirations for student participation:</i> It is hoped that the five cohorts will interact effectively within the newly formed space as a consequence of this plan. The current lack of base room accommodation and shared social space is deemed to be significant barrier to establishing effective interaction.
Learning Styles	<i>Describes new emphasis for learning styles:</i> The space proposed under this plan has been developed to complement different learning styles. The solution proposed attempts to strengthen the peer to peer interaction between students through the formation of the departments 'heart space'. In addition the new plans attempt to strengthen the learning interaction between student and content (following Anderson's equivalency theory 2003) by providing dedicated base rooms with improved access to the managed on line learning environment, 'Moodle.' Emphasis will be placed on developing a set of inter connected rooms that are technology rich so that students can use multiple forms of media to share and test ideas.
Designs, Taxonomic	
Entrances	<i>Provides descriptors of how the space is required to be used:</i> New department branding is proposed across the ground floor of the Clegg building to advertise the existence of the Landscape Architecture department across floors two and three. The new heart space floor plate will be the first space visitors see as they enter the department on the second floor. The heart space will provide a vibrant social and self-study space with linked formal teaching spaces leading off adjacent corridors. The new entrance design arrangements are planned to provide identity and impact for the department. In addition further presentation space is planned for the department within the Chapel building. The intention is to progress a project where space is developed to present student work. This space may become the new venue in time for the end of year shows presented by the

	<p>students. Externally the adjacent Magnolia Court entrance way is planned to be a social learning space that provides a showcase for the Landscape Architecture department. The area in question is a poor entrance way to the Clegg Building and through the discussions the team have identified proposals to develop this space that will advertise and promote the existence of the Landscape Architecture department within the Clegg Building in addition to providing the students with an on-going case study to debate professional practice. The works anticipated at this stage will be to improve the external landscaping and to demonstrate value through good design. The works will include replacing the courtyard walling around the magnolia tree, upgrading the external paving and relocating the recycling centre. New bench seating is proposed that will make the courtyard a useable external space for the department. In terms of the design work developed by the students it was thought that the principles set out by student 9 (Nancy) should be developed further as the guiding proposal for the redevelopment of the Magnolia Court. The space would provide a welcoming learning space that through the concentric circle design would allow small or larger groups to interact without becoming distracted by passing foot traffic.</p>
<p>Teaching Spaces</p>	<p>The development plan proposes investment in the five current teaching spaces and one external space. The project seeks to extend floor plates to provide additional space in areas CL220 and CL253. The existing accommodation is also to be re-purposed to provide the following improvements. CL220 should be subject to refurbishment to improve the insulation values of the accommodation. In addition the heating system is beyond economic viability and is proposed to be replaced. Improved storage is required to enable drawing board and course materials to be stowed more effectively. In terms of CL253, networking is proposed to be installed across the upper floor once extended. The lack of a data projector</p>

	will be addressed on the lower floor of CL253. The group has requested demountable, sliding inter connecting partitions to enable the dual use of this room.
Learning Centres	Increasing access to the Moodle learning environment and installing WIFI connectivity across the department is seen to be a positive step in accessing the subject specific documents and also the library online databases. The installation of the WIFI network should also be accessible to the external learning space. The plan proposed to be adopted sets out the relocation of the students from the library TC114 to the base rooms within the Landscape Architecture department. This proposal is as a consequence of the specialist nature of the software the students require for the course and the subject specific technician support that is required within the department.
Use	<i>Open: Describes how we will use the space either enforced through policy or mediated informally through teaching and learning practice.</i> The heart space will be designated as an open access facility providing approximately 30 workspaces. This space will not be timetabled. The five teaching spaces are currently timetabled however this is proposed to be restricted to timetabling within the Landscape Architecture department so that the use of base rooms is protected for each cohort. The external space will be used when weather permits as an alternative learning space but will not subject to any timetabling rules.
Technology	
Mobile	<i>Describes the technologies planned to be deployed in the space, setting out investment plans anticipated.</i> The network within the spaces is proposed to be extended and wireless access points are anticipated throughout the facility to enable the use of mobile devices. Diversification into various other technological platforms was agreed to be supported wherever possible. In particular the team wished to bid for an ‘IPAD trolley’ that provides a set of tablet units

	for the use buy the department. Training needs were discussed and applications were introduced to help diversify the formally taught sessions proposed.
Visual / Connected	Visual connections are planned between the spaces to provide a sense of an interconnected department. The colour schemes that include floor and wall finishes will complement each other so that the accommodation provides visual impact for the staff and students. Externally the Magnolia courtyard development was seen as a unique visual branding opportunity that would represent the department and do well to market the existence of the department and the courses in the future.
Supportive	Technician support is proposed to be strengthened through the use of the newly formed ICT support team that is based at the FCH campus. Further discussions were proposed that would introduce the support team to the work within Landscape Architecture. On that basis improved service levels were anticipated moving forward.
Specialist	Some of the specialist software applications were dedicated to Apple Mac equipment. The support for this particular platform was deemed to be inadequate and it was therefore proposed that this issue would be addressed when the technician support review was to be undertaken. The location of the printers in TC114 was noted as being a problem. The equipment was deemed to be remote for the core of the department and on that basis the equipment would be relocated to within the extended footprint of the Landscape Architecture department.
Surfaces	
Reconfigurable	<i>Describes the furniture and physical components required in the new space other than technology that support the function of the space. Describes costed plans to support the plan.</i> The development plan proposes that the spaces are refurbished to provide enhanced facilities. The plan sets out the refurbishment of the spaces to improve internal finishes, heating and ventilation systems.

	Equipment selection was seen as an important factor. Equipment that would provide the flexibility to be stacked and relocated was requested.
Fixed	The plan sets out the requirement to establish CL253, CL220, and TC114 as fixed, formal teaching spaces consisting of 824m ² of accommodation. The heart space and the external Magnolia Court space would become flexible learner space.
Learner created	Learner created space would be developed within the atrium heart space formed within the upper levels of the Clegg Building.
Infrastructural	<p><i>Describes the aspects of the space required to influence the environment, e.g. air conditioning.</i></p> <ol style="list-style-type: none"> 1. General improvements consisting of upgrading departmental signage. The estates team provided an initial cost estimate of £3,000 to improve the branding across all the spaces described. 2. Applying a consistent specification for the replacement of furniture and equipment that adopts a corporate brand to provide impact. The estates team provided an initial cost estimate of £8,000 for the purchase new equipment that would be required in the extended spaces and a further £12,000 for the equipment required within the existing teaching rooms. <p>Room CL220</p> <ol style="list-style-type: none"> 3. Improved heating infrastructure to room CL220. The estates team provided an initial cost estimate of £4,000 to undertake the necessary improvements described. 4. The ICT team provided an initial cost estimate of £6,000 for the Installation of a more extensive wireless installation. 5. The estates team provided an initial estimate of £35,000 to extend the floor area to provide a further 88m² of accommodation. <p>Room CL253</p> <ol style="list-style-type: none"> 6. The Extension of the floor area to provide a further 46m² of

	<p>accommodation was estimated to require a development budget of £15,000.</p> <p>7. The formation of heart space on upper floor of Clegg Building providing 120m² of additional accommodation was estimated at a further £35,000.</p> <p>8. The external works described to refurbish the Magnolia Court was estimated at a capital cost of £65,000 for the scheme prepared by Nancy.</p> <p>Overall the phase 4 development proposal requests investment of £183,000. The team discussed phasing options to reduce and manage the impact of this bid. On that basis the group suggested a Phase 1 expenditure estimated at £100,000 with the balance being factored for a later Phase 2.</p>
Timescale	<p><i>Describes the timeframe of the resourcing consideration.</i> The programme proposed sets the development work across two curriculum years. Items 1 to 6 are proposed to be completed through the summer 2011 with the balance of the works scheduled through the following summer.</p>

5.7 Concluding the Research within the Inquiry Group

The development plan presented was used as planning document for the Estates team to direct discussions associated with prioritising capital investment. As consequence of the co-operative inquiry much of the development work described within this plan was actually undertaken. Alteration works to improve the environment and to extend the floors were completed. The works to Magnolia Court as designed by the students has been adopted as the design brief for further improvement works planned through the budget planning period 2013/14.

Chapter 6 Analysis

6.1 Analysis Relevant to the Research Questions

To assess if the research undertaken does introduce a planning framework that has the purpose of improving space efficiency the research questions identified in chapter 3.2 are re-introduced. The analysis presented reflects back to the research questions when explaining the interpretation of research data.



The research methodology introduced a four stage inquiry cycle. The framework used to define the methodology (JISC 2007) was formed from an evaluation framework that was originally developed as a post project evaluation tool. The JISC framework was originally

trialled following the completion of various new building projects to seek information that would assess if the design and subsequent delivery of the project could be gauged as a success and if lessons could be learned that would improve the design development process for subsequent projects. The value of the original framework was the diverse nature of the assessment criteria. The framework sought to understand if space was deemed to be effective from multiple different perspectives. The research methodology presented adopted the extensive criteria used within the JISC framework and re-modelled the criteria into a four stage planning tool that prompted the researcher to seek out a discussion with space users. Specific elements of criteria extracted from the JISC framework were relevant for each stage.

6.2 Design of the Space Planning Framework: Phase 1 Pro forma

Estates Department Space Planning Framework	
Inquiry Cycle 1: Focus of Inquiry	
Faculty	Specifies the university faculty
Department	Describes which department
Context	
Purpose	Describes the purpose of the co-operative inquiry.
Users	Establishes the interested stakeholders
Policy Makers	Describes the key policy makers
Policies	Describes current policies, enablers and restrictors



The initial criteria considered set the focus of the inquiry and helped establish the initial parameters of the investigation. Cycle 1 as illustrated above, prompted the group to think about the faculty or department that was the focus of the inquiry but of more significance was that it set the context of the research.

Although this is a basic prompt it did help the group focus on a specific sub element of the faculty and provided clarity for the investigation. The research undertaken commenced by seeking information about the faculty and the department.

Historical space reports and timetables setting out the current patterns of use were noted. This may be a common sense starting point for an experienced space manager but the planning framework was designed to help novice or new space planners as well as experienced practitioners. Reviewing and understanding such historical data was useful when starting the discussions with a newly formed group. It was found that having an appreciation of the spaces enabled the discussions to become meaningful from the outset. In addition an important desktop exercise was completed within this first phase that would allow later benchmarking of the phase 4 development plan proposals. Work was completed to calculate how much space the department would be allocated using the current sector space tool, the space needs framework. This current methodology is presented in figures 28 to 32 (p. 114) and a space allocation was derived by calculating the numbers of students within the 5 groups.

An area allocation or space norm was used based on the joint academic coding system included within appendix B. Utilisation levels that represent the sector median were adopted within the calculation and on that basis area assessments for each of the cohort groups were derived. The net area allocation was extended in figure 34 (p. 120) to include space for the required library study and a final area assessment of 978m² was noted as a notional target for the department. Having this context was important when commencing the research. The output of this more informed discussion was incremental development. A major change to space allocation is an unrealistic aspiration and so having this information available helped check the validity of proposals presented through the discussions. The approach adopted through the research was purposely planned to be very different. The method of the research is clearly stated as a 'co-operative inquiry' that introduced the language that moved away from a 'space assessment' and the consequential cynicism that comes with such an introduction as previously discussed by Biddison and Hier (1998).

The systematic design framework described by Shani and Passmore (1985) was used as a guiding framework in the design of this pro forma. The work suggests that context is drawn out and concerned with environmental, organisational and individual characteristics. Using this principle the criteria extracted from the JISC framework was used to test the context of

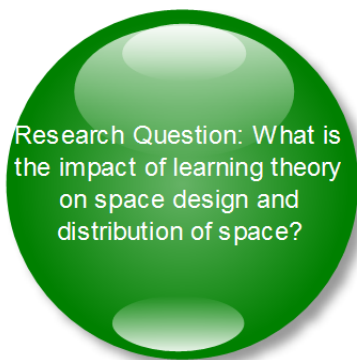
the inquiry. The research was placed within Collen's (1988) 'third arena' that placed the space planner within critical, social action, inquiry or emancipatory research. Consequently a first step was to establish the key stakeholders or co-researchers that would form the inquiry group. This was again an important step as effective co-operation is a key requirement if the process is going to consider the wider context of space use.

A novice researcher may consider that the key stakeholders are just the current room users. The framework prompted the user to think about a wider set of interested parties and on that basis the actual research undertaken started by contacting the senior managers who would be interested in the output of the work. The final section on the phase 1 pro forma was a summary list of the policy makers and key policies. Buchanan and Boddy (1992) described action researchers engaged in 'performing' and 'backstaging activities' and understanding what the rules and who sets the rules is a fundamental starting point for a researcher when 'backstaging' activities. The formation of a 'task and finish' working group did enable the more detailed research to progress smoothly within the inquiry group. Establishing objectives, reporting arrangements and responsibilities helped bring credibility to the first phase which was concerned with forming the research group. The context and objectives of the research was easily communicated as a consequence of the formation of the steering group. In terms of presenting the draft end stage development plan, returning the proposal to the Space Management Working Group brought credibility and tested the proposals ahead of spending monies on the first stage development work.

Conclusion

The research question posed was to understand how evaluation frameworks can guide the development of a new space planning tool. A new approach associated with the engagement of space users has been documented in the form of co-operative inquiry and the process of co-operative inquiry has been enabled through the development of the four staged process described as the space needs framework. The analysis suggests that the space needs framework has generated rich descriptions of the current activities within the department that was the focus of the case study. In addition, as the process developed the space needs

framework prompted the researcher to seek an understanding of a wide set of variables that all combine to influence space use. As an output the space needs framework provided the opportunity to record the shared understanding that ultimately formed the development plan owned by the cooperative group. So to answer the question posed, the evaluation framework used has provided the basis of an effective space planning tool that has helped establish a very clear focus for the inquiry. The analysis now progresses to consider the effectiveness of the space planning tool through the 2nd phase which was designed to help the space planner understand current practice. Again the analysis is considered in relation to the research questions initially established.



6.3 Design of the Space Planning Framework: Phase 2 Pro forma

The second inquiry cycle used the evaluation framework criteria to assess how space and associated resources were being used currently. This was the first insight into understanding the impact learning theories and the different modes of delivery were having on the design of the current spaces occupied.

Estates Department Space Planning Framework		
Inquiry Cycle 2: Current Practice		
Activities		
Interactions	Describes the interactions actually happening	
Design Gestures	Links between built environment and pedagogy	
Process	Scripted: An indication of the formality of the processes which occur within the space	Open:
Practice	Seeks to identify how the space has been used, conceptualized and re-purposed in practice	
Occupancy	Frequency of Use	Occupancy Use
Academic Contract	Notions of cultural acceptability within the space, disciplinary rules, pedagogical signatures	
Effectiveness	Describes student participation	
Learning Styles	Describes learning styles observed	
Designs, Taxonomic		
Entrances	Provides descriptors of how the space is actually used	
Teaching Spaces		
Learning Centres		
Use	Open: Describes if use is enforced through policy or mediated informally through teaching and learning practice	Closed
Technology		
Mobile	Describes the technologies deployed in the space	
Connected		
Visual		
Supportive		

Specialist	
Surfaces	
Reconfigurable	Describes the furniture and physical components other than technology that support the function of the space
Fixed	
Learner created	
Infrastructural	Describes the aspects of the space that influence the environment, e.g. air conditioning
Timescale	Describes the timeframe of the resourcing consideration

Interactions

The second phase inquiry cycle focused on understanding what the current practice was within the particular school or department. The second cycle opened by prompting the group to seek out an understanding of the current interactions. The framework acted as a useful prompt to draw out what rooms the Landscape Architecture team had access to and how they used the rooms. What became evident through the exchange were the constraints associated with custom and practice, particularly associated with timetabling. The framework helped draw out the discussions associated with implied and historic rules that were not written policies, just reflections of 'how things are done'. The framework differentiated between formal taught and informal private study which was useful when attempting to understand how the department timetabled the various spaces. This exchange introduced the notion that the use of space is far more than a group of students being placed in a room. Talking within the group about the interactions introduced the concept of social learning and formal taught sessions so again for a space planner who is inexperienced within the HE sector, having this prompt would be useful to open an exchange.

Design Gestures

The space framework also prompted the researcher to gather data and reflect on how the design of the space either complemented or hindered teaching and learning. The research identified basic hygiene factors such as regular distraction to students as a consequence of

different groups competing for space simultaneously in CL253. The notes recorded on the framework considered matters such as lighting, heating and the location of key items of equipment. It recorded the users observations associated with how spaces could or could not be used and noted the tensions associated with groups competing for room CL132. In use the co-researchers readily had views on these matters however if the space planner was in a situation where the exchange across the group was limited, then this would have helped prompt questioning concerning current issues associated with design.

Process

The framework prompted the researcher to think about the group discussions from an 'open' and 'scripted' perspective so described to receive an indication of the formality of the processes which occurred in each space. Discussions surrounding this interaction moved away from the identification of the basic hygiene factors to discussions associated with how co-researchers wished to influence the teaching and learning activity through the introduction of different learning approaches. The framework allowed the space planner to seek an understanding of the way students currently used the space. The research identified groups attempting to use the same CL253 space in conflicting ways. One cohort was attempting to undertake private study whilst a formal session was held at the other end of the room. This was clearly distracting for both groups and must be questionable in terms of providing a quality learning environment.

Practice

The 'practice' section provided a useful space to record how the resource was actually being used and how that differed from how the space was conceptually designed and purposed. As an example the research identified that the students were attempting to create three dimensional models in a room that was clearly not set up as a design studio. The space was clearly a traditional classroom and storage and access to equipment was a continuing frustration. Storage was located in an adjacent through corridor which meant students had to effectively leave the room to access equipment or store their work. This type of activity may

appear on paper to be space efficient however the end users were clearly dissatisfied with the arrangement.

Occupancy

The section dedicated to occupancy provided a useful prompt for preliminary research ahead of the inquiry cycle. In terms of the action research undertaken preparatory work was completed to establish the approval process and focus for the case study. This data was gathered from the annual university headcount survey and was useful in that it illustrated how frequent the space was used and to what capacity. The data recorded identified very high frequency of use statistics and above sector median occupancy statistics. Including this data within the space planning framework introduced the operating context for the department at an early stage. Discussions within the inquiry group quickly noted the intense use of the space that was in turn evidenced by considering occupancy data.

Academic Contract

The space planning framework also helped initiate discussions associated with the formal and informal rules that existed within the various spaces. A relaxed and informal atmosphere was recorded as being the guiding aspiration for the various interactions planned. This was difficult to facilitate in such a heavily used suite of rooms. Increasing the capacity in the spaces CL220 and CL253 provides the opportunity to form a base room for the different groups which directly provides the opportunity to alter how the space could be used in the future. The culture of packing up materials and equipment changes with the development of a base room and the space planning framework identified and prompted a discussion around this development opportunity.

Effectiveness

The concern with developing more base rooms within the faculty is the impact this would have had on the overall utilisation for the department. The establishment of dedicated resource rooms such as this does promote the tendency to reduce the turnaround of classroom activity which in turn would reduce utilisation. The space framework sought a

discussion surrounding the balance of base room and shared social space. This prompt helped establish the overall accommodation plan and helped the space planner think about what criteria needed to be considered when establishing the accommodation offer. The research noted the lack of social learning space in CL253 and acknowledged the formal set up for equipment.

Learning Styles

The space needs framework was a useful tool to document curriculum development linked to learning style. This was a difficult concept to draw out through the discussion however the through the course of the inquiry cycles it became clear that the staff wanted the space to develop in two distinct ways. The researchers wanted to develop a 'heart space' or a social space on the upper floor that would not be timetabled but would be used informally between the various students from all of the five groups. The concept of developing a social space is perhaps deemed to be unproductive by a space planner as it is accommodation that generally does not get added to the timetable and consequently does not get measured when resource intensity is measured for a particular area. The space planning tool did encourage the space planner to support the stated need for such additional social space as the co-researchers were able to discuss the improvements peer to peer learning would have on the student experience.

The space planning tool therefore not only helped to introduce multiple factors for consideration but helped the space planner understand how students interact and learn. As an output there was justification for social learning space that traditionally may have been challenged and would potentially have become a point of contention. As an example, the co-researchers were keen to encourage peer to peer learning and to place more emphasis on this form of learning style. The current environment achieved that in a limited way but was far short of the spaces described by the academics through the exchange. The co-researchers were also keen to ensure the infrastructure was also developed so that the 'student to content' learning interaction was more readily available. Dedicated base rooms would provide the physical manifestation for improved course content, supplemented with allowing the students to access content from numerous other platforms associated with mobile technology. The

space planning tool allowed the space planner to make the connection that established the importance of technology to access relevant content. This reinforced the concept that an effective learning environment is a holistic discussion that is very much more than allocating space in accordance with a space norm.

Entrances

The space planning framework helped the researchers think holistically about the wider student experience associated with how students feel part of the department. The framework sought to document constraints and opportunities associated with the how the entrance of the department promoted the learning experience. In this case study the absence of a departmental entrance led to discussions associated with 'identity' of the department and how students felt that they were remote and not part of a significant department. Again discussions focussed on the development of social space to form the entrance. This was thought to be important as it promoted the sense of being part of something more significant.

This was an important factor when linked to how the co-researchers wished to develop the peer to peer learning experience. Through this phase the team did not need a prompt to think in this way so the phase 2 pro forma was used as just a method to capture the exchange.

Teaching Spaces

This section of the planning tool was used to document improvements associated with the type of learning materials presented around the room. Discussions opened by reflecting on general descriptions of the spaces but they did progress to an exchange associated with what appropriate content should be presented around each classroom space. Then rooms were noted as being 'clinical' in nature and it was thought ownership of the spaces could be encouraged if relevant materials to the Landscape Architecture department could be displayed.

Learning Centres

This section of the planning tool was used to document what access and what facilities the learners could access in terms of the library and learning centre. Understanding how effective the learning centre is to a student is acknowledged on the current space needs framework as being a critical issue. The current spreadsheet asks the space planner to assess how much time the learner has been allocated across the timetable for private study within the library. This section of the pro forma was much more useful in that it prompted an exchange that described how the learners wanted to use resources within the learning centre. On that basis the research identified that the staff wanted to switch the resource from the learning centre to the Landscape Architecture base rooms. The co-researchers believed that due to the nature of the specialised software, access to the computing equipment is best supported from within the department. The framework provided a specific section to focus on the discussions associated with learning support and again acted as a useful prompt when considering support functions to the department. This singular issue had significant space implications and was fundamental in supporting learning activity. The framework was of considerable value here in prompting this discussion.

Use

This section of the space planning framework was useful in that it helped prompt the negotiation of the rules associated with how space was to be used in the future. The co-researchers were clear that the new heart space that was proposed to be developed within the Clegg building should not be restricted by adding this to the timetable. On a similar basis the other rooms have been historically heavily timetabled and it was agreed that this would also be changed. The remaining spaces would be timetabled as base rooms which in effect mean that the space is designated as a specialised resource and not available for use outside of the department. There was an initial concern about this new policy however overall the data provided by virtue of the space needs framework demonstrates the department will be operating under the space norm allocation.

Technology, Mobile

The space planning framework was used to document the proposals associated with developing mobile technologies within the department. The discussions and ideas raised through the co-operative inquiry were similar to the principles summarised by Campoy (1992); Stommen and Lincoln et al., (1992) in that the researchers wished to see a shift from whole class to small group instruction that was made able by students using technologies to work and explore learning at their own pace. The framework recorded the interaction however in the absence of such a discussion the framework would have provide a useful prompt for researchers trying to understand the implications of mobile technologies within their particular study. The implications of harnessing alternative technologies means the way the space is used is quite different and so it is appropriate that a space framework encourages this dialogue.

Visually Connected

The framework sought to prompt the research group into discussing the visual connections across the department. The discussions within the inquiry group attempted to strengthen the presence of the department and considered signage, furniture, location of the teaching spaces, the use of the spaces and the types of activity being undertaken to ultimately develop the brand and presence of the department. This particular section was useful as it provided the mechanism to document through the case study the areas where the co-researchers believed improvement could be identified. The group explored how external spaces could be made available for the students to undertake design practice. External learning spaces were discussed and opportunities to develop ecology and environmental plans for the university grounds.

Supportive

The framework prompted the researchers to think about support activities that would enable or frustrate a particular activity. The research focussed on ICT support as being a barrier. This perhaps would not have been apparent through a traditional assessment of space efficiency so again was a useful prompt that established a key efficiency factor. In particular the group was

concerned about the lack of ICT support associated with the use of the main Francis Close Hall ICT room TC114. Proposals were discussed associated with extending accommodation and relocation resources back to within the department.

Specialist

Linked to the 'supportive' prompt the framework provided a section that enabled the specialist nature of the event to be considered through the discussion. The co-researchers discussed frustrations associated with the lack of ICT support due to the specialist nature of the software used by the Landscape Architecture team. The improvement set out within the development plan suggests more technicians are required but it also identifies a training need to help support the CAD applications used.

Surfaces: Reconfigurable

This section introduces the specific development plan proposals that the co-researchers believed would enable accommodation effectiveness. The following sub categories set out the specifics of the plan.

Fixed

The plan describes the development of teaching spaces CL253, CL220 and TC114 and proposed that this space became fixed core teaching accommodation. The framework therefore provided a section to allow the researchers to document how the different types of space would be used. Understanding the interaction between formal teaching space and informal social learning space is a more sophisticated methodology that is underpinned with understanding the different learning styles and opportunities that the co-researchers wished to explore.

Learner Created

The learner created section of the framework provided an opportunity for the researchers to document where and how social learning spaces would be developed. For this particular case study a new social learning space is proposed to be formed as a second phase of the

development plan. The project proposal established the need to form a new floor on the second level of the Clegg building. This was deemed to be a cost effective way of forming the much needed extra space.

Infrastructural

This particular section establishes a space at the end of the report where the proposals are summarised into a costed action plan. When linked to the final section, ‘timescale’ a section for project programme and sequencing was established.

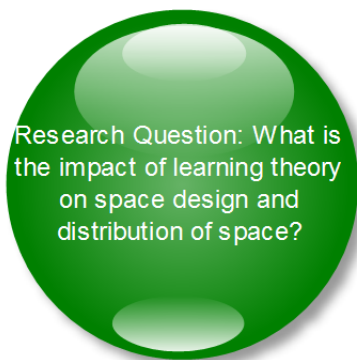
Conclusion

Whilst the tool has provided the space planner with a framework to collect and document research for a particular area, it has acted as a useful prompt that seeks to understand a wide variety of complicated issues such as changes in learning style that impact on space design and use. The prompt is very necessary for estates practitioners who are not familiar with teaching and learning strategies that ultimately influence how space is designed and used. The diversity of inquiry introduced through the evaluation framework has therefore contributed in a significant way. To conclude section 6.3 and to answer the research questions posed it can be summarised that the analysis demonstrates that the use of the new procedure through the second phase has provided a detailed understanding of the multiple factors that contribute to a clear definition of how the space was used including descriptions of what the limiting factors were. The new methodology has identified that the end users of the space have a great deal to say about the impact of learning theory and how technology should be used within the space. So on that basis the design of the new procedure was relevant and effective in that it drew out this discussion to inform the next planning stage.

6.4 Design of the Space Planning Framework: Phase 3 Pro forma

The inquiry group came together again November 2012. The third phase of the research consisted of six group meetings. The group engaged and generated some interesting and quite radical proposals in a few short weeks. Assessing the implications and forming this into a deliverable development plan took three months to do and reflecting on this process more

effort could have been made to keep the members of the inquiry group better informed of the work that had been undertaken in forming the responses to the ideas generated. This has not been a criticism raised by participants to the inquiry cycle but merely an observation as a participant of the process. The planning framework in phase 3 saw the tool change to provide a document that prompted the researcher to record and explore *proposed* changes identified through the inquiry cycle discussions. The group had become more confident with the member interaction and this was a contributory factor that saw the size and shape of the group expand. The academic team wished to use the expertise of a particular student cohort to help design and plan elements of the scheme. This was quite unexpected but demonstrates how establishing the right environment for creative research can set in train a structure that provides opportunity far in excess of expectation at the start of the process. The group introduced solutions and ideas for the both the internal and the external spaces described through phase 2. The following key themes of particular relevance are noted and are relevant to answering the two of the research questions posed.



Interactions

It was interesting to see how the group had begun to look wider than just to the spaces currently occupied by the department. There were some interesting proposals to use the Chapel space at Francis Close Hall as the presentational space for the end of year shows. The space is poorly used and this idea would could certainly be supported which in turn would alleviate space issues that arise at this point through the calendar. Much discussion was held about developing interconnected spaces and social learning spaces.

Design Gestures

The focus was more intense associated with location and design of space rather than area allocated. The group wanted to establish spaces that complement in terms of location and how they would be equipped. Getting the design of this right was certainly a theme that reoccurred through the various exchanges. Mezzanine additions were debated as being cost effective solutions to provide the space within the department and to achieve that in a cost effective way.

Occupancy

The group wanted to ensure frequency of use and occupancy of use utilisation statistics were reduced as a consequence of extending the number of teaching and learning spaces available to the department. There was a general acknowledgment that it was too competitive for all that as an output was adversely affecting the quality of the student experience.

Academic Contract

More space would also allow the group to depart from the strong rules of operation that existed through the timetabling of the space. A less regimented arrangement was seen as benefit for all.

Effectiveness

Staff development associated with accessing and using technology and applications was thought to be a continuing need that would be satisfied by accessing the CEAL building and the training facilities contained at that site.



Learning Styles

The group was seeking to strengthen the peer to peer relationship between students as a method of improving learning within the department and they believed that remodelling the accommodation would help draw the different cohorts together.

When considering the design gestures the inquiry group believed that it was important to place the social space or form social space adjacent to the teaching spaces so that new opportunities for peer to peer working could be tested. The department will be operating at approximately 17% less space than what could have been established through a traditional space norm assessment. The development plan potentially aligns space in a way that complements the learning theory and through this case study the consequences of that is improved space efficiency.

This was felt to be a missed opportunity currently. Accessing social learning spaces was seen as a key facilitator. In addition to strengthening the student peer to peer relationship the group also placed emphasis on improving the learning experience by ensuring that students could access exciting, relevant course materials. The group wished to widen opportunities to access content via Moodle and proposed investment in WIFI technology. The research team wished to improve the quality of the course material used and believed an improved focus on the interaction between student and course content would provide improvement. Accessing this information was proposed through several different technological platforms and again this was anticipated to be used from within formal and informal teaching spaces. To access the learning material new technologies were described and different types of space were anticipated both formal taught accommodation and social space. As a consequence the design and distribution of space is different. The group was looking to relocate teaching away from a structured ICT space within the TC114 and replace that with sessions within the department that could be accessed through a MAC computer or potentially a smart phone. The shift in learning theory to focus on improving peer to peer learning relationships and student to

content interactions has meant that the space is different. On this basis an area allocation based on a space norm would seem to miss this important interaction.

Entrances & Teaching Spaces

A broad theme of 'presence' and 'branding' was noted across many of the discussions. The department wanted to develop this to ensure it maximises future recruitment opportunities but to also address concerns raised by students associated with lacking a sense of belonging.

Learning Centre

The location and support of the resources currently contained within the Learning Centre was a recurrent theme that was proposed to be managed through the relocation of specialist printing equipment back the Landscape Architect suite of rooms.

Reconfigurable

This was perhaps the most pleasing aspect of the research where the core researchers decided to expand the membership to include their student group. The theme of providing an external social learning space introduced some interesting proposals that ended up being viable and complementary to a rundown external space on campus.

Conclusion

To consider the effectiveness of the new procedure through the third phase, the research questions were again considered. The solutions and ideas that came through this development stage were prompted by the new space planning methodology. The solutions and ideas did come from 'unpacking' the use of space through reflections associated with the understanding of spacial requirements needed for different types of learning experience using new modes of technology rich methods of delivery. So again the research questions were relevant but more importantly the design of the new methodology in the form of co-operative inquiry, prompted the researcher to approach the inquiry in a way that provided ideas that have improved resources for the faculty.

6.5 Design of the Space Planning Framework: Phase 4 Pro forma

The development plan that records the proposed actions for the case study at Francis Close Hall is significantly influenced by the co-researchers wishing to change the way they deliver the curriculum within the department. The opening section of the Development Plan describes the interactions that are planned within the department and the co-researchers placed emphasis on developing accommodation that has a strong identity with interconnected rooms.

Reflections

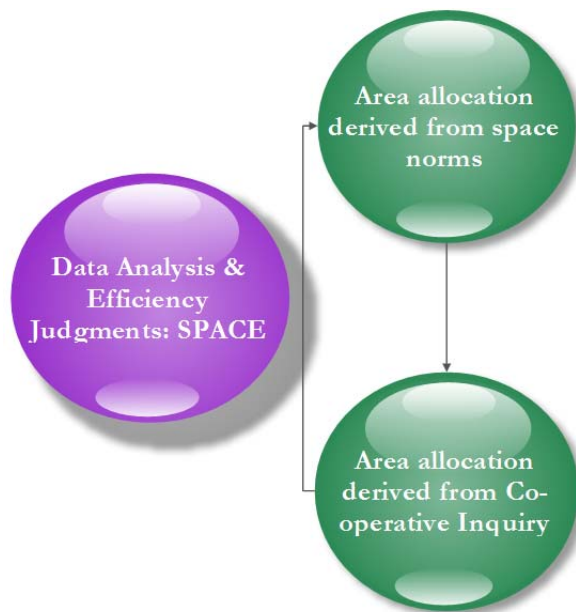
Through the case study the methodology adopted was specifically selected to ensure that the approach provided the best opportunity to engage and understand the implications of how the academic team wished to design and deliver the various courses. The space needs framework specifically encouraged the dialogue and prompted the co-researchers to think about teaching and learning first as a guiding strategy to influence special design and space use. From the analysis we can see that the development plan is proposing some very specific changes that realign the accommodation to provide more social learning space and to provide improved access to a wide variety of alternative technologies. The development plan and the changes so described do however emerge from the teaching and learning strategies introduced by the co-researchers through the process of co-operative inquiry. The answer to the initial research question is that learning theory has a significant impact on the design and distribution of space and on that basis a new approach to space planning must place focus on understanding this issue before a space allocation is proposed.

Conclusion

The data gathered identified that the co-researchers wished to develop the number of base rooms and to extend and develop the social learning facilities. The team wished to enhance access to the course materials and to use the content found on the internet to extend, test and widen the learning principles introduced through the taught sessions. The space needs framework prompted this discussion and the output can be seen across the exchange

documented through the various stages of the co-operative inquiry. On a similar basis to the analysis associated with the previous research question, the direction set out by the team did influence the type of space now required. The team wished to promote the use of technology as a means of increasing the peer to peer interaction. The more significant impact is associated with developing skills to question through independent research, enabled by accessing diverse and extensive internet based information. This aspiration is promoted by the establishment of the social learning and group learning spaces proposed. So to conclude this section and answer the research questions, the final phase of inquiry prompted through this new methodology has established a solution that is space efficient whilst meeting the needs of the inquiry team. So the design of the tool that considers the variable concept of the learning interaction that places focus on learning theory and technology has provided an effective solution within this case study. The next step of the research is to test this statement through validation.

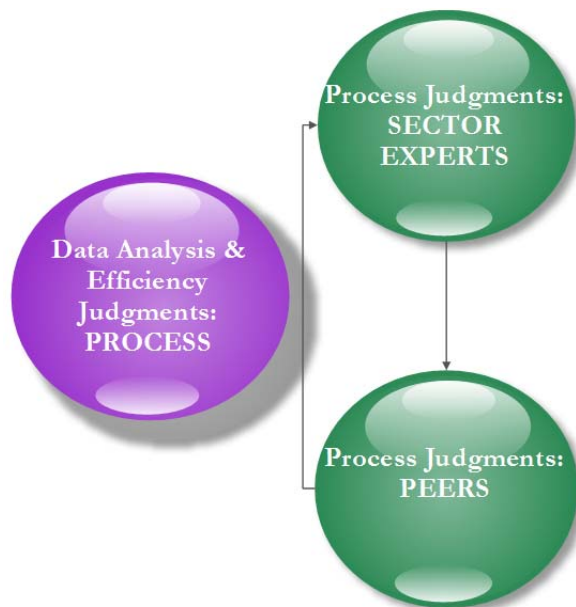
6.6 Validation: Space Efficiency Judgements



The research data presents a position where the department has contributed to the development of a plan that is seen as a significant improvement to the allocation and distribution of the resources for the curriculum area. This result has increased the amount of

space allocated however it is still significantly less than an allocation derived through a statistical calculation derived by applying a space norm (p.157). The process adopted has the benefit of a form of validation that allows a judgement to be drawn that is based on a statistical assessment of the output of the research. This has relevance to space managers responsible for departmental, faculty and whole organisational capacity planning. This case study has identified a positive output when area is considered in isolation. A limitation of the research is that it is not known whether engagement on this basis will have a similar impact. Future case studies conducted within the department on this basis will develop a trend and allow further conclusions to be formed. (Limitations of the research are considered in more detail in chapter 7, section 7.10.)

6.7 Validation: Process Judgements



A further limitation of the research anticipated was linked to the methodology adopted and whether it could subsequently transfer across different faculties and departments. Landscape Architecture is by the very nature of the subject area accustomed to the language of spatial design. The methodology adopted placed emphasis on establishing co-operative inquiry as the process to gain a detailed understanding of how staff and students wanted to work and learn

within the department. The individuals were conversant with spacial design but it is argued that the **process of engagement** was the important learning point through the research and the variable nature of the tool can therefore cater for a detailed discussion within **any** faculty as long as there is a cooperative forum for continued discussion. On this basis it is argued that the new approach to space planning is transferable. To validate this position, the detail of the process adopted for the case study was shared with peers within the estates department and with sector experts, namely Sian Kilner, Kilner Planning and the Head of Space & Asset Management at the University of Bristol, Matt Fullford. The process of validating the findings is described below as follows:

6.7.1 Validation discussions with Kilner Planning

The first validation meeting was held in June 2013. Kilner Planning was asked to contribute to the work because of the extensive contribution made in developing space planning tools within the HE sector through the work of the Space Management Group (2006a, 2006b).

The format of the half-day session consisted of an introductory presentation of the research. A draft of the abstract and selected details of the case study and analysis were issued ahead of the meeting as background reading. The session commenced with the writer presenting details of the case study and describing the methodology adopted and the analysis drawn from the case study. Conclusions drawn from the research were not shared at this stage as it was anticipated that this could have skewed the response received. Following the presentation the writer sought views on the case study through a structured interview. Questions were pre-prepared and were used to direct the discussion. At the end of the meeting a transcript was made of the session.

The following views were received as a consequence of the session.

Do you think this approach could be of use across the sector?

There was clear support for the methodology presented. Through the exchange Sian Kilner thought that the strength of most Universities was their ability to change and respond to

external market forces. Kilner Planning used the words 'agile' and suggested that it was much more common to find estates departments able to engage in a 'multi layered resourcing discussion'. She described this multi-faceted interaction as being an increasingly 'common language' that would work well if guided by a more structured planning tool such as the proposed within the research. Sian believed there was merit in the process presented but stressed the importance of a clear process of triangulation to measure area and consequentially space efficiency. Having the ability to understand the resultant space allocated, quantified against space norms was still seen as an important output. Despite this Sian had seen examples of forms of the approach described within the case study but accepted there was no acknowledged procedure or guidance to offer to the sector.

How do you think the new methodology could be improved?

Sian was interested to see the extent of the research presented within the case study. The discussion was complementary about the learning through co-operative inquiry and the solutions derived through engagement. Sian did suggest simplification of the methodology if it was to be used as a general tool by a space planner. Sian recounted her experience where the process of consultation had been swept aside as a consequence of top down institutional decisions forcing immediate action. This was noted as a common occurrence which means estates teams would find that there is no time to engage in such a comprehensive dialogue. We jointly reflected on projects where this issue had comprised a planning process. We did reflect that the stages of the new procedure were still relevant however the rigour of each discussion could be reduced if time was seen as being of the essence.

Do you think it is transferable to other curriculum areas?

Through the discussion a specific question associated with transferability of the new methodology was asked. Sian believed that the process was transferable between departments and faculties because she could see that a co-operative inquiry or a grouping of individuals with shared common goal was in her experience a powerful 'change agent'. She did not believe the type of accommodation was relevant. The focus was on getting the key

stakeholders together to be creative and as a consequence efficient through their deliberations. Kilner Planning wondered if it would work where a faculty had no space or ownership of space to begin with. In effect, the subject area would have nothing to trade with. She believed the underlying issues had common themes that were prompted by the space planning framework. She believed that this commonality was the reason it could be transferred between subject areas.

In summary the output of the session provided for a complementary exchange. It was agreed that a copy of the final thesis would be made available to Kilner Planning for onward discussion within the Space Management Working Group.

6.7.2 Validation discussions with University of Bristol

A further validation meeting was held in August 2013 with the Head of Space & Asset Management at the University of Bristol, Matt Fullford. Matt introduced his role at Bristol and noted that he was responsible for all space planning matters for an estate that was the home for 17,000 undergraduate students consisting of some 425,000m². This represents an estate five times larger than Gloucestershire. Matt's help and advice was sought due to his experience of managing a significantly more complex and varied university estate.

Again the format of the half-day session consisted of an introductory presentation of the research. A draft of the abstract and selected details of the case study and analysis were again issued ahead of the meeting as background reading. The session commenced with the writer presenting details of the case study and describing the methodology adopted and the analysis drawn from the case study.

Do you think it is transferable to other curriculum areas?

Following the presentation Matt explained the types of approach he commonly adopted when managing space matters. He described various examples or case studies and through that discussion it highlighted the difference between the two Universities. Matt reflected on several projects where the academic teams were focussed primarily on research rather than

undergraduate or post graduate teaching. Research in the writer's university is relatively small so it was interesting to see how Matt's approach transferred between the two activities. Matt described the methodology where the discussions were driven by space norms. This, as noted within the literature review (section 2.2, p.14.) is the usual practice and was therefore of no surprise. The approach seemed to be a reactive exchange that commenced as a consequence of the academic team signalling that there was a space related problem that was hampering the work of the department or faculty. The new methodology that would systematically work across the university to establish a longer term resourcing plan was seen as a step forward. The limitations of this were shared when we compared the size and nature of our staffing teams responsible for this activity. Whilst this procedure was seen as a benefit, resourcing the team to enable it to move away from providing a reactive to a planned space planning service was seen as a challenge.

In terms of the transferability of the new procedure, Matt was excited by the co-operative approach presented and noted that they 'would try to apply this approach' as he believes he has had most success through an approach where there was no conflict or tension through the discussion. Matt was particularly interested to note that there were no boundaries set through the stages of co-operative inquiry. He could see that this encouraged creativity but more importantly it would allow the process to be used across all types of activity within Bristol. This was a useful point that provided confidence associated with future planned onward trials in different curriculum areas.

Do you think this approach could be of use across the sector?

Matt was interested to consider the use of the approach within Bristol. He could see the need for the output of the process to provide a resultant space norm to aid the verification of the resultant plan however he was much more relaxed about this aspect than compared to the view made by Sian Kilner. Matt noted that 'it was good to know the space target' (when discussing in particular the Veterinary School at Bristol) but was more interested in ensuring the School had a 'decent and fit for purpose' allocation of space. On that basis he could see

the need for a more structured space planning tool that placed emphasis on fitness for purpose rather than area allocated.

Matt also reflected on the nature of the university estate moving forward. He made the point that this procedure would be more valuable now due to the current operating context for Bristol. Capital investment was now limited compared to five years ago and consequently accommodation solutions were now focussed on refurbishment and repurposing rather than new build. Matt believed the sector would benefit from this new procedure, particularly at this time because it encouraged creativity and ‘self-help’ that would focus on re-purposing and using what they have as opposed to moving directly to a more ambitious and expensive solution.

How do you think the new methodology could be improved?

Matt did provide a useful point associated with how the process could be improved. Matt explained that through his experience he had been involved with projects where creativity and solutions had been developed using a similar collaborative process. He described an example where the group had developed space by knocking down walls and forming larger space through a process of remodelling and refurbishing a poorly used suite of rooms. The result of this had provided more built area however the space had no windows and was consequently hated by the teaching teams and students. Matt warned that there needed to be a checkpoint within the co-operative inquiry process to check basic compliance and safety matters as a process led by academics could miss such fundamental design issues. This was a useful point that needs to be factored in future use.

6.7.3 Validation discussions with peers within the Estates Department

The final validation process adopted for the research was within the estates department. The campus manager and the facilities manager have responsibilities for space planning work within the university and so on that basis views were sought through a joint meeting. In terms of preparation, a presentation of the research was conducted on the same basis as the

previous two validation discussions. A structured interview followed the presentation and a transcript note taken as a record.

Less time was spent discussing the detail of the case study due to the staff being familiar with the work that had taken place within the Landscape Architecture department. Much of the discussion replicated the views expressed by the external contributors. Both managers could see the merit of the structured, staged approach for defining the extent or focus of the inquiry, establishing current practice and future ideas. It was acknowledged that the detail of the space planning tool acted as a clear prompt to discuss space use. The managers noted that they would not ordinarily have thought about discussions associated with understanding the pedagogy.

Overall the managers believed this would be a good procedure to trial further. The most significant reservation was linked to a training need. The managers were less confident about their facilitation skills when the discussion through co-operative inquiry would move into an exchange based on pedagogy. They did however note that they were not leading the discussion and that solutions would be group led.

To summarise the validation exercise undertaken, a satisfying set of responses were received that demonstrated that the process of co-operative inquiry and the arrangements of the specific four stage procedure trialled was readily understood by all. The procedure, whilst quite different from current practice was not overly complicated to a point where the overall understanding of the process was compromised.

The key issues tested were associated with the transferability of the process across different room forms. The experience held by the external experts and internal practitioners suggested that the inherent flexibility associated with the design of the new space planning tool would enable effective use across subject areas and between teaching and research based subjects. On that basis the validation process has provided confidence that the new methodology could be used for more significant trials within other Universities.

6.8 Learning Reflections: Analysis

1. The evaluation framework helped focus the inquiry and gain a detailed understanding of current arrangements and constraints.
2. The design of the new methodology prompted the group to be creative in finding solutions to the issues raised.
3. A methodology that considers the variable concept of the learning interaction that places focus on learning theory and technology has provided an effective solution within the case study.
4. A challenging process requiring specific training needs to enable facilitation.

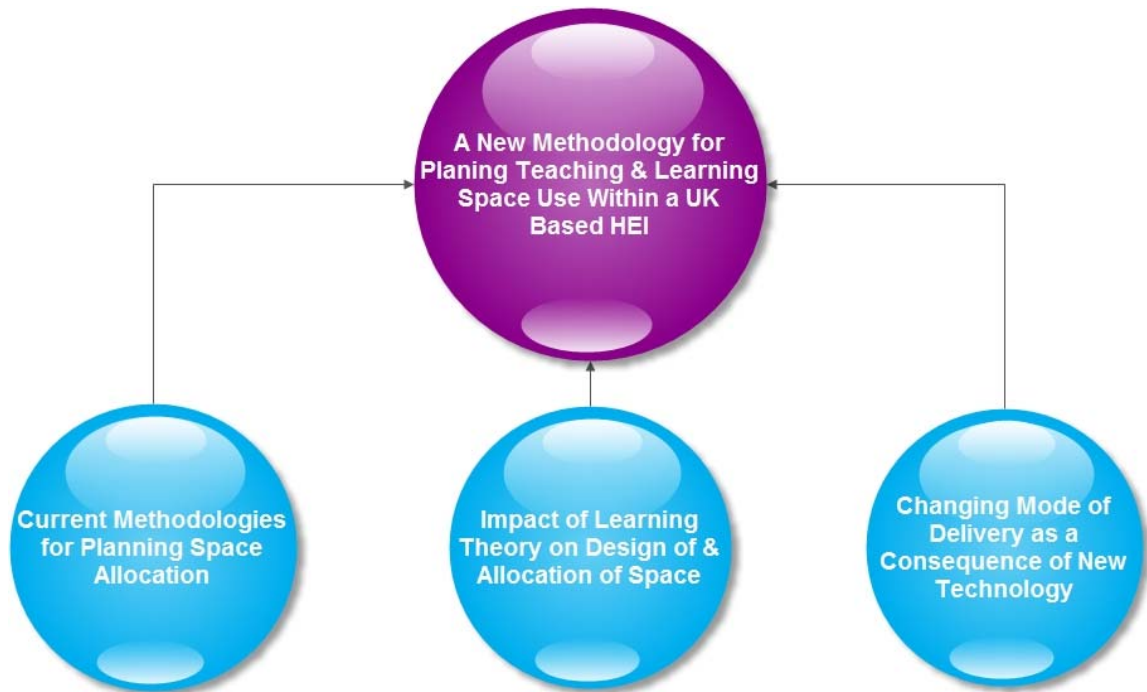
Chapter 7 Conclusions and Implications

Before conclusions are presented it seems appropriate to remind ourselves of the research objective so that conclusions clearly link back to the original focus of the inquiry. The learning from the literature review concluded that there is a need to place focus on improving space utilisation across the educational sector. The review considers the economic environment our Universities operate within and notes the financial imperative to ensure the sector is able to deliver its educational activity from an optimized cost base. The literature review considered how space planning and space distribution has developed historically and notes that despite this effort there is still major opportunity for improvement. The review concludes by suggesting that there is a gap or an absence of fitness for purpose dialogue between those using or planning the use of teaching and learning space and those responsible for the development and distribution of space. The following figure usefully illustrates the journey through the literature review resulting in restating the research objective.



As a consequence of the literature review the research focussed on three subthemes. Research questions were established that would seek to understand the impact each of the sub themes

would have through the research. The sub themes and associated research questions have been considered in the analysis.



The fourth and final question draws the themes together and allows overall conclusions and recommendations to be drawn.

7.1 Main Findings: Managing change



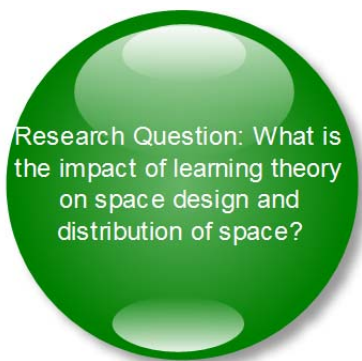
Using the space planning framework through cycle 1 helped the researcher develop a very clear focus for the study. It prompted the researcher to define the extent of the research but more importantly to consider the politics associated with who and how the space was used.

Managing space effectively is also about managing change effectively and the formation of the Space Management Working group was seen as a good way to start that conversation. Improving space efficiency was noted through the co-operative cycles as being concerned about the policies and policy makers associated with access and the use of space. A space planner using the current methodology is concerned with space norms and student numbers, with no guidance provided to introduce how to understand and then manage this complex interaction which binds space use.

7.2 Understanding the context and formal / informal rules of use

The second phase inquiry cycle was developed by the use of the planning framework to help investigate the current activities taking place. The framework was useful to record how many spaces, the sizes of the space and how design gestures featured to direct the use of the space. Of significant benefit was the discussions that were prompted associated with the current informal and formal rules associated with the use of space within the area. The team believed that they were simply not allowed to use the external communal areas for teaching purposes. This issue had never been raised with the estates team from my recollection and was an easy rule to waive. There would be no impact as a consequence of changing this rule. However it opened up a whole new perspective for the Landscape Architecture department who then viewed access to external areas as an opportunity to stamp a brand on the campus to publicise their existence and to develop social learning space.

7.3 Understanding informal and formal learning processes generating ideas



In addition to teasing out issues associated with custom and practice the phase 2 framework asked questions of the academic team associated with how they currently delivered the learning experience.

The process teased out issues associated with custom and practice the phase 2 framework asked questions of the academic team associated with how they currently delivered the learning experience. The exchanges documented the formally taught and informal learning arrangements and through this stage of the investigation it became clear that the learning experience was bounded by the accommodation and resources provided to the department rather than supporting the learning propositions that the academics sought to introduce. The third phase cycle that focussed on introducing the potential solutions identified that the academic staff would like the facilities that encouraged peer to peer and student to content learning. This aspect changes the space and resource allocation significantly and would never be clear to a space planner who would approach a space assessment using the current formulaic area allocation process. This whole approach of seeking to understand the learning interactions proposed has not been a scientific calculation borne from a positivistic perception of what is right for the end user. Approaching the inquiry from a participatory paradigm has opened the mind to think constructively about the wider interaction.

7.4 Harnessing technology brings flexibility through delivery



The investigation identified that access through multiple formats, smart phones, tablet technologies and computers was a limiting factor within the department and to aid the flexible use of space and to encourage the development of the teaching strategies that focus more on peer to peer learning, investment would be needed to provide the resources and remove the current barriers.

The framework prompted this exchange which is fundamental in enabling space to become more effective as a learning environment. A space planner needs to draw out this discussion. It is not prompted through the current methodology and it is believed that this new process is of real benefit in addressing this issue.

7.5 Providing adequate support structures enable flexibility and efficiency

The use of the framework prompted the group to think about how other departments supported the work of the students. The research identified that a review of the technicians had reduced support to the students and that they were struggling to work remotely in the ICT main learning centre room TC114. Ensuring adequate support staff arrangements are in place is a fundamental issue when assessing effectiveness. Again this issue may not have been identified without the benefit of the space planning framework.

7.6 Generating shared commitment leads to effective solutions



In terms of reflections on the process, the methodology introduced a shared interest in establishing a set of improvements and designing a solution for the benefit of the students.

This notion of an academic and support department working together to develop improvements to aid the teaching and learning strategy and to maximise space efficiency does address an accepted shortfall across the sector.

7.7 Improves strategic resource planning processes

The development plan established through the fourth phase of the inquiry presents a plan that the Landscape Architecture department and the Estates team can adopt for potentially a 5 year planning period. This approach will help feed into the wider planning for the Estates Strategy and if developed across all curriculum areas could strengthen the way capital development and investment projects are prioritised in the future.

7.8 Has led to space efficiencies within this case study

The resultant area allocation for the Landscape Architecture is more than the current allocation but less by some 17% compared to the space that would have been allocated using

the traditional space allocation methodology. In addition the Landscape Architecture and Estates department has a shared plan moving forward.

7.9 Time consuming and requires significant effort

In terms of the process adopted, it can be seen that there are some clear benefits associated with undertaking a co-operative investigation on this basis. The drawback is the time and effort it takes to plan and progress such a piece of work. Through professional practice it may be that a less in depth assessment may provide the majority of the improvements and future research could be undertaken to determine if a less intensive piece of work could achieve the majority of the improvements and benefits described above.

The following list summarises the main findings from the research

Advantages of the new process

- Placed focus on the inquiry
- Prompted the group to think and challenge rules associated with custom and practice
- Introduced a process that helped engagement
- Identified boundaries associated with who owns space and helped establish the location of power through relationships
- Prompted the space planner to think about effective change management process
- Provided a prompt to understand what teaching and learning strategies the academic team would wish to develop and implement
- Provided a prompt to consider how the learning interactions could be improved through technology
- Provided a prompt for stakeholders to think about wider issues for the department, such as branding that helps market and develop the department.

Limitations

- Time and effort to progress a co-operative inquiry

- Issues of transferability of process in other departments (whilst this could not be tested through the research, the views received through the validation process suggest that the design of the methodology will allow transferability.)

7.10 Limitations of the Research

In terms of limitations of the research, there are three matters to consider. The question of whether the research methodology is transferable between different faculties was anticipated and addressed by discussing the matter with external sector experts and practitioners within the estates department who were experienced in current space management techniques. The validating group believed the process would be transferable as the inherent flexibility associated with the design of the new space planning tool would enable effective use across subject areas and between teaching and research based subjects.

Other limitations noted were associated with the time the process took. It was noted that at times, estates practitioners would not have the luxury of a long planning period to consult and plan. Decisions associated with the shape and form of accommodation within a faculty or department may be taken unilaterally which reduces the opportunity to establish a rich inquiry. It is however noted that the process is 'scalable'. The stages need to be adhered to the depth of exchange could be reduced through each cycle if time was of the essence.

7.11.1 Contribution to Knowledge

The research does not attempt to undermine any of the current arrangements and procedures university estates professionals use today. The research contributes an educational strand that seeks to encourage space management practitioners to use the current space planning tool in a way that encourages an inclusive discussion that by the very nature becomes progressive which in turn aids space efficiency. In answer to the final research question, will a space planning tool that is designed to consider the variable concept of the learning interaction improve space utilisation? We can measure success in a number of ways. A successful outcome for a space planner may mean optimising space and achieving the lowest area allocation per student full time equivalent. Alternatively a successful outcome for an academic

member of staff may focus on how the space performs in supporting the learning activities and consequently an area output per student is irrelevant.

The second inquiry cycle set out to understand how the space examined through the case study was performing. It was a surprise to find that the team were working with a suite of rooms that through calculation demonstrated that they had too little space. Many of the problems raised by the staff were as a result of this. Specifically the team were working from accommodation consisting of 686m² and through a space needs assessment that applied space norms we could have established a space demand of some 978m². Overall the project has concluded by establishing accommodation which equates to a total area allocation of 820m². The process has increased the overall space allocated however the team on completion of the works linked to the development plan will be operating from a space approximately 17% smaller than justified through current space norm allocation practice.

The department is relatively small and whilst it is encouraging to present a result that argues that it has driven space allocated below benchmark, the real benefit is through the quality improvement anticipated as a consequence of engagement that was focussed on discussing resourcing matters as a team of co-researchers. The outputs include opportunities for students to learn through peer to peer experience by forming social space and to use the facilities to access a diverse and more substantial set of data that will improve learning opportunity by intensifying the student to course content interaction. The output of the research presents a collaborative tool that enables a shared understanding of the teaching and learning to be documented into a development plan for a particular group. The involvement of the students through the third phase was an interesting development that demonstrates the flexibility and creativity of the process. This helped develop a solution for the department but is not seen as a fundamental requirement for similar studies within alternative curriculum areas. The solutions presented by the students helped shape external space that would improve the visibility of the department. The additional external space did not count as additional measured space so the benefits of the work cannot be argued as improving space utilisation.

The overall process consisted of a lengthy set of discussions that required the principal researcher to be able to reflect, to be able to adapt and to be creative through facilitation. The research method has been demanding but it establishes the principle that approaching a complicated discussion from an alternative paradigm does produce opportunities to develop a shared understanding of the tensions and in turn solutions will present that complement parts of radically different agendas. On this basis it can be argued that a space planning tool that is designed to consider the variable concept of the learning interaction can improve space utilisation.

7.11.2 Contribution to Practice

The position adopted within this research suggests Estates Directors and resultant guidance emerging from HEFCE should place more emphasis on discussing the definition of what academic colleagues consider to be an effective learning environment. The research sets out a procedure and an alternative perspective to enable senior estates professionals to try this alternative approach. Further short papers are proposed to illustrate the research with practitioners however to complete this thesis, a guidance note with the new space planning tool is presented in appendix C. It is anticipated that this note will aid other practitioners to adopt this new methodology.

7.12 Reflections on the Research Strategy Adopted

The research methodology adopted, summarised in Figure 10 (p. 48), described 10 stages of development. The first and second stages sought to explain why ontology was an important initial consideration and from that reflected on the nature of the investigation from the perspective of a space planner holding a positivist world view. The methodology adopted argued for adopting a very different paradigm described as a participatory approach. Adopting this participatory paradigm helped the researchers investigate ‘multiple contradictory, but equally valid accounts of the same phenomenon representing multiple realities.’ (Onwuegbuzie, Johnson & Collins 2009, p.122.) Adopting this ontological position has undoubtedly helped with reflection and engagement with academic colleagues, moving

the focus away from a formulaic space allocation discussion to a wider more detailed exchange associated with how space should be designed to support a set of complicated interactions.

Stages three, four and five of the development of the research methodology focused on what type of research methodology would best fit the inquiry anticipated. First principles considered the merits of a quantitative and a qualitative investigation measured against theoretical frameworks described by Heron & Reason (2006); LeCompte & Schensul (1999); Marshall & Rossman, (2006); Hatch, (2002); Creswell, (2007); Ritchie & Lewis, (2003); Willis, (2007) and Bradwell, (2009).

The research undertaken had some elements of data to help validate the allocation of space as an output however the majority of the research was clearly a qualitative inquiry. A single case study has been completed as a consequence of mapping Creswell's (2007) descriptions of the characteristics of qualitative studies. From the research completed it is believed that an in depth understanding of the Landscape Architecture department and consequential improvement plan could only have been achieved on the basis of a singular case study. Attempting to develop a study investigating multiple faculties either within the researcher's university or across the sector would provide a limited exchange due to the scale of the investigation with limited results anticipated as a consequence. On that basis it is believed on reflection that the ontological positioning and the adoption of a detailed singular case study was the correct judgement to make at the start of the research.

The JISC (2009) framework used through stage five was pivotal in providing the guidance to develop the space planning framework. The JISC (2009) framework acted as a prompt to the space planner who used elements of the framework as an information gathering tool.

Works by Schön (1983), Argyris, Putnam & Smith (1985), Heron & Reason, Bradbury (2006), Friedman (2006) through the sixth stage of development strategy introduced variations to action research. Work by Shani & Passmore (1985) described a systematic design based

framework that helped design the four stages of the inquiry cycle that in practice provided a good balance and prompt to initially establish the focus, understand current practice, draw the group into developing ideas and solutions and finally describing a development plan. Work by Buchanan and Boddy (1992), Rowan (2000), Coghlan and Shani (2005) helped influence the initial approach in establishing the Space Management Working Group and understanding the politics associated with the researcher 'backstaging and performing' through the research. Work by Collen (1998) was very useful in helping to determine how insistent the space planner should or should not be through the cycles. The concentric circles of research described critical, social action, inquiry, emancipatory research characteristics that described how the new methodology was proposed to be delivered and helped reflect on how 'insistent' the space planner should be to achieve effective co-operative inquiry. So overall the methodology presented has guided the research in the direction initially anticipated.

7.13 Next Steps

The next steps for this research will be to further develop the guidance note presented within appendix C. It is intended that the guidance note is eventually trialled by other university estates professionals through the network consisting of the Association of University Directors of Estates (AUDE). The University of Gloucestershire contributes to the South Western Regional network of the AUDE body and it is intended that the principles of this research are introduced and trialled on that basis.

The process of co-operative inquiry adopted and the participatory perspective placed on the approach is a difficult concept for a space planning practitioner who will be using the current space norm based model. To help communicate this learning journey into manageable steps a number of short papers are proposed as an introduction to the guidance note. The first paper proposed will set out arguments associated with adopting a different ontological perspective.

A further paper will discuss the learning journey through the ten stages of developing the research methodology so that a space planner can understand the reasons why the four phases of co-operative inquiry are all progressively important. The paper will set out the

challenges of this rigorous process and will help Estates Directors consider training needs ahead of adopting this methodology. A final paper will summarise the conclusions derived from the analysis of the case study and on that basis introduce the new guidance note for debate across the sector.

Within the University of Gloucestershire, a further space project is now proposed that adopts this methodology. The Francis Close Hall campus is the home for three university faculties and a further case study and project is now proposed through the Space Management Working Group. The ambitious project sets out to hold a co-operative inquiry for the three faculties and professional departments based on the site. The work will commence later this year. Terms of reference are currently being discussed and it is anticipated work will commence April 2014.

To conclude this chapter the following learning reflections are summarised in section 7.14.

7.14 Learning Reflections: Conclusions

Advantages of the new process:

1. Placed focus on inquiry
2. Prompted the group to challenge custom & practice
3. Helped engagement
4. Identified boundaries associated with space ownership and helped manage power through relationships
5. Helped the researcher to think about effective change management
6. Helped discover what teaching and learning strategies the academic team would wish to develop and implement.
7. Helped stakeholders consider how the learning interactions could be improved through the use of technology.
8. Provided a prompt for stakeholders to think about wider issues for the department, such as branding that helps market and develop the department.

Disadvantages of the new process

1. Time and effort to progress co-operative inquiry.
2. Issues of transferability of the process to be tested in the future

Contribution to Knowledge

Approaching a complicated discussion from an alternative paradigm does produce opportunities to develop a shared understanding of the tensions and in turn solutions will present that complement parts of radically different agendas.

Contribution to Practice

The development of a guidance note that will aid practitioners to adopt this new methodology.

Chapter 8 Reflective Diary

8.1 Why DBA?

Initially the driver to undertake doctoral study was based around a professional requirement to develop an in depth knowledge of space management procedures as a consequence of a specific project that I was responsible for within the university. The university had a large built estate of some 80,000m², which when considered against sector space utilisation statistics, suggested that there was over provision of space in the region of some 20 to 25%.

The university has historically invested in many new build schemes which has reduced cash reserves and whilst the focus was on new build, had failed to maintain the existing accommodation resulting in a significant amount of backlog maintenance. Building condition grades over the last 5 years identified that the teaching and learning space was degrading quickly and to compound this, maintenance budgets were cut in an attempt to offset an operating deficit. As the property manager for the organisation my brief was very clear. I was tasked with cutting the built area significantly which would reduce the annual maintenance burden, would secure capital receipts and provide operating cost savings as a consequence of site disposal. This action would in turn contribute to an improved organisational operating position. The impact of this action would drive poor space utilisation statistics much higher as a consequence of attempting to deliver the same volume of activity from a reduced estate.

To achieve the brief, my work over the last two years has focussed on many aspects of this general strategy. I have been responsible for the closure and the disposal of a London campus the proceeds of which were used to stabilise the institution and reduce debt borrowing. In addition I have been responsible for the part refurbishment of two campus sites (The Park and the Hardwick sites) in Cheltenham to allow the consequential closure and sale of the Pittville Campus. Providing appropriate replacement accommodation and assessing the impact this project would have on the curriculum from a strategic and operational perspective were prime reasons for wanting to specialise in educational space allocation procedures. On a similar basis I was responsible for rationalising space, disposing of various sites and

developing smaller, fit for purpose teaching facilities in a similar role for a Further Education College. What I learnt from that process was the importance of engagement with staff to ensure that the replacement space was carefully designed to meet the needs of the staff and students. The difficult part to this is often balancing the competing and at times conflicting requirements identified through the design development process. So on reflection, the decision to undertake doctoral study was initially prompted by the need to enhance my own understanding of space management procedures so that I could learn and lead a design development process for a number of complicated educationally focused building projects.

I could have adopted the current advice offered by the Higher Education Funding Council and with my previous experience used the current guidance to develop a space needs framework that would have informed the architects design. This could have been done quickly but would have provided me with a solution that was based on a formulaic allocation of area based on student numbers multiplied by a space norm appropriate to the activity in question. I had become aware of the short comings of this approach based on previous post project reviews I had undertaken and was keen to ensure that I should develop the project by attempting to get the best space solution for staff and students. This was the primary reason for wishing to undertake some investigatory research into a particular topic along with a personal driver to undertake further study for reasons of personal development.

8.2 Personal and professional implications of undertaking doctoral study

Preparing for doctoral study was initially very challenging. I started reading and writing around the topic of space management and this began to generate ideas and lots of questions which was relevant to much of the day to day project work that I was involved in. The structure of the DBA programme worked well for me as the taught modules and the assignments provided me with opportunity to think in great detail about the relevance of the research through each of the phases of research. As noted previously I had a research topic in mind when I joined the programme that was linked to significant leadership and development work that was progressing surrounding the Universities Estates Strategy. In my opinion this is the best way to get the most from the taught modules of the doctoral programme, to start the

study with a theme or topic in mind that you can use as a point of focus through the various stages.

The decision point to commit to the DBA came with the establishment of the deadline for the second assignment. I had successfully completed the first assignment and as a consequence quashed the silent questions I had been asking myself about whether I was capable of study at this level. This was the first time I discussed my doctoral work in any detail with my wife, within my social circle and with work colleagues. Much of my day to day work at the university has been driven by adopting the role of a project manager. In a way this focussed approach to addressing operational matters within the department has felt safe, a fall-back position that is easy to adopt as a consequence of early formative training and consequential experience. For me the doctoral study has provided the opportunity to develop my reflective skills and now as a consequence I believe I am a more able manager due to learning how to think with a more measured and reflective management style.

To begin this journey I started to read around the subject of ontology shortly after completing the first literature review assignment and once I had got a basic grasp of the different paradigms started to reflect on how I was acting as a manager and what stance I believed was appropriate to the research. It occurred to me that I find it easy to revert to sequential thinking typically adopted within project management methodologies whereby I become very task driven. I became aware as a consequence of this reflective thinking that at times I can become too focussed on completing the process at the detriment of achieving a considered output. A simple example is the way I deal with email. I respond almost immediately and cannot bear the thought of returning to work the following day with a full inbox. I know from past experience its best to reflect on certain issues before a response is whipped across cyberspace but task and finish conditioning which has been a key driver presses me to get it done. Clearing the inbox is at times more important than effective communication. I began testing this through very subtle in direct discussions within my immediate work circle but did not generate any further meaningful discussion to help reflect on the theme of personal effectiveness, probably because of the line management relationship.

My doctoral progress did come up in conversation over dinner with friends. The discussion ended up around how different individuals can be as a consequence of which role we are 'pretending' to play, be it a parent, a work peer, subordinate or supervisor. I have never worked formally alongside my wife but she was surprisingly very opinionated about not wanting to work with me. She did not view my perception of a professionally driven, responsive and direct management approach as being a mechanism to foster productivity. In fact there was much laughter at how I act when presented with life shaping decisions. Apparently the persona of 'project manager' dominates and I revert to playing with spreadsheets and Gantt charts. A third child, a new car, an overseas holiday, a new spreadsheet! I had never given this behaviour a second thought until I read around the subject of different ontological and epistemological stances.

I started out clearly positioning myself as a positivist or within a paradigm that would be close to that very scientific reasoning. As I read and reflected on how I work and act as a manager my view changed to a point where I would now give an opposing answer. I thought about the criteria that describes the world through the eyes of a constructivist and the importance this paradigm places on understanding the social interaction and sense of a particular construction or experience. Positioning oneself within a positivist paradigm seems naive now particularly when you consider how I have become an established and successful manager.

To be target driven and able to work to challenging deadlines is a necessity for almost any manager so I concluded that adopting a positivist approach to work has a time and place for all effective managers. I started to think about how I was acting as a manager in instances where I believed I had excelled. I mentioned earlier I was responsible for the sale of the London campus for the university. The work consisted of a complicated transaction. To begin with I had to advertise the site in a depressed market and then agree general heads of terms and a sales contract. The complexity was compounded by the purchasers need to novate a building contract and associated warranties for major extension works completed in addition to agreeing a sales contract. This makes perfect sense as an estates practitioner but is clearly a specialised piece of work. Apart from the legal support I employed there was nobody

else within the university who had the experience or understanding of property sales agreements and building contracts that could have pushed the transaction to completion and achieve through negotiation the terms I finalised. I used that piece of work to think about how as an individual I had acted. I was consistent and efficient in turning the contractual editing of the documentation around but the key was the relationship I developed with the purchaser. We became friends. The expectation I sold to University Council became my boundary and the purchaser and I negotiated on multiple different issues, trusting each other's honesty when we could not accept or concede a point. We directed the legal teams to document our agreement and at times I used the strength of the social bond to force agreement. On a similar basis the various space related discussions that I had developed as part of the relocation and consolidation project at both Swindon College and now as a consequence of the closure of the Pittville campus have been based on establishing an understanding of the requirements now and in the future as set out by the respective academic.

Understanding and interpreting the complicated constructions around the needs of the respective stakeholders, both specific and perhaps more importantly implied have been areas where perhaps I could say has been some of my best work as a manager. Clearly communication and being sensitive to the strategic context and being able to interpret body language to add to the social discourse is very important but from reflecting on my performance through the examples stated I can see my biggest contribution as a manager has been as a consequence of the importance I place on fostering relationships and understanding the social context. This is clearly not the world view from within a positivist paradigm and to get to this position has been quite a learning experience for me.

The operationally driven practical, scientific project manager within me is the shallow, responsive positivist that deals with much of the routine day to day activity that leads the estates department. The more important inner me is the more sensitive, deep reflective person that wrestles with the meanings of social interaction and adopts values typically described from within a participatory paradigm. Perhaps then if I was asked to explain what

sets me aside as a manager, I could describe how reflection generates informed creativity which combined with pragmatic formative experience allows one to perform at multiple levels.

This self-assessment and realisation was the valuable personal learning that I have derived from the process of doctoral study. Reading around the different ontological perspectives has allowed me to structure in my own mind who I am professionally, what I am good at and perhaps more importantly which areas I need to focus on to develop as a manager. The pragmatic project manager pushed me through the early taught stages of the programme but the value and 'worth' derived from the later reading and research captured the attention of the reflective constructivist who I consider to be the real sub conscious decision maker. The learning achieved through the research has had a profound impact for me as an individual across multiple levels. My learning set was amused when we discussed the symbolism behind my decision to stop wearing a tie to work. An action completely out of character but a decision made as I felt it wasn't important anymore.

My wife and I did not discuss if we were going to try for a third child in any significant degree. We both knew deep down that we wanted the rich family life we are lucky to have to be extended and the joint decision was made, however it was the shallower pragmatic individual that worried about the consequences of the life changing decision the constructivist had made. This is typically an example of the many fascinating reflections for me that have been drawn forward from a subliminal understanding to a more honest, conscious realisation prompted by the opportunity that has come about through reflective study.

8.3 The Thesis

Through the course of the taught modules I enjoyed the initial work that focussed on the literature review. I enjoyed reading and developing my knowledge of current space management practice within the sector. The process of undertaking the DBA was for two reasons, initially to improve the consultative process for a significant rationalisation and

relocation project and to secondly develop personal skills and management expertise. The duration of the doctoral study has been far longer than the timescales established for specific work related project that prompted the initial idea and because of this the learning through the various stages of research has come after action was taken through the project. This was a frustration through the research, particularly through the taught module that focussed on methods and methodology.

The research strategy took a long time to develop and ended up evolving as a consequence of mapping a series of complicated theoretical frameworks and reflections (figure 10, page 48). The output from the co-operative inquiry has provided for a rewarding set of interactions. In terms of the learning from undertaking action research, there are a number of reflections. Developing the relationship within the group is critical. At the start of the process there was cynicism which reduced as the group explored the selected issues. The style of my approach was quite different through the process. There was a conscious effort made not to lead the discussion in a particular direction but to use the space planning framework to prompt a discussion if the group needed more detail. Within the group I was still the group leader however the agenda was certainly shared. Getting that balance right was difficult but it did enable some interesting ideas such as enlisting the help of the students to explore points of interest.

Overall the DBA programme has been an extremely demanding process that has tested me academically, emotionally and to some extent physically. The work through the taught stages was enjoyable as a consequence of developing relationships with the other students within the Cheltenham 3 cohort. However the research phase did become more difficult due to the fact I was pushing forward with a research strategy that I had developed with all the uncertainties that come with such a new set of theories. Not knowing where the work was leading was a difficult time for me and this nervousness did not diminish until I was well into the analysis section and I could begin to see how the qualitative data I had gathered was forming a solution. So overall my advice would be to not take the decision to undertake doctoral study lightly. If you do then it is a marathon and the appropriate training is to complete the race is

long and arduous. In terms of next steps, as set out in section 7.13, I intend to use the space planning framework to promote the approach to space planning. Initially I intend producing three discussion papers for the sector to introduce the research. Following that I intend trialling the approach within the AUDE south west regional forums which will allow other University Directors of Estate to access and trial the application. Ultimately I would wish to see the guidance develop to sit alongside and complement the Space Management Group guidance so that other Universities can use co-operative inquiry to develop space plans, improve efficiency whilst contributing to enhancing the quality of the learning experience.

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Appendices

Appendix A: JISC (2007) Evaluation Framework Definitions.

*The **Context dimension** refers to the anticipated affordances of the space in terms of learning and teaching objectives.*

The **interactions** aspect is related to the concept of learning interactions. This should capture the described elements or distinctive varieties of learning practice that inspire or shape the design brief of ‘collaborative’ learning, ‘exploratory’ learning, ‘case-based’ learning etc. A taxonomy of possible learning practices has been described in a recent BECTA funded project (CAPITAL - Curriculum & Pedagogy in Technology Assisted Learning:¹⁸ part of the Research & Development Programme for the next phase of the UK's Harnessing Technology Strategy). These are: Exposition, Reflective, Performative, Networked, Community, Collaborative, Tutorial, Assessing, Browsing, Cross-contextual, cross-conceptual, case-based, problem-solving, inquiry-driven, ludic, construction.

What?
Context
Interactions
Design gestures
Curriculum Maths ICT ... Non-specific
Process Scripted Open
Practice
Occupancy
Interactions
Academic Contract
Effectiveness Participation Processes Products Physicality
Users Culture Learning styles Affective conditions Effective conditions
Ecology
Designs
Taxonomic Entrances Teaching spaces Learner Centres
Use Open Closed
Technology Mobile Connected Visual Supportive Specialist
Surfaces Reconfigurable Fixed Learner Created
Infrastructural

The **design gestures** aspect originates from our expert interview with Peter Jamieson, and derives further pedigree from the notions of ‘signs and codes’ developed by Savin-Baden (Savin-Baden, 2008, p.10). Basically, design gestures are the links between Built Environment practitioners and pedagogy. An architect may react to a design brief which includes a specification of desired learning scenarios by building into their design specific features which aim to enable those scenarios. These ‘pointers’ or design gestures may take many forms: the layout and type of furniture, the lack of furniture, the distribution of light, types of technology deployed, the shapes of rooms or walls or the presence of specific alcoves, etc. If the space is subsequently used for teaching in ways that ignore these efforts, then it is conceivable that practice within the room could still be achieved. Conversely, the gestures may be inhibiting pedagogy through poor design. Either way, an acknowledgement of this connection is useful for practitioners. This aspect, therefore, focuses attention on the specific design aspects of the space which accommodate or encourage learning and teaching interactions.

The **curriculum** aspect captures the domain-based design of the space. Even non-specified spaces such as open access library centres might have been defined to serve one or a number of definable faculties due to their location or other factors. The curriculum aspect is also clearly linked to notions of discipline-based pedagogy.

The **process** aspect serves as an indicator of the formality of the processes which are intended to occur within the space, along a spectrum from prescribed and structured (scripted) to completely open in format.

*The **Practice dimension** seeks to identify how the space has been used, conceptualised and re-purposed in practice.*

The **occupancy** aspect relates to demonstrable use of the space for appropriate activities. It is related to existing notions of quantitative evaluation, which still may form a useful sub-set of an evaluative process which aims to demonstrate reproducible success.

The **interactions** aspect relates to the identically titled aspect from the context dimension. The purpose here is to identify and describe the interactions that are *actually* happening within the space, in order to derive and enable a process of comparison between desired and actual practice in terms of learning interactions.

The **academic contract** aspect is centred upon notions of cultural acceptability within a space. It is particularly related to disciplinary rules, pedagogical signatures, discipline-based pedagogy, safety and accessibility regulations, and notions of acceptable behaviour within society more widely, as mediated through societal perceptions of roles and interactions within an academic context.

The **effectiveness** aspect is concerned with the participatory nature of the use of the space (with reference to student involvement and engagement), as well as the processes which support that participation and the learning and teaching interactions. The aspect also takes into account the physicality of the learning space, in terms of what participation within the space physically involves for the users, and the products which result from the participation and processes.

The **user's** aspect considers the characteristics of the space users. In an increasingly globalised Higher Education sector, issues of differing cultural norms within an academic context must be considered. Users may be sensitive to affective conditions (broadly, how 'likeable' the space is) and effective conditions (a perception of effective practice being achieved within the space).

The **ecology** aspect recognises that spaces operate within a wider ecosystem of other spaces, and within a context of the wider work and life balance of the users. Relevant sub-aspects might include the physical location of the space within an institutional context, and factors both locational and cultural which might cause the space to be unpopular despite the provision of good facilities, or conversely popular due to factors other than the presence of a good environment for learning.

*The **Designs dimension** enables the development of a rich and context-aware vocabulary for description of the space itself.*

The **taxonomic** aspect considers the fundamental type of space which is being evaluated. We are influenced by existing work which has sought to construct taxonomies of learning spaces (JISC, 2006). Entrance spaces include examples such as receptions, services areas, throughput spaces re-purposed for public events, and information displays. Teaching spaces include vocational or domain-based areas such as laboratories, large lecture spaces, lecture spaces, spaces for seminars or discussions in small classes, and instructional computer labs. Learner centres include cafés, open access computer labs, student configurable spaces, breakout rooms and corridor enclaves, museums and art installations, outdoor spaces, and performative spaces.

The **use** aspect considers whether the activity within the space is enforced through policy or mediated more informally through changing teaching and learning practices.

The **technology** aspect considers the technology deployed within the space to support the learning and teaching interactions. Mobile technologies include tablet PCs, laptops, mobile phones, wireless keyboards and mice, PDAs and digital cameras. Connected technologies include wired computing systems, wireless networks, wireless-enabled laptops, and internet enabled PDAs and mobile phones. Visual and interactive technologies include video conferencing, video and web streaming, image projection, interactive whiteboards and voting systems. Supported learning systems include assistive technologies, accessible USB ports, audio-visual prompts, video recording facilities and plasma screens for the display of information. Specialist equipment relates to domain-specific educational needs, and might include scientific, medical, robotic, archaeological equipment, etc.

The **surfaces** aspect takes into account those other physical components located within a space, such as tables, chairs, walls, floors, ceilings, windows, doors, and so forth. The

configuration of these surfaces may be entirely fixed within the space, scaffolded but open to re-configuration by users, or potentially entirely configured by the users within the learning and teaching scenario.

The **infrastructural** aspect considers the facilities provided by the built environment of the room which are necessary if the affordances of the technology, surfaces and learning scenarios within the room are to be realised. Infrastructural elements include lighting, air conditioning, mains power provision and networking points. Walls are also infrastructure because their construction defines the space itself; this should not be confused with the role of walls within the surfaces aspect, which is concerned with their configuration to support learning.

Appendix B: The Joint Academic Coding System.

Table 1: Comparison of 1987 NOCAG and 2003-04 estimated space allowances

1987 NOCAG subject group FTE space allowances						2003-04 Estimation of allowances implied by space/student numbers					
Subject group	Academic staff: student ratio	UG m ²	PGC m ²	PGR m ²	Allowance inc for academic staff	Subject group	Academic staff: student ratio	UG m ²	PGC m ²	PGR m ²	Allowance inc for academic staff
Pre clinical medicine & dentistry	1:8	14.1	14.1	20.4	3.8	Pre clinical medicine & dentistry	1:8	11.2	11.2	16.2	3.0
Clinical medicine	1:6	6.5	6.5	22.2	5.2	Clinical medicine	1:2.6 ²	10.5	10.5	23.0	9.5
Clinical dentistry	1:6	10.5	13.0	16.2	4.2	Clinical dentistry	1:6.6	6.6	8.0	10.0	12.6
Studies allied to medicine and dentistry	1:8	9.8	12.3	18.4	3.8	Studies allied to medicine and dentistry	1:16.2	6.3	8.3	13.1	1.5
Biological sciences	1:9	9.2	12.2	19.1	3.4	Biological sciences	1:6.8	8.2	10.6	16.1	3.6
Psychology	1:11	8.2	10.5	19.5	3.0	Psychology	1:14	6.0	7.8	15.0	1.9
Agric & Forestry/ Veterinary science ¹	1:9	9.2	12.2	19.1	3.4	Agric & Forestry/ Veterinary science ¹	1:7.7	7.8	10.2	15.7	3.2
Physical sciences	1:8	9.8	12.3	18.4	3.8	Physical sciences	1:6.3	8.6	10.6	15.5	3.8
Mathematics	1:11	3.6	3.6	5.0	1.3	Mathematics	1:12.2	2.8	2.8	3.9	0.9
Computer sciences	1:11	7.3	10.2	11.2	2.2	Computer sciences	1:15.1	5.3	7.6	8.4	1.3
Engineering & technology	1:9	9.8	16.6	17.9	3.2	Engineering & technology	1:9.3	7.7	13.1	14.2	2.5
Architecture, building and planning	1:8	9.8	9.8	9.4	2.3	Architecture, building and planning	1:16	6.9	6.9	6.6	0.9
Geog & Economics	1:14	5.4	6.8	7.1	1.0	Geog & Economics	1:12.6	4.4	5.5	5.7	0.9
Social studies	1:12	2.4	2.4	4.9	1.2	Social studies	1:17.3	1.6	1.6	3.6	0.7
Business	1:11	3.3	3.3	5.0	1.3	Business	1:22.2	2.1	2.1	3.5	0.5
Languages	1:10	3.5	3.5	5.2	1.4	Languages	1:14.6	2.4	2.4	3.8	0.8
Humanities	1:11	2.6	2.6	5.2	1.3	Humanities	1:15.7	1.8	1.8	3.8	0.7
Archaeology	1:10	5.5	6.8	7.2	1.4	Archaeology	1:8.8	4.5	5.6	5.9	1.3
Art, design, music & drama	1:10	9.1	9.1	8.8	1.9	Art, design, music & drama	1:16.4	6.7	6.7	6.4	0.9
Education	1:11	5.0	5.0	4.8	1.3	Education	1:19.1	3.5	3.5	3.4	0.6
						Catering & hospitality management ³	1:21.4	5.8	8.1	13.6	1.1

1 Additional allowance for special additions
 2 Staff:student ratio likely to be affected by inclusion of clinical staff
 3 Additional subject group included to allow for this cost centre

Appendix C: Guidance Note for use with the Space Planning Tool

1. The following pro formas set out the four stages of the inquiry. There may be multiple meetings within each stage however practitioners should ensure that the co-operative inquiry follows each of the phases.
2. The first stage seeks to define the focus of the inquiry. Draw together the stakeholders and commence discussions prompted by the following framework. Use the framework to document the discussions through each cycle.
3. Further explanations of the definitions are included in appendix A.
4. Guidance in respect to co-ordinating a co-operative inquiry
 - a. Seek volunteers relevant to the inquiry.
 - b. Use the pro formas cycle stages 1 to 4 to prompt the discussion if the flow of the inquiry needs to be enabled
 - c. Try not to lead the discussion into a statistical assessment.
 - d. Use the current space needs framework to assess the space demand but use this to triangulate the findings of the co-operative inquiry. Do not use this to direct space allocation.
5. Use this pro forma as a prompt to draw out the discussions associated with current practice. Document findings using the pro forma.

Estates Department Space Planning Framework	
Inquiry Cycle 1: Focus of Inquiry	
Faculty	Specifies the university faculty
Department	Describes which department
Context	
Purpose	Describes the purpose of the co-operative inquiry
Users	Establishes the interested stakeholders
Policy Makers	Describes the key policy makers
Policies	Describes current policies, enablers and restrictors

Estates Department Space Planning Framework	
Inquiry Cycle 2: Current Practice	
Activities	
Interactions	Describes the interactions actually happening
Design Gestures	Links between built environment and pedagogy
Process	Scripted: An indication of the formality of the processes which occur within the space
Practice	Seeks to identify how the space has been used, conceptualized and re-purposed in practice
Occupancy	Frequency of Use
Academic Contract	Notions of cultural acceptability within the space, disciplinary rules, pedagogical signatures.
Effectiveness	Describes student participation
Learning Styles	Describes learning styles observed
Designs, Taxonomic	
Entrances	Provides descriptors of how the space is actually used
Teaching Spaces	

Learning Centres		
Use	Open: Describes if use is enforced through policy or mediated informally through teaching and learning practice	Closed
Technology		
Mobile	Describes the technologies deployed in the space	
Connected		
Visual		
Supportive		
Specialist		
Surfaces		
Reconfigurable	Describes the furniture and physical components other than technology that support the function of the space	
Fixed		
Learner created		
Infrastructural	Describes the aspects of the space that influence the environment, e.g. air conditioning	
Timescale	Describes the timeframe of the resourcing consideration	

6. Use this pro forma to prompt the discussion within the inquiry group to introduce ideas and solutions that address the issues identified. Use the framework to document the exchanges.

Estates Department Space Planning Framework		
Inquiry Cycle 3: Introducing Solutions		
Activities		
Interactions	Describes the interactions that could happen	
Design Gestures	Links between built environment and pedagogy and how this could improve	
Process	Scripted: An indication of the formality of the processes which are intended to occur within the space	Open:
Practice	Seeks to identify how the space could be used, conceptualized and re-purposed in practice	
Occupancy	Frequency of Use, potential targets	Occupancy Use
Academic Contract	Notions of cultural acceptability within the space, disciplinary rules, pedagogical signatures.	Potential changes required
Effectiveness	Describes aspirations for student participation	
Learning Styles	Describes new emphasis for learning styles	
Designs, Taxonomic		
Entrances	Provides descriptors of how the space is required to be used	
Teaching Spaces		
Learning Centres		

Use	Open: Describes how we want to use the space either enforced through policy or mediated informally through teaching and learning practice	Closed
Technology		
Mobile	Describes the technologies required to be deployed in the space	
Connected		
Visual		
Supportive		
Specialist		
Surfaces		
Reconfigurable	Describes the furniture and physical components required in the new space other than technology that support the function of the space	
Fixed		
Learner created		
Infrastructural	Describes the aspects of the space required to influence the environment, e.g. air conditioning	
Timescale	Describes the timeframe of the resourcing consideration	

5. Utilise this framework through the concluding 4th stage to document ideas generated through the co-operative inquiry.

Estates Department Space Planning Framework		
Inquiry Cycle 4: Development Plan		
Activities		
Interactions	Describes the interactions that are planned	
Design Gestures	Links between built environment and pedagogy and how this is planned to improve	
Process	Scripted: An indication of the formality of the processes which are planned to occur within the space	Open:
Practice	Seeks to identify how the space will be used, conceptualized and re-purposed in practice	
Occupancy	Frequency of Use, stated targets	Occupancy Use
Academic Contract	Notions of cultural acceptability within the space, disciplinary rules, pedagogical signatures.	Potential changes required
Effectiveness	Describes aspirations for student participation	
Learning Styles	Describes new emphasis for learning styles	
Designs, Taxonomic		
Entrances	Provides descriptors of how the space is required to be used	
Teaching Spaces		
Learning Centres		

Use	Open: Describes how we will use the space either enforced through policy or mediated informally through teaching and learning practice	Closed
Technology		
Mobile	Describes the technologies planned to be deployed in the space, setting out investment plans anticipated.	
Connected		
Visual		
Supportive		
Specialist		
Surfaces		
Reconfigurable	Describes the furniture and physical components required in the new space other than technology that support the function of the space. Describes costed plans to support the plan.	
Fixed		
Learner created		
Infrastructural	Describes the aspects of the space required to influence the environment, e.g. air conditioning	
Timescale	Describes the timeframe of the resourcing consideration	