

Master of Fine Art: Design

**The Logistics of
Harmonious Co-living.**

*Exploring contemporary co-living
through design interventions.*

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Abstract:

Contemporary co-living, as an accommodation alternative, is in a unique position to provide social fulfilment and sustainable development through sharing and community generation.

However, it is increasingly clear that there is a lack of understanding of the realities of these spaces, and that this limiting the commercial application of the co-living model. Existing architecture, artefacts, and services are failing to accommodate the needs and objectives of collective users. Therefore, to experience the full ecological, social, and economic benefits of co-living, research must be performed to understand how residents share, experience, and inhabit space.

This project responds by applying design thinking and collaborative exploration methods to produce case studies for two contrasting co-living developments in London, UK. Workshops, observations, literature research, and interviews build a foundation of contemporary knowledge.

This inspires the design of an exploratory, pedagogical tool, in the form of a modular furniture collection. On top of its physical functionality, it offers developers the opportunity to learn and experiment towards a better understanding of how residents utilise space and resources. A prototype is built and tested with both case study sites acting as Living Labs. The design intervention produces a positive increase in resident well-being, and confidence in interacting with the space around them. Moreover, developers confirm an increased understanding of the residents needs and actions.

The success of the project, and its physical outcome, shows the role design can play in contemporary research, positive change, and sustainable development. The results have implications for co-living providers, researchers, and designers supporting sustainable lifestyle alternatives.

Keywords: Design, Co-living, Community, Collaboration, Sustainability.

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1 Introduction

1.1 Project Description

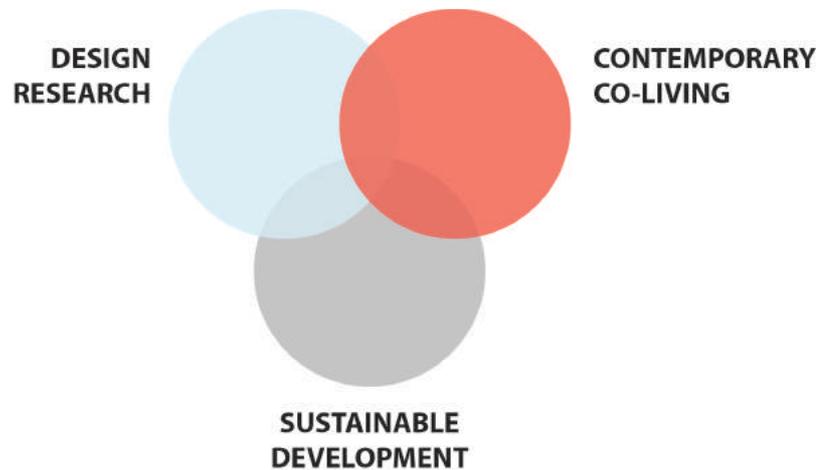


Figure 1, Project Summary Diagram (Author, 2017)

Population growth, increasing ecological awareness, and a new generation intolerant of poor service, are challenging traditional housing typologies. The problem is most evident in urban areas where we are seeing an unprecedented rise in the demand for compact, affordable, and sustainable accommodation. A failure to meet this need is forcing people to live in low quality accommodation, compromising on location, amenities, and expenditure. This is fostering unsustainable, isolated lifestyles. Though we live in closer proximity than ever, feelings of home, community, and ownership are being increasingly lost.

Against this backdrop, co-living developments are attracting renewed attention in the developed, western world. A pragmatic response, exemplified by equality, flexibility, and sharing, contemporary co-living has been empirically proven to provide a high standard of living and psychological well-being (Easterbrook & Vignoles, 2015). This ability to combat the problems of traditional housing typologies, in the face of complex social and physical challenges, places it in a unique position to facilitate sustainable development.

However, within contemporary co-living environments exist a different and unfamiliar set of dynamics and negotiations to those in traditional housing. Human and non-human actors collide in densely populated spaces and each must adapt to incorporate the other. This creates scenarios, conflicts, and interactions within a large and fluid network. In practice, contemporary co-living developments are failing to understand and facilitate how this network looks and functions. This is negatively affecting its desirability and accessibility, and limiting its greater application.

This project presents the hypothesis that we must seek to better understand contemporary co-living so as to increase its utilisation, and realise its full spectrum of economic, social, and ecological benefits.

This issue has been explored in two formats, a written report, and a design intervention, structured around alternative ways of understanding, doing, and making

collaboratively. Together they investigate the realities of contemporary co-living in two contrasting London-based developments and present information towards better negotiating the dynamics of shared spaces. The project is produced with a focus on sustainable development.

It begins by utilising co-design and action research theory to understand the relationships between people, place, and artefacts, and to learn how they share, inhabit, and experience space. This includes active observations and data collection, in the form of case studies, interviews, and literature research. With a framework for design intervention established, concepts are ideated and visualised through collaborative workshops. Following analysis and stakeholder feedback, a single concept is brought forward into a physical prototype which is tested on site. Reflections on the design outcome and process are presented within a summary and discussion.

The resulting artefact serves as a functional, modular furniture collection, that encourages user engagement and interaction. Primarily, though, it acts as a pedagogical and research tool for developers to monitor patterns and movements, and better understand how residents share, inhabit, and experience co-living environments. This presents opportunities to improve resident experience and quality of life, and to educate users on how to make better use of available services and space.

This project shows the value of stakeholder engagement, and the role of design as an exploratory method, in the broader contexts of contemporary research and sustainable development. It also demonstrates how artefacts can modify our actions and experiences, challenge pre-conceptions, and generate new knowledge.

1.2 Personal Background & Motivation

As part of “Generation Rent” I have witnessed, first hand, the problems with existing housing typologies. Quality is extremely poor, landlords and estate agents offer very little service, and the burgeoning cost hugely limits accessibility. The isolation this causes is something I have become uncomfortably familiar with in my time living and working around Europe.

Concurrently, I have followed the growth of the co-living movement as it has re-emerged over recent years. This movement caught my attention as the first to challenge the market with a viable alternative. But, the rapid expansion has left little time to experiment, develop, and reflect on the logistics of the model. As a designer, I identified opportunities within this field.

In many ways, the underlying ideology of co-living is aligned with my personal design and moral ethos. I feel a responsibility to challenge consumer habits, and to support the exploration of sustainable alternative lifestyles. Further, I identified with its critique of traditional housing typologies, and its efforts towards positive socio-political change.

I chose to work with space and artefacts based on my education and experiential knowledge in these fields. I was motivated to work in three dimensions as I have strong prototyping skills, and wanted to reach out to a large audience in a relatable and understandable medium. I based my research in contemporary London developments as it is a market, and location, I can easily engage with and personally relate to.

1.3 Aim & Purpose

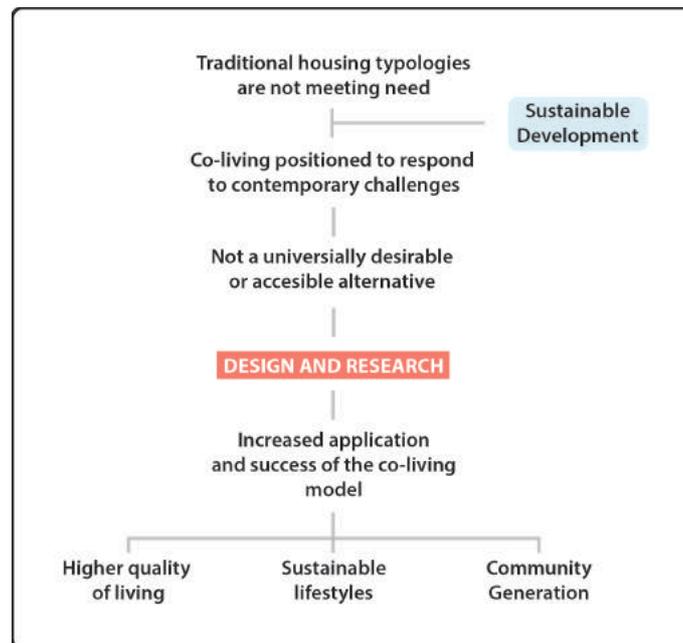


Figure 2, Logic Map (Author, 2017)

The aim of this project is to explore the systems, networks, and dynamics of contemporary co-living spaces towards understanding the realities of their use. It also aims to contrast different types of co-living, providing service for two distinct demographics, in the same city. Performing this research will generate new knowledge and identify opportunities for design intervention. The economical aim is to drive investment and research into supporting contemporary co-living as a sustainable lifestyle alternative. The cultural aim is to identify opportunities for the creation of communities through the application of design and design thinking, and to increase the accessibility of the co-living model. Additionally, the project aims to evidence the value of design, collaboration, and experimentation as tools for contemporary research.

The purpose of this work is to increase the awareness, desirability, and accessibility of contemporary co-living as a sustainable lifestyle alternative. With these actions, there is the opportunity for design to become an agent for change, acting as a driving force to attract people to experience, form, and inhabit collective spaces. The larger purpose is to work towards sustainable development by engaging with, and supporting, more ecological ways of living.

1.4 Delineation of the Project & Field of Study

The primary field of study for this report is **contemporary co-living**. This describes living arrangements that occur when three or more biologically unrelated people share a residential structure (Bothell, 2015).

This project specifically focuses on contemporary co-living in **western, developed countries**, occurring in the rental sector and offering short to mid-term accommodation for

single individuals. These exist, most commonly, in urban area. This project considers those specifically in the city of **London, UK**. It incorporates the themes of **design** and **sustainability** to create a framework for research and development. Whilst co-living also exists in less structured ways in many developing countries, for example, the Favelas of South America, they have a very different history, scale, and purpose. This project also does not include, but acknowledges, the existence of co-living in student and elderly accommodation.

The work in this report has been produced in co-operation with the research collective, Purehouse Lab. Purehouse Lab is a co-operatively governed non-profit organisation whereby members share resources and talents with the goal of developing an in-depth understanding of the co-living phenomenon.

Supporting case studies, testing, and workshops were performed on site at Roam, and Unit 6, London. Roam is a “network of global co-living spaces that provide everything you need to feel at home and be productive the moment you arrive” (Haid, 2015). At the luxury end of the market, and priced accordingly, it targets the geographically mobile with high quality accommodation and services, in popular city destinations. Unit 6, comparatively, is an independent collective live-work space that is entirely self-run within a converted warehouse. Its price makes it possible for those unable to afford traditional London accommodation to live in a desirable location and connect with like-minded individuals. For more information see:

<http://www.purehouselab.org>.

<https://www.roam.co>

1.5 Research Questions

To frame the subject, context, and objectives of this paper, two research questions have been formed. These show the duality of this thesis as both a research, and design project.

1. How can design help us to identify, understand, and negotiate the networks, systems, and dynamics of contemporary co-living spaces?
2. How can we better facilitate co-living through the design and implementation of environment specific artefacts?

2 Project Framework

2.1 Theories & Concepts

This section defines and discusses the framework of theories and concepts that had influence on this project to provide justification for their selection and implementation.

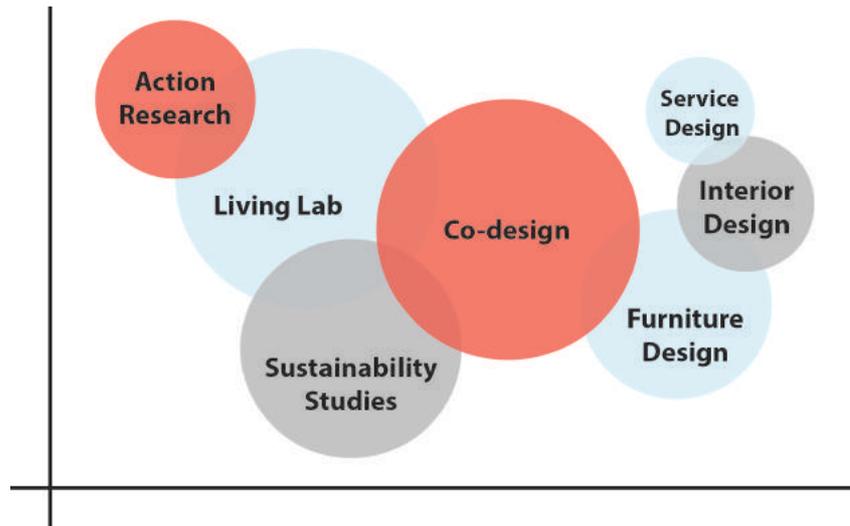


Figure 3, Theoretical Framework Map (Author, 2017)

2.1.1 Sustainability Studies

Sustainability studies describes research that contributes to sustainable development (Shedroff, 2010). The most universally accepted definition for sustainable development is “development that meets the needs and aspirations of the present without compromising the ability of future generations to meet their own needs” (Butlin, 1989). It is a multifaceted concept that balances complex social, ecological, economic and cultural influences.

Within sustainability studies is the subfield of eco-design, defined as the creation of “new products and processes which provide customer and business value but with significantly decreased environmental impact” (James, 1997).

These fields have influenced this project because sustainable development is the most critical consideration for designers today. The world we live in has been adversely effected by our collective choices. To prevent further damage, and begin to reverse that which has been done so far, we should seek innovative paths towards sustainable living (Shedroff, 2010). Sustainability studies are increasingly impacting research projects, and commercial products and services.

2.1.2 Co-Design

The practice of co-design involves stakeholders in an active role within the design process to better understand and meet their cultural, spiritual, and physical needs. It is developed from traditional participatory design with the distinction being the inclusion of all stakeholders, and not just the end users (Szebeko & Tan, 2010). Born in Scandinavia, co-design has roots in broader political contexts, as a means of providing user empowerment in the 1970s. It is now equally utilised in the business and commercial sector in response to the changing meaning of value (Prahalad & Ramaswamy, 2004). Recent research has shown that working within a co-design environment creates more innovative concepts than those in a traditional setting (Mitchell et al., 2015).

Co-design has influenced the theoretical and methodological framework of this project to reflect the equality, empowerment and experimental attitude that is the foundation of co-living (Fromm, 2012). Its methods facilitate working with contemporary issues. Conclusively, user participation increases the acceptance of later interventions, which will be valuable for this project when prototyping (Meltzer, 2000).

Co-design has been critiqued for its unpredictable results and complex logistics. To overcome these challenges this project has been produced in collaboration with industry sponsors and remained research driven, with value placed on any, and all, new knowledge generated.

2.1.3 The Living Lab Concept

This project takes inspiration from the experimental and creative methods of the Living Lab concept. First explored by Mitchell, Larson and Pentland of MIT, a Living Lab represents “a user-centric research methodology for sensing, prototyping, validating and refining complex solutions in multiple and evolving real life contexts” (Niitamo et al., 2006). Unlike a testbed, where users are observed subjects, in a Living Lab they contribute to the creation and exploration process to explore potential applications of new ideas and artefacts. It builds upon participatory design and contextual design (Folstad, 2008).

This concept has been included in this project primarily to provide a framework with which to perform analysis of interventions and design proposals. Using co-living as an open development environment, it provides methods that allow for the exploration of new models for actor interaction within this space. Living Labs not only test design solutions, but generate a wealth of new knowledge about models and practice. It is a human centred, and user focused theory that will produce data allowing this project to respond to empirically observed needs. Examples of successful applications of the Living Lab concept include mass collaborations such as crowdsourcing and research spaces such as Space10, Copenhagen.

2.1.4 Action Research

Action Research provides tools for teams and communities to act on their problems, and subsequently reflect on the outcome and process. It is also used for producing guidelines of best practice (Denscombe, 2010).

Though primarily a social science theory, it has influenced the methods of this project as it balances active participation with knowledge generation. It overlaps, in some ways with the theories of co-design, but differs in how it generates information for improving strategies and practices. This is valuable as this project is not just concerned with one design solution, but with advancing the practice of co-living as a movement.

2.1.5 Primary & Secondary Data

Primary and secondary data collection will allow for the exploration of current work and practice and for results to be analysed and presented in a way that is clear, consistent, and comparable. This practice is universally applied in research projects of all contexts.

2.1.6 Design

This project applies the methods, tools and theories taken from the complementary fields of interior, furniture, and service design.

Interior design considers the volume and characteristics of space and how this influences the relationships between people and objects, and creates a backdrop for our lived experience (Vaikla-Poldma, 2013).

Furniture design contains methods and tools for ideation, creation, and manufacture, and produces physical artefacts in response to human need. Its theory balances ergonomics, aesthetics and function.

Service design considers full customer journeys and works to provide valuable engagement. This practice produces unique, personalised, and holistic experiences.

These fields were chosen to provide tools to help realise and interpret user needs. They also focus on lived experience which is valuable in understanding contemporary problems. Further, they are unique in their tools for idea generation and visualisation, and creating physical objects.

2.1.7 Actor-Network-Theory

Actor-Network-Theory is an approach to social studies that considers all factors involved in a situation to be of equal value (Latour, 2005). This creates a network of artefacts, ideas, and processes that become equally as relevant as human actors in creating scenarios. Its tools and methods are effective in describing activity and showing how networks are built, assembled and maintained (Carroll et al., 2012). It has been chosen as part of this project's framework as it is a holistic way of mapping relationships in complex environments, and because it acknowledges the role artefacts play in shaping human action.

2. 2 Implementation & Methodology

This section discusses how the outlined fields and theories will be acknowledged and implemented within the research, development, and design process. This forms, and describes, a loose methodology.

2.2.1 Sustainability Studies

Methods: Life Cycle Analysis, Value Engineering, Workshops & Stakeholder Collaboration

Phase: Throughout

Ecological sustainability will be considered and acted upon through the methods of lifecycle analysis and the application of the MET Matrix to physical interventions and design outcomes. This will ensure resource use is considered and controlled (Cerdan et al., 2009). Social and cultural sustainability will influence the case study locations and the use of methods that bring together stakeholders on an equal platform. To ensure economic sustainability, the cost of, and logistics of implementing, the design intervention will be kept to a minimum. This will be achieved through value engineering and by working with existing locations and artefacts. This complex balance of considerations reflects the multifaceted concept of sustainability and the objectives and theories of sustainability studies and eco-design.

2.2.2 Co-Design

Methods: Practical Design Workshops

Phase: Collaboration & Exploration, Design Development

To implement the co-design framework, collaborative tools and methods will be used in the concept generation and development phase of the design process. Workshops and events will be run that bring together stakeholders to provide opportunities for discussion and creation. These workshops will use card sorting, construction activities, and role play. This will offer participants the opportunity to not only discuss their experiences but play an active role in design and creation, through making and doing collaboratively. Industry partners will provide participants, staff, and locations to make these workshops possible. The same workshops will be run at both case study locations for continuity and comparison.

2.2.3 The Living Lab Concept

Methods: Site Visits, Workshops, Prototyping, Usability Testing

Phase: Design Development, Intervention & Testing, Proof of Concept

Workshops, development, and prototyping will take place on site at Roam and Unit 6, with each space acting as a short term Living Lab for analysing design interventions. This immersion into co-living environments will present opportunities for collaboration with a diverse group of real residents and work as an empathy building experience. Working onsite will also ensure the project considers current practice and relationships with existing artefacts and services. After this stay, return visits will allow for further testing in the Living Lab format; bringing in, or creating on site, working prototypes, observing them in use, and then reflecting on their performance with residents and collaborators. This will create a fast feedback loop. Working in this way will allow for development and refinement to be based on

quantitative and qualitative points including functionality, cultural implications and emotional response.

2.2.4 Action Research

Methods: Interviews, Stakeholder Mapping, Open Source Knowledge Sharing

Phase: Research & Data Collection

Action research thinking will be applied using interviews and open source knowledge sharing. This will reflect on existing practice during research and data collection and be achieved by working with stakeholders with experiential knowledge of contemporary co-living. The stakeholders include Purehouse Labs, a research collective for co-living and community generation, and staff at Roam and Unit 6. This will involve attending events and conferences, performing interviews and organising meetings, to create channels for the sharing of knowledge and resources.

2.2.5 Primary and Secondary Data

Methods: Literature Review, Observations, Questionnaires

Phase: Research & Data Collection, Proof of Concept

Primary data will be collected through site visits, interviews, observations, and questionnaires. This work will be documented with maps, notes, and photographs. During the project, two reference case studies will be produced of contrasting co-living sites to generate contemporary information that will help shape the final outcome. Active observations will be ongoing and used to collect data such as current use of space, most and least used artefacts, and patterns of movement and interaction. Following design interventions, resident interviews and short surveys will be used to reflect on their success.

Secondary data will be collected using literature review and online research.

2.2.6 Design

Methods: Sketching, Model Making, Journey Mapping, 3D Visualisation

Phase: Collaboration & Exploration, Design Development

The project will be shaped around a concurrent design process that focuses on user understanding and the physical production of designed interventions and outcomes. The key phases of this will be structured as thus: initial research and data collection, concept and ideation, development, prototyping, testing, and production. This will keep the project on schedule, whilst offering opportunities for experimentation and innovation with the methods of interior, service, and furniture design. Connecting this with co-design in the project framework ensures that the problems of imbalanced power avoided. The influences of these combined fields will be evident in the methods of sketching, prototyping, and the format of presentation and visualisation. The influence of service design will be seen through the

processes of storytelling, journey mapping, and attention to the creation of holistic, personalised experiences. Other tools utilised from design fields include 3D visualisation, workshops, and technical analyses.

2.2.7 Actor-Network-Theory

Methods: Observations, Mapping

Phase: Research & Data Collection, Proof of Concept

Actor-Network-Theory will influence the primary data collection process through the production of environment and scenario specific maps, based on active and passive observations. This will act as a tool for the documentation and analysis of unfamiliar environments. It will also influence contextual work and the testing of the final design outcome.

3 Background & Contextual Analysis

This chapter locates the work of this project within the broader contexts of co-living and furniture design, with related concepts such as public space projects and sustainable development. It defines key terminology, background, and identifies and analyses prominent historical and contemporary work.

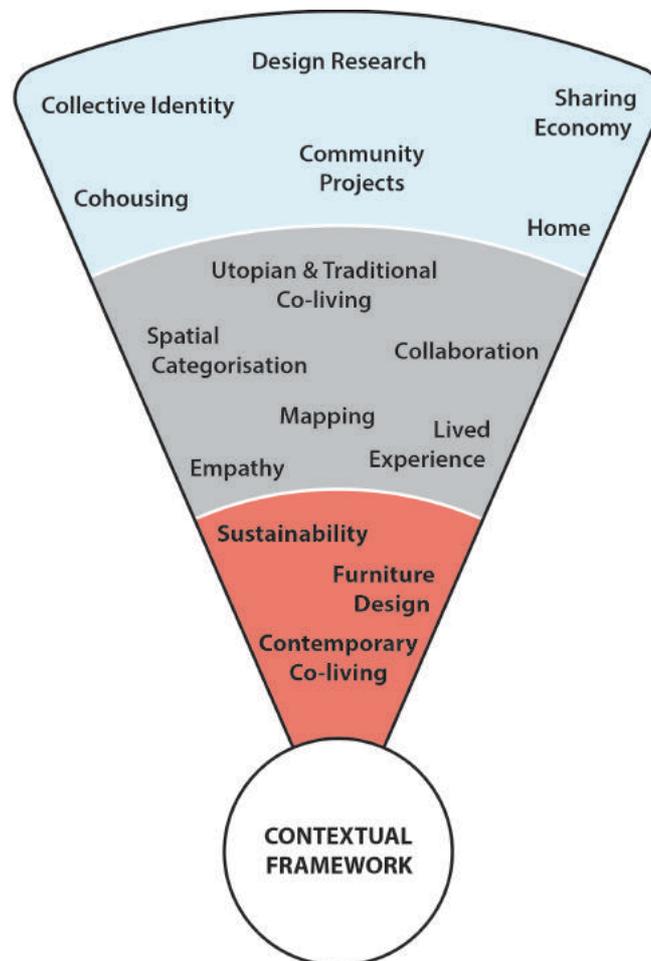


Figure 4, Contextual Framework Diagram (Author, 2017)

3.1 Co-living

3.1.1 Definition & History

Co-living is a residential structure that accommodates three or more biologically unrelated people (Bothell, 2015; Tummers, 2015). It is commonly contained within a single dwelling, sub-divided into a combination of public and private spaces (Scott-Hanson & Scott-Hanson, 2005). Its practice is built around shared values and objectives, and justifies compromises on some personal freedoms, to accommodate the needs of the group and the rights of others. The “co” has been proposed to mean ‘Collaborative’, ‘Communal’ and ‘Collective’, and thus includes a wide variety of practices (Tummers, 2012; Vestbro, 2010).

Co-living can be traced back to the origins of society as a pragmatic response to a need for safety, security, and social opportunity. As a housing typology, it has been able to respond, over centuries, to cultural and community development, changing economic climates, and increasing global mobility. Despite this, with increasing value placed on individual space, property, and ownership, co-living vastly decreased in popularity.

For a brief time in the second half of the 20th century, co-living re-emerged in Denmark and progressed into other western, developed countries, as a way of challenging social norms and actively living out a political agenda (Davis & Warring, 2016). These spaces were created as utopias, built upon the egalitarian principles of sharing, equality, and participation. They referenced the ancient co-living model but with a unique focus on socio-political needs and ecological sustainability. In Sweden, for example, the feminist movement in the 60s introduced co-living as a way to balance gender roles (Horell & Vestbro, 2011). This period of exploration in housing towards sustainable development, is the last successful application of the co-living model (Krokkors, 2012).

3.1.2 Challenges to the Housing Market

Population Growth and Density

Population is growing at a rate of 1.13% per year, and by mid-2030 the planet will have to accommodate an estimated 8.4 billion people (PRB, 2014), with 66% of these forecast to be living in urban areas (International Organisation for Migration, 2015). This increased quantity and density cannot be accommodated if we continue to live in existing housing typologies, and use space and resources at the current rate.

Cost increase

The young generation is being increasingly priced out of urban centres and desirable locations due to the rising cost of living. On average 50% of income is spent on rent alone (Outsite, 2016). In London, renters outnumbered homeowners for the first time ever in 2015, and the cost of living in these homes is increasing 7.7% annually (Homelet, 2017). This is creating a system that does not provide opportunities for long term saving towards home ownership.

Demographic and Lifestyle changes

By 2020, an estimated 40% of workers will be freelance, remote, or project based (Intuit, 2010). Further to this, the young generation are staying single for longer and, raised on the instant gratification of the internet, are more intolerant than past generations to poor service. This new and unique group require increased flexibility, cultural diversity, and social liberation.

Co-living is uniquely positioned to respond to this trifecta of complex challenges.

Co-living facilities reduce space per capita, energy use, and waste production (Katz, 2016). Achieved through the sharing of resources, this reduces ecological cost and environmental damage in response to individualism, social stratification, and wasteful consumer habits (Horelli & Vestbro, 2012). It also provides access to shared products such as washing machines, cooking utensils, and entertainment facilities. This, alongside the division of rent and services, reduces the cost of living for residents.

Further, empirical studies report that contemporary co-living developments produce active and diverse communities that enhance social interaction and provide collective support (Tummers 2015). In this way, they combat the loneliness, isolation and disconnection that exists within modern society (Fromm, 2000; Jarvis, 2011; Krokfors, 2012; Vestbro, 2010). Contemporary co-living, then, is more capable of meeting social and cultural needs compared to traditional housing typologies, with a unique emphasis on equality and diversity.

Co-living is a promising sustainable alternative to traditional housing.

Despite this, the model is not being explored or applied in a way that will significantly affect the current market. This is because it faces complex challenges in its successful application.

When attempting to accommodate a diverse collective group, and responding to the complex physical requirements of busy community living, contemporary co-living spaces require unique social and physical architecture. These are layered networks of scenarios and interactions, that, in comparison to traditional housing typologies, place increased demand on the tangible and intangible actors within them (Latour, 2005). There are also problems with privacy, security, hierarchy, territory definition, and the integration of new residents unique to co-living (Khajehzadeh & Vale, 2015; Schwartzberg, 2015). Collectively, and amongst other barriers, these must be overcome to challenge the negative preconceptions of sharing, and to facilitate contemporary co-living as a viable mainstream lifestyle.

3.1.3 Co-living Research

Hayden, in 1979, explored seven utopian communities to observe their use of space and document the built environment. Her findings identified the role of architecture not only as a means to organise physical space, but as way of representing a community attitude and collective identity (Hayden, 1979). At a similar time, Kanter identified physical design as an influential factor in the success and failure of the co-living model in practice (Kanter, 1972).

More recently, Fromm explored the architectural features and planning process of contemporary co-living developments in the USA. His findings showed the value of what he called “intermediate space” in creating active communities (Fromm, 2000). His work, like Kanter’s, found that design plays a vital role in the success, or failure, of a co-living space, and identified a need for further work to understand and map out the realities of resident experience and needs (Fromm, 2000).

Markus performed complementary research in Europe that also found design features playing a role in broader contexts and identified the part flexibility in function plays in the success of the co-living model (Markus, 2000). Together the work of Fromm and Markus empirically evidence the value of both the tangible and intangible attributes of artefacts in lived experiences. This reflects the Actor-Network-Theory, and shows the importance of considered design choices to complement the objectives of co-living.

Based on the analysis of two co-living communities, Williams produced guidelines for “design factors that encourage social interaction”. These were “proximity to buffer zones, good quality and diverse communal space with ample opportunity for surveillance, and clear private units” (Williams, 2005). This work was the first of its kind to begin to make recommendations for place-making, collective identity, and community generation, towards social sustainability. It worked only at an expert level, with almost no interaction with stakeholders. Though it makes recommendations towards what the physical architecture of co-living should offer, it misses a focus on the realities achieving this. This is preventing the application of these guidelines in contemporary co-living.

The research of Herck and Meulder also worked to identify the factors that determine the success of co-living spaces. Through observations and interviews, they found that “design for diverse use, creation of opportunity for informal meetings, and integration of environmental heritage” were critical in producing desirable and functional public spaces. They also provided positive and negative examples based on their guidelines. These guidelines appear to be actionable, but without designed, commercial artefacts specific to this application, they are difficult to meet.

The work of Easterbrook and Vignoles directly explores the influence of the built environment on human psychology through multilevel latent growth modelling. They showed that increasing the frequency of coincidental meetings, in turn, increases interpersonal bonds and individual and collective well-being (Easterbrook & Vignoles, 2015). This provides evidence for the value of contemporary co-living, but does not show how coincidental meetings can be created in practice.

“Is sharing the solution?”, follows up on a contemporary co-living program to identify potential barriers to making shared accommodation work. The challenges identified include changing perceptions of sharing, supporting and integrating new tenants, and understanding and facilitating their needs (Green & McCarthy, 2015). This is unique because, as opposed to presenting guidelines for design, as is common in other research, it presents barriers with the potential to be overcome and challenged by further work.

The main methods used in the reviewed research are observation, interview, theoretical testing, and analysis of literature. Reflecting generally, this work fails to access the experiential knowledge of stakeholders, which is shown by a limited understanding of the spectrum of their needs. Further, the guidelines and presented theories are not practical or actionable within contemporary co-living developments, when considering the current market, demand, and situation. In response, this project will work only with actionable interventions to demonstrate and explore how value can be added to the co-living experience, with the methods of co-design and the Living Lab concept.

3.1.4 Design for Co-living

MINI Living



Figure 5 & 6, MINI Living Exhibition (MINI, 2016)

MINI Living is a conceptual living space, produced and exhibited in collaboration with ON Design, Tokyo. The team created a flexible floor plan and, alongside repurposed furnishings, designed custom storage that acted as flexible room dividers.

This concept showed how artefacts can challenge spatial categorisation and produce multi-functional environments. Further, it served to demonstrate a possible future for the co-living movement that balanced aesthetics with opportunities for engagement and resident control of the space around them. However, its application of space and resources does not consider the ecological effects of over-consumption, or any empirical observations of the needs and objectives of potential residents. The cost and complexity of using this in a commercial environment means this concept has had little impact on contemporary co-living spaces.

Pitstop



Figure 7, Pitstop Workshop (Chan, 2016)
Figure 8, Pitstop Exhibition (Lau, 2016)

Pitstop is an ambitious architectural concept that proposes a building-block system of self-contained rooms, stacked, to create buildings with private and public space. Much of this concept investigates and visualise three unique, self-contained bedroom designs. What makes this project unique is the method of concept generation, which was done alongside young people in participatory workshops. This concept shows the value people place on playing a role, or having a decision that affects their living environment, in this case between three private space designs.

However, the scale of the proposed development simply isn't feasible with the current demand and market. There are very few examples of co-living facilities built from the ground up, a consideration not accounted for here. Mock-up spaces were built and exhibited but there is no evidence that any testing was done to see the realities of use. This project raises the questions; how much must be shared before a block of accommodation becomes a co-living environment? And, at what size does the community become too difficult to manage as a whole?

'3in1' by BatLab



Figure 9 & 10, 3in1 Internal Space (BatLab, 2017)

'3in1' is a housing experiment by Hungarian architecture firm, BatLab. They redeveloped an existing property to house internal studios as a micro-community, with shared access and communal space. The floor-plan creates a residential hub for three individuals in less than 110 square metres. The unusual design feature here is the use of vibrant colours to add distinction between zones within the property. This concept shows the value of transparent engagement opportunities and considered methods of integrating and familiarising new residents.

There is a risk, however, that the bold colours may stand in the way of building resident relationships. Like team colours, for example, making the zones, and property, of each individual so distinct has the potential to cause conflict. These clear borders also mean that furniture and layouts cannot transition easily in response to the needs of the users.

3.1.5 Commercial Realisation of Co-living

In the current housing market, there are numerous companies and independent providers offering contemporary co-living or living as a service.



Figure 11, The Collective Kitchen (The Collective, 2016)

Large commercial developments (company-managed) focus on a balance of function and aesthetic, popularly influenced by Scandinavian design, minimalism, and contemporary urban architecture. Within these spaces are distinct public and private areas often combined with the provision of luxury services. The communities are managed, and driven by organised events, supported by staff members. These developments and their organisers have access to considerable resources to invest in providing a high quality of living in premium locations.

However, this focus on providing luxurious designed spaces, and keeping close control over the community, does not reflect the research and guidelines found in successful application of co-living through history (Fromm, 2012; Labit, 2015). In general, developments of this scale are not being experimental enough with their spatial categorisation and design choices, which is limiting the opportunities for resident engagement. Unable to control the space around them, and adapt its function to their individual or collective needs, residents struggle to take control and build confidence in their immediate environment, which is being reflected in short tenancies. In part, this is because artefacts and spaces that are desirable enough to compete in the high-end market, compromise on functionality, and reduce opportunities for interaction. This unique need for a specific combination of features can only be responded to by design and development.

What is evident, further, in these spaces is an over-compensation for the needs of residents, in response to a lack of understanding. This includes excessive resources, spaces, and services, the wasteful provision of which is not in line with sustainable development.

Independent (self-managed) co-living sites, on the other hand, are experiencing some different challenges. These spaces commonly have smaller communities, fewer

boundaries, and less distinct public and private areas. They also rely on the residents to engage with the space around them in order to build a better-quality collective space. Based on empirical research and the historical success of co-living, this should be a more successful strategy. However, independent providers struggle with cost and scale. This means they are unable to provide artefacts, services and facilities that to respond to the full extent of residents' needs. This is producing environments that are not set up to provide the optimum quality of living.



Figure 12, Unit 6 Common Area (Author, 2017)

Contemporary co-living developments in general, are struggling to apply the findings of research and conceptual projects performed in this field, because they are too complex, not always actionable, and are not being produced or shown in mediums that are relatable. This project responds to these challenges, and looks to build upon historical and contemporary research by maximising learning opportunities, generating knowledge towards understanding residents' needs, and working towards accessible, scalable, and functional design interventions.

3.2 Furniture Design

Furniture refers to objects, created or found, that support human activities and respond to physical and emotional needs (Blakemore, 2006). These artefacts can be used internally or externally and can be considered design, a form of decoration and, in some cases, both. Types of furniture include seat (single and multiple), sleeping or lying, entertainment, tables/ surfaces, storage, and sets (Blakemore, 2006). Furniture is also commonly categorised by material or location. Typically, they perform a specific function which dictates a certain form, in some cases added to for aesthetic purposes. Through history furniture has been explored extensively resulting in unique and distinct styles. It plays a significant role in our lived experience as it has both tangible and intangible qualities. As a field, it intersects significantly with interior design (Booth & Plunket, 2014).

This project is specifically interested in furniture that breaks traditional categorisation to provide multiple functions and serve the needs different users. This emerging concept is perhaps the least developed of all furniture types, as it is the most complex and challenging to design and apply successfully (Lawson, 2013). This type of furniture integrates, in the context of this project, with co-living as it can respond to the unpredictability of user needs, and encourages interaction, co-design, and co-creation. This is reflective of artefacts role as an actor within a greater network, responding to situations whilst continuing to provide function.

To create additional value, furniture that serves multiple functions can also be modular. This describes furniture that can be built and expanded upon so as to offer additional control and responsibility to the user. This process of interaction, and the relationship this builds with the artefact, creates a cognitive bias, known as the Ikea Effect (Ariely, Motion & Norton, 2011). This also applies to DIY products where the user plays a role in its physical construction.

Designing furniture to fit into these categories presents unique challenges. The market for this, however, is growing rapidly in response to changing social situations and increasing population density forcing users to inhabit smaller homes (RIBA, 2016). Prominent manufacturers and designers responding to this need include Ikea, Cartell, Muji, and Bo Concept.

3.2.1 Project Examples

MAG (Magnetic Assisted Geometry) by Benjamin Vermeulen



Figure 13, MAG Components (Vermeulen, 2017)

This is a range of furniture that uses magnets set into solid wood, combined with sheet steel panels, to create multi-functional furniture that snaps together without tools. These can be disassembled and reassembled quickly in response to need.

The artefacts this creates, though described as modular and multi-functional, actually resemble quite traditional furniture. Further, sheet steel is not a material which is warm and inviting which may further prevent user interaction. It is also not clear how these pieces can adapt to changing needs, aside from being taken down and put away.

Tetrad Modular Book Shelf System by Brave Space Design



Figure 14, Tetrad Shelf (Brave Space Design, 2015)

Created from five individual pieces, the shelf system encourages user interaction to design a unique piece of furniture for their available space. It also accommodates reconfiguration in response to need.

This concept is a visually interested storage solution that is successful in involving users in the design and creation process. However, the final construction, in any combination, is limited in functionality to just a single furniture category, for the reason it cannot be considered truly multifunctional.

Modular Shelving System by Bambica

Built from a combination of Bamboo rods and plastic pegs this system encourages users to design and create completely unique furniture solutions. With enough pieces there is the potential to build large and complex structures that could serve functions beyond storage. Further, the material and manufacturing choices show consideration for sustainability.

However, the process of interaction is complex, requiring time and effort on the user's behalf. In reality, this may mean that once constructed it is not adapted or engaged with often. Further, its structure shows some fragility, and in practice may not support functions other than light storage and display.

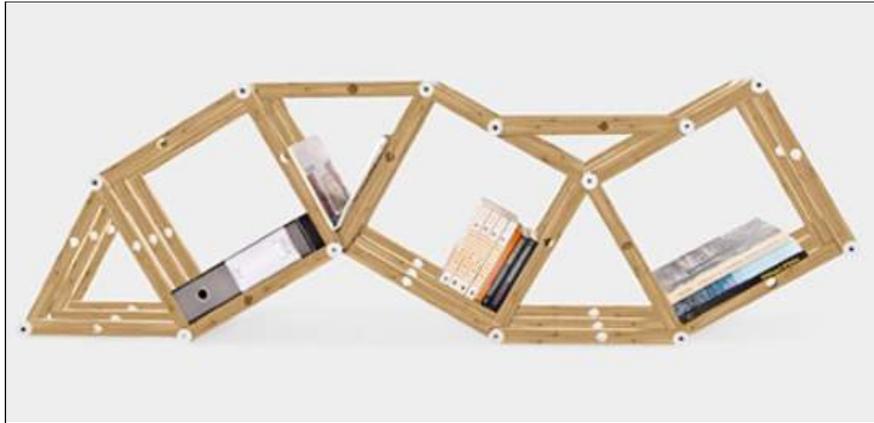


Figure 15, Bambica Modular Shelving (Bambica, 2014)

Fluid by Arik Levy

A conceptual product, designed for an exhibition in Milan, this combination of small cages can be used individually as seating or combined to create large storage solutions or room dividers.

The simplicity of interaction here is really valuable, achieved by their transparent structure and basic shape. The complexity of manufacture, though, would add considerable cost, and their cage-like design prevents the storage of larger items, despite their size. Further, as a conceptual piece, it is likely they will not make it into production.



Figure 16, Fluid Concept Image (UrbanLux, 2009)

Kallax by Ikea



Figure 17, Kallax Display (Ikea, 2016)

Kallax is an open storage system comprised of cube units that start in 1x4 and 2x2 combinations. It is perhaps the most common and popular multi-functional and modular furniture collection. These units have the flexibility to respond to changing needs and different room sizes, when built in different combinations and with the addition of desk tops and accessories.

However, the size of these units makes them difficult to move easily, especially between rooms or up and down stairs. Further, built of particle board, they are not suitable for high wear applications and will not withstand heavy weight or accidental misuse. This makes them best for situations where they don't have to be interacted with once built.

3.3 Public Space Projects



Figure 18, Goods Line Sydney (Aspect Studios, 2014)

In a lesser way, this project is contextualised by research and development in public space and community projects. Work in this field focuses on creating opportunities for social cohesion, and understanding the needs of collective users. Project examples include the Goods Line, Sydney, Superkilen in Copenhagen, and Gas Works park in Seattle.



Figure 19, Superkilen Overview (Bann, 2016)

4 Project Response

This project hopes to change the relationship between co-living stakeholders by providing a platform for feedback, improved understanding, and collaboration opportunities. Further, it will challenge the negative preconceptions of sharing by presenting a definition of co-living that has moved beyond its historical association with radical and experimental political utopias. This will be achieved through questioning the realities of contemporary co-living and challenging the assumptions made of their internal networks, and the cultural, social and physical needs of their users. It hypothesises that spaces for co-living requires different language, artefacts, and architecture to traditional housing typologies, and that through research and exploration we can better understand and serve the unique and changing objectives of co-living residents. By providing new tools and knowledge, this project will influence better choices, which will subsequently produce higher quality living spaces and improved resident experiences. With this understanding, and better use of space and resources, the benefits of co-living can be fully realised, and made accessible and desirable for a larger demographic.

In a broader context, this project hopes to evidence how design can be used as a catalyst for change, in both attitude and situation, towards sustainable development. It will raise questions such as how we use space, how we identify ourselves as part of a community, and how we define our needs individually and as a group.

Collectively, this discussion and exploration has the potential to encourage experimentation, beyond traditional housing typologies, and towards alternative, community-driven solutions. This will create increased awareness, and improve the quality, of alternative lifestyle opportunities, providing social, economic, and ecological sustainability.

5 Process

This chapter describes and discusses, chronologically, the research, design, development, and testing process of this project. It also presents the empirical findings of each phase to justify the design and application of the final outcome.



Figure 20, Process Diagram (Author, 2017)

5.1 Research & Data Collection

I produced and distributed a questionnaire as a method of primary data collection. This sought to identify the demographic of co-living residents, their reason for inhabiting these spaces, and the quality of their overall experience. It also asked those unfamiliar with the field to describe their satisfaction with current housing typologies and the barriers that would prevent them from trying co-living for themselves. This received 92 responses. The questionnaire played a part in exploring the broader cultural context of co-living and understanding its role and utilisation within society. This identified a negative preconception of sharing and a fear of losing control of your environment that is challenging the growth of contemporary co-living. Further, it found cost and quality of life as the factors that would lead, and have led, people to try co-living (see appendix A).

I arranged site visits at two co-living developments in London, offering housing at contrasting ends of the economic spectrum. Roam accommodates geographically mobile millennials, providing networking opportunities, high quality housing, and luxury services, in desirable city locations. By comparison, Unit 6 offers low cost accommodation in a converted warehouse in a central but less popular London location. It is self-built, resident managed, and provides only basic services. At each site, I observed behaviour, and explored the utility of space and artefacts. I documented this primary data with notes, sketches, and photographs. I also produced low tech “heat maps” showing the use of communal areas, overlaid with actor-network diagrams. The resulting image showed the complexity of a co-living space, highlighting the demand put upon artefacts and services as actors within a network that continually changes in use and objective. Design was applied here as an exploratory research method to gather information, unavailable in literature, specific to contemporary co-living.

The results at each site were, predictably, quite different. Residents in Unit 6 played a more active role in shaping their space, and were more likely to interact with artefacts and services. The rooms there had vague spatial categorisation which allowed residents to explore their utility in unexpected ways.

In contrast, Roam had spaces which were clearly defined, and in some cases, underused, and residents engaged less with the space and artefacts around them. There was, in this way, a clear correlation between the aesthetic qualities and perceived value of a product, and people's willingness to move, explore, and engage with it.

Obvious at both sites were some shared struggles including how to use their limited space, create feelings of home and integrate new residents into the community. Artefacts and services were also subject to high use, serving changing functions and objectives, in line with the residents' collective and individual needs. Observations found this to be causing wear and failure.

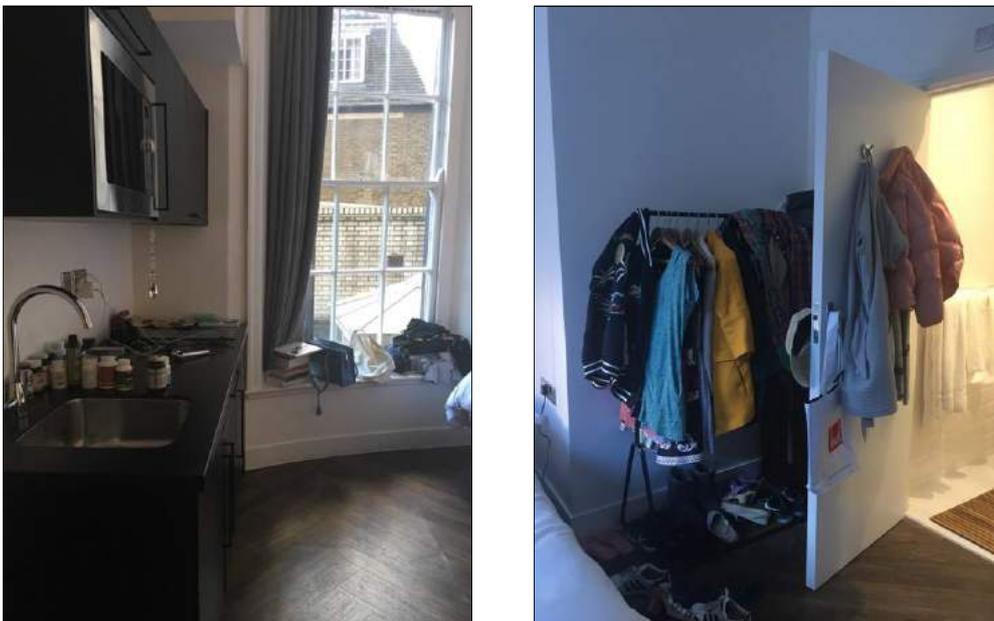


Figure 21, Storage Problems (Author, 2017)

Reflecting critically, I could have added value to my experience by posing as a resident instead of as a researcher. In that guise, I may have seen more genuine behaviour and interactions. This can be a problem with traditional design and research practice, where the power balance between designer and user prevents honest engagement.

I arranged interviews, as a further primary data collection method, to expand upon my research and observations. On both sites, staff confessed a lack of understanding, and difficulty forecasting, how residents will act, and what they will require within a contemporary co-living environment. Without this information, they accepted that some assumptions had to be made when categorising space, selecting furniture, and providing services. Examples of where this had not been successful included storage complaints in the bedrooms, and an underused lounge space at Roam. Whilst, Unit 6 had furniture that was challenging to move and didn't accommodate the flexibility the residents now asked for. Both sites shared mutual

problems including a lack of durability in existing artefacts, inappropriate size or scale, and difficulties in educating residents on how they can engage with the space around them.

For further photos see appendix B.

5.1.1 Empirical Findings & Action Points

This phase identified a clear negative preconception to sharing, founded in a desire for individualism and control of our immediate space. Within existing co-living environments, it found a high demand on artefacts and services resulting in durability and longevity problems. Further, it found wasted and under-used space (height and floor), specifically prominent in intermediate areas such as hallways and stairwells. Finally, it found a lack of developer knowledge of the needs and actions of residents.

5.2 Collaboration & Exploration

I planned a collaborative workshop to utilise action-research thinking to reflect on existing co-living practice. I produced flash cards to provide discussion topics, using buzzwords from literature research. The loose structure and familiar materials encouraged participants to be honest and open. The residents at Unit 6 generally felt more confident within their community, were more familiar with where things were kept, and understood the role and boundaries of each space. Further, they were able to reflect on times they had taken action, or given feedback, that had directly resulted in changes to the space around them. The residents at Roam related to the community as a networking opportunity, and had more obvious distinctions between public and private space and property. They also discussed categorisations for each room using traditional language (lounge, office, bedroom) and identified more assumed boundaries. These differences reflected my initial observations.



Figure 22, Card Sorting (Author, 2017)

Both groups asked for more transparent opportunities for interaction with artefacts, services and each other, and better provisions for community events. They also thought more could be done to create the feeling of home, instead of that of a live-work space, particularly in the evenings and weekends. Both groups exhibited personal and emotional connections to the people and spaces around them, and I was inspired by their experiences as part of the co-living movement.

I organised follow up collaborative events that explored co-design as a tool to generate ideas and stimulate creative development. I ran two further workshops to visualise artefacts for co-living and explore their application in existing spaces. These were held on site to provide inspiration and reference. Participants were asked to develop furniture solutions that would improve their quality of life, or better serve their individual or collective needs. Using a combination of Lego and craft materials, they were then challenged to make their design and place it within a model. The ideas were explained and explored through the use of performance and presentation, documented with photographs and video. This format encouraged participants to be more creative and confident in their ideas.

The outcome varied between each participant, but generally fit one of three groups: storage, surface, and community.

1. Those who created storage wanted additional opportunities, primarily in their private space, to house their belongings in a way that was transparent and simple to use. They wanted units that made it easy to see what was inside and large enough to accommodate bigger items to act as a platform for organisation and display.

2. Those who designed surfaces created standing desks, high tables where they could quickly place things down, and surfaces that expanded to accommodate collective users. Another common design was for a surface at the bedside for charging a phone, and placing items such as glasses, or a water bottle.

3. The participants who designed community items created larger, complex artefacts that served specific functions for the collective group. This included a band stand/ stage for events, tiered seating for cinema nights, and an open kitchen/ BBQ that could be put up and used for larger community dinners.

Using a single three-dimensional model to present each idea challenged the group to think beyond spacial categorisation, and allowed them to add or remove actors freely. This changed how the group referenced space, using private and public as opposed to specifying bedroom, lounge, or kitchen. In general, artefacts that were specific to one or the other were found to have less value than those that could transition, in response to the user's needs, between the two.

As the time limit on the workshop was short, most users chose to represent their artefact with a simple form. When analysed collectively, it became clear that each form could be stripped back to a combination of smaller shapes, most often cubes. If a cube was built that was strong enough to stand on, durable enough to be moved, consistent enough to stack together, and sized to be large enough for storage but small enough to integrate into existing spaces, it could, in varying combinations, offer the functionality asked for by each participant.

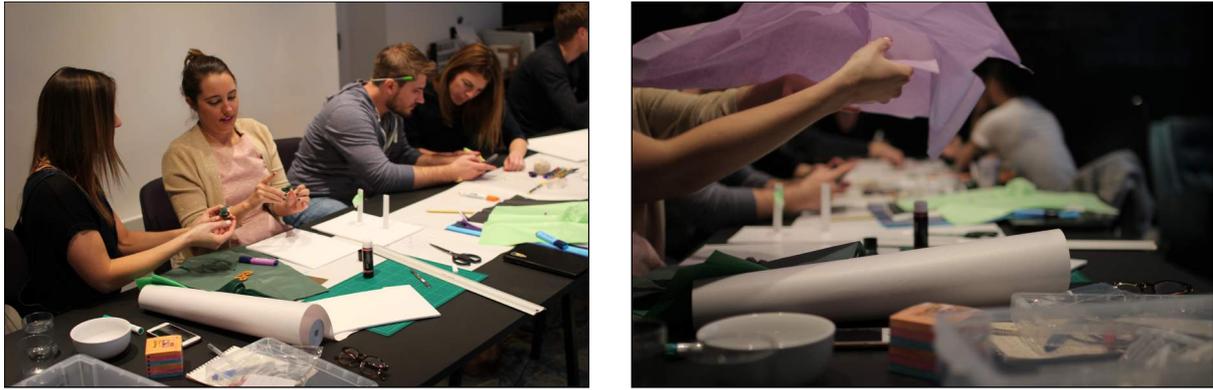


Figure 23 & 24, Workshops (Author, 2017)

For further photos see appendix C.

5.2.1 Empirical Findings & Action Points

This phase identified a lack of opportunities for feedback between residents and providers. It found existing artefacts were unclear in their role or purpose, and that this was limiting interaction. Further, it showed residents' desire to explore and personalise their immediate to improve their experience. It also identified a value in artefacts that could move flexibly between public and private space in response to changing activities.

5.3 Design Development

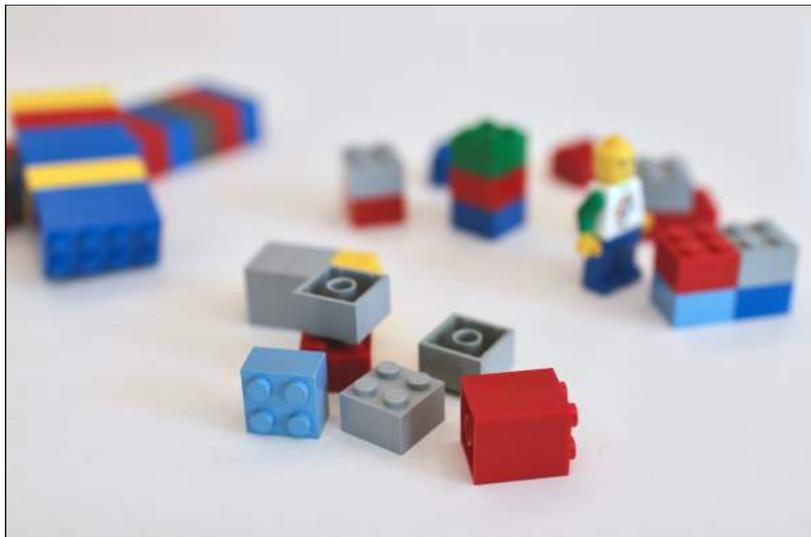


Figure 25, Lego Modelling (Author, 2017)

Outside of the workshops, I experimented with the cube idea using 2x2 Lego blocks. With enough blocks, they can be moved, stacked and laid out to create surfaces, units, and spaces. What makes this even more desirable is the ability for them to then be repurposed,

creating something entirely different. I began visualising how this could look as an artefact for co-living, through sketching, brainstorming, and mapping. These are design tools used to explore ideas. I focused on the process of interaction, and the service and value the object could add to the resident experience. On reflection, it would have been valuable to generate this content as part of a team to increase output and creativity. This was made challenging by the complicated logistics of organisation, a drawback to the co-design theory that adds cost and time.

I met with co-living founders and developers Bruno Haid and Dane Andrews (Roam). I presented the cube concept, using Lego blocks to visualise its application. At this point, I explained it as a design solution, competing with existing furniture manufacturers to offer a desirable final product. They instantly engaged with the idea, and discussed with me how valuable it would be to observe how residents interacted with the units, and to be able to explore new ideas for layout and function quickly. Within this, I identified the role the cubes could play as a pedagogical tool, educating developers about the needs and actions of residents to help them better create better spaces and experiences. This instantly distinguished the concept from other existing artefacts and fitted exactly with the aims and objectives of this project. I returned to sketching to experiment with how the cubes could be implemented and experimented with as a tool, without interfering with their application as a functional, aesthetic artefact. This changed the direction of this project in response to thorough understanding achieved through collaborative research.

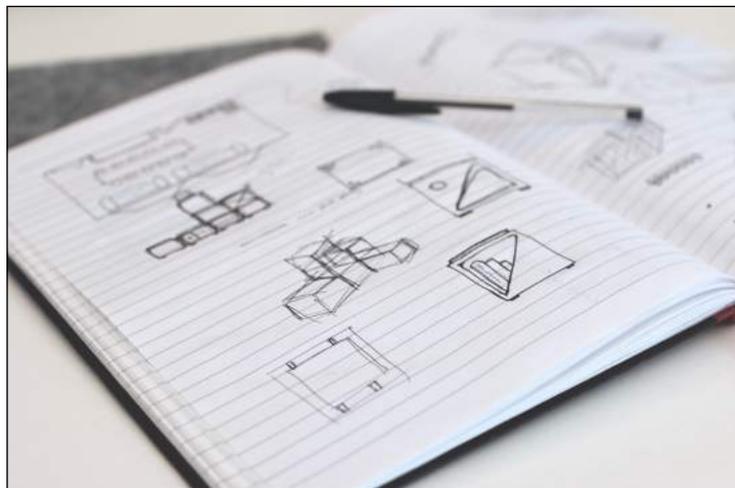


Figure 26, Design Sketching (Author, 2017)

5.4 Intervention & Testing

I stayed for several nights at each site. This experience allowed me to understand the differing realities of contemporary co-living on a personal level, and as such, better empathise with the difficulties of living in temporary spaces. This provided evidence for the value of personal touch points, and control over your immediate space, in creating feelings of home. I also witnessed first-hand how new residents gained confidence in public spaces as they became more familiar with where things are how they could interact with them. Living on site allowed me to prototype and brainstorm quickly and, subsequently, perform

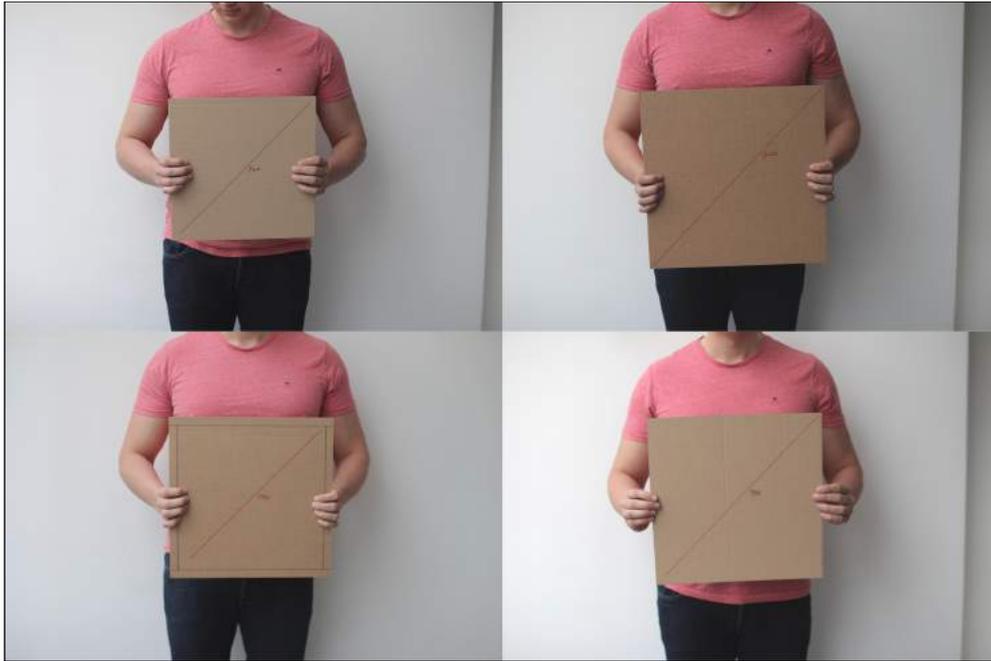


Figure 27, Size and Interaction Testing (Author, 2017)

tests and interventions that gained immediate feedback. I made use of the communal areas as open development environments to explore ideas and interaction. I experimented with size and scale, location, purpose, and functionality, in response to different daily activities. I also analysed existing furniture to see how I could work with, and add value to what was already there. Developing alongside the co-living community provided a critical and questioning viewpoint to challenge my proposed concept. The diverse demographic also created an opportunity to discuss the cultural and societal implications of my design. This open sharing of opinions, made possible by tangible experience, is what makes the Living Lab concept so effective as a research and development tool.

The residents at Unit 6 developed the cube concept by asking for the flexibility to hack and change them to further suit their needs. Whilst on site, it became clear they had the skills and tools to achieve this. They also wanted the durability to really test the units with



Figure 28 & 29, Prototyping (Author, 2017)

heavy objects, stacking four or more together, standing on top of them, and using them without concern for fragility.

Residents at Roam, on the other hand, asked for really simple movement and interaction opportunities. They also wanted the finish and aesthetic to be able to match their existing space, with more attention paid to their visual appearance representing a piece of designed furniture, not a low-cost research tool. In this way, it would better integrate into their carefully considered interior design, which is a significant selling point at their end of the market.

Responding to this framework of information, observations, and feedback, and with further design and development, I built ten cubes. As a learning and development tool, taken from industrial design, prototyping allows you to fully understand the manufacturing process and subsequently make choices in line with sustainability studies, when moving into production. I worked with component size to minimise waste from sheet material and trialled construction methods to reduce complexity and add strength. As the units have been created for collective spaces, and will be regularly moved and engaged with in unpredictable ways, I made material and hardware selections in line with heavy, consistent use. To achieve this, and still support the ecological goals of sustainability studies I produced a simple life cycle analysis and put additional time into working with ethically sourced materials and finishes.



Figure 30, Arrival on Site (Author, 2017)

The prototypes were taken to both sites to test resident engagement and to experiment with function and application. This was a valuable opportunity to watch other people interact with the design at full scale, and see how they imagined its place within a co-living environment. The cubes were left for a period of one week during which each site became a type of Living Lab. I visited a few days in with additional hardware, paint, and

accessories to work with residents to modify each unit to add further function and value. This co-design process also inadvertently added a cognitive bias towards the cube units, as the residents themselves played a role in creating them. This is known as the Ikea effect, and plays a role in increasing user well-being and acceptance (Ariely, Motion & Norton, 2011). These extra details could also be later reflected on by users and developers, generating further information, and evidencing the cube's potential for hacking. The elements added included chalkboard paint, small handles/ knobs, feet/ legs, and wheels. At the end of the week I returned to document and discuss how they had been utilised.



Figure 31, Hacking (Author, 2017)

For further photos see appendix D.

6 Results

6.1 Proof of Concept

A fast resident survey found users at both test sites were more confident to interact with the cube units in comparison to existing artefacts. All residents reported an awareness of how the cubes function and could discuss some of the applications for them in both public and private space. They also noted that the cubes had become a discussion topic between the community, as they explored and shared opportunities for their application. Further, the vast majority of residents (85%) had engaged with the cubes in some capacity since they were introduced.

On site at Roam, the units had been moved to bedrooms to combat the lack of storage in these spaces. Others were in use providing surfaces in the communal areas. On the first floor, an unused landing space had been, during the week, used as a standing desk location with three units stacked together. This reflects the need to maximise on intermediate spaces found in existing research. When first distributed by the community manager, they had been placed in the kitchen to display some of the items that a new resident might look for, but in a more obvious location. This supports resident integration, a requirement found in the research process. The modifications they had introduced included chalk board paint, to match their internal doors, and legs which added aesthetic value, and prevented damage to the fragile flooring in some areas.



Figure 32, Cubes at Roam (Author, 2017)



Figure 33, Cubes at Roam 2 (Author, 2017)



Figure 34, Cubes at Roam 3 (Author, 2017)

On site at Unit 6, residents had set up the units to create a small ironing station that offered additional surface space and storage. Others had been used as low level tables around the sofas for relaxing and creating a space for casual conversation. Two had been taken, and were in use, in the kitchen offering an additional, moveable work surface. During the week, they had also been used to set up a community event, as a stand/ stage for a guitar performance. The modifications they had made included hooks, nobs for cable management, and wheels which made the cubes easier to move across their large open-plan space. Further, they talked about how with more units, they would like to experiment with creating room dividers that provide temporary private environments to cater for different activities.



Figure 35, Cubes at Unit 6 (Author, 2017)



Figure 36 & 37, Cubes at Unit 6 (Author, 2017)

Developers at both sites found value in the generated information. Observing the patterns of use and modification over time generated new knowledge towards understanding how residents experience, and act within, co-living spaces. This will help them better respond to resident needs, subsequently providing improved living spaces. This works towards social sustainability by improving resident confidence and well-being through the fostering of relationships with the space and people around them. Creating feelings of control, trust, and responsibility, the cube units offer a unique opportunity for active engagement, and non-verbal feedback between co-living stakeholders. It also works towards ecological and economic sustainability by making better use of space, and facilitating informed decisions about required resources. If, for example, the cubes are used commonly as night tables then providers can confidently invest in a commercial form of bedside storage and return the cubes to a communal space. Without this knowledge, night tables could be purchased that are, in reality, surplus to requirements. This intervention is scalable, for small and large developments, and considers accessibility by having a low cost and simple application.

Despite the challenge of working and producing for contrasting ends of the economic spectrum, this intervention has proved successful in both testing environments. All units are still in use on-site, and continue to add value to the resident experience whilst generating new knowledge for the developers and staff.

For more photos see appendix E.

6.2 Physical Function



Figure 38, Interaction (Author, 2017)

The cube units offer value in many scenarios, within both public and private areas. They can capitalise on vertical height, or floor space as available. Built with 18mm Birch Plywood and finished by hand with linseed oil, they are hard wearing and durable, with a

tactility that makes them inviting to touch and engage with. Their size responds to in-depth testing to ensure the surface is large enough for most applications, but compact and comfortable enough for anyone to pick up and move. The shape facilitates complete flexibility in orientation. Further, through considered and calculated compromises, the units stack to achieve three functional heights in line with found ergonomic data.



Figure 39, Desk Set Up (Author, 2017)

Single Cube: 380mm (Stool/ Chair 400-440mm)
Double Cube: 760mm (Desk/ Table 710-775mm)
Triple Cube: 1140mm (Standing Desk 1120-1150mm)

Using Baltic Birch plywood keeps the weight low but offers strength beyond that of even solid birch of the same thickness, whilst resisting warping, curling or separating. This attention to material selection ensures the units will not wear over time or with heavy use. The cross lamination is exposed at the edges to add an aesthetic detail, and the internal grain direction runs continually to produce a designed look. It is this attention to the finish and quality of the boxes that allows them to integrate easily into high quality, luxury spaces. The boxes are screwed and glued to add strength, with rebates preventing the screw heads protruding and effecting the quality of the surface. Hardware has been chosen from a simple colour palette and are of a minimal design to integrate seamlessly with the cubes aesthetic. This combination of considered material and detail mean the cubes go some way towards hiding their role as pedagogical tool, presenting themselves as a modular furniture collection that offers considered function and a beautiful, minimal aesthetic. What makes this collection distinctive from other modular furniture is the choices, process, and application made specifically in collaboration with co-living stakeholders.



Figure 40, Bedside Table (Author, 2017)

6.3 Technical Specification

6.3.1 Material

The unit is built using 18mm grade BB Baltic Birch Ply. Generally considered as the utility or commercial grade, this material was carefully chosen for its sustainable lifecycle, and worldwide accessibility. It is used currently for a variety of furniture and structural applications. Birch is a renewable resource, with every part of the tree having a current application. It is an abundant, fast growing species that does not impinge on natural biodiversity meaning it meets FSC and PEFC certification. Recent developments in bond type has also meant that it can now meet CARB regulations, removing formaldehyde from its traditional adhesive.

I finished with polymerised Linseed Oil to add durability and improve safety by removing sharp edges and rough spots. Linseed oil is a natural product that is pressed from the dried seeds of the flax plant. It adds a satin finish, water resistance, and hardness that is non-toxic and bio-degradable.

6.3.2 Hardware

Off the shelf hardware was used to reduce cost and increase accessibility. This was purchased from IKEA. In time, and with scale, the design of the hardware could be brought in-house to allow full control of different aspects of their production and to create additions specific to the cube units.

For fixings, I used 4mm x 50mm Fischer wood screws with a double countersunk head. These screws have an easy-start tip and double threading which prevents splitting when drilling near edges and into end-grain. I combined this with ECOS wood glue, which is a water-borne acrylic adhesive with zero VOCs or solvents.



Figure 41, Hardware Detail (Author, 2017)

6.3.3 Size

The final cubes are 380x380mm.

6.3.4 Cost

The cost per unit is 167SEK excluding labour (approx. £14.20).

Sheet of FSC 18mm Baltic Birch ply 1220x2440mm (5 cubes per sheet): 569SEK

Sundries (screws and glue): 15SEK

Polymerised Linseed Oil 500ml (approx. 3 cubes): 119SEK

Wheels (four): 59SEK

Legs (four): 225SEK

Hooks/ Knobs (pair): 19SEK

Costs accurate as of May 2017 and reflect the production of ten prototype units. Cost will reduce with scale.



Figure 42, Cube Studio Photo (Author, 2017)



Figure 43, Cubes in Kitchen (Author, 2017)

7 Discussion and Conclusions

7.1 Project Summary

This project was initiated to investigate the realities of contemporary co-living, and respond to a need for research and development to increase its desirability and accessibility. The questions tackled were:

- 1. How can design help us to identify, understand, and negotiate the networks, systems, and dynamics of contemporary co-living spaces?*
- 2. How can we better facilitate co-living through the design and implementation of environment specific artefacts?*

These were answered through a complex and detailed process of collaborative research-by-design that culminated in a physical intervention, built, tested, and reviewed at contrasting co-living developments, Roam and Unit 6.

Co-living is defined by this project as the sharing of a single residential structure by a group of individuals, beyond the traditional family unit. As a pragmatic response to the problems with existing housing typologies, co-living is shown to offer opportunities for community, sustainability, and social cohesion. This project considers these environments at contrasting ends of the spectrum, collecting data from both a high-end, developer-run space, and a self-run, live-work warehouse. Both locations are in London, used as a sample that reflects other developed, western cities.

Though the definition of sustainability is now broadly accepted, the challenges of achieving it are vastly complex. It is not as simple as reducing resource use or recycling our waste, it requires completely changing consumer habits, whilst still meeting societal, cultural, and economic needs. Understanding these needs is complex in itself, but these must then be balanced with the broader requirement to consider the world ecology. Inefficient resource is generally accepted as one of the leading problems sustainable development faces today. This project focused on investigating and experimenting with alternative ways of living, and making better use of resources in these environments.

This project identified four significant barriers to accessible co-living. Firstly, a lack of research and development in this field has manifested in poor understanding of the needs of users, and the creation of spaces that do not facilitate their unique objectives. Secondly, there exists negative preconceptions of sharing and a concern that communities cannot be fostered adequately within co-living environments. Further, restrictive start-up costs and limited tools are preventing wider experimentation and application of the model. Most significantly, this paper finds existing artefacts fail to withstand collective use and encourage user engagement, and subsequently are not integrating into the complex co-living network or adding value to the residents' experience.

Influenced by the methods of action-research, co-design, sustainability studies, and the Living Lab concept this project used a unique and holistic process of collaboration and experimentation to generate new knowledge. Design tools were applied, further to this, as an exploratory method and to produce a physical outcome.

The findings of this process confirmed the hypothesis that co-living is a unique environment, and that this presents a set of needs not currently being met. It identified and mapped the complex, dynamic relationships between co-living actors and found the role trust, responsibility, and control play in creating the feeling of home. Further, it showed the importance of flexible functionality and intuitive engagement in helping residents relate quickly to new environments and feel confident in playing a part in shaping their own space and joining community activities. This project also created an open platform for discussion between stakeholders.

These findings and barriers were responded to with the construction of a physical design intervention. This took the form of a multifunctional, modular furniture collection. The collection provides opportunities for engagement and interaction not just between the user and the artefact, but between multiple users and the space around them. Its primary function is as a tool for developers to experiment with space, subsequently influencing choices based on patterns of use, movement, and action. On top of this it presents an opportunity for communication and non-verbal feedback between stakeholders. It takes into consideration the ecological, social, and economic aspects of achieving sustainable development, and is accessible for anyone looking to try alternative ways of living. As a pedagogical tool, it responds to developers need for information and understanding without compromising on function and aesthetic. Its application immediately adds value to the residents' experience as it can be built and moved to serve varied roles in many scenarios. It responds directly to the problems with existing furniture and spaces such as lack of durability, limited function, and counterintuitive interaction. In this way, its basic form manages to create complex opportunities for use, exploration, and development. With improved understanding and better living environments more people will be encouraged to inhabit co-living spaces and experience its full spectrum of ecological, economic and social benefits.



Figure 44, Unit Combination (Author, 2017)

7.2 Challenges

In this project's short duration, there were several significant problems that had to be overcome to ensure the aims and deadlines were met. The most significant was the lack of existing research and literature in the field of contemporary co-living. As this phenomenon has grown so quickly, there has been little time for data collection to take place. Primarily, found materials were for the purpose of marketing or advertisement. This was overcome by the application of methods taken from co-design and the Living Lab concept. These focus on collaboration with stakeholders, and testing in real environments, facilitating the generation of a vast quantity of current information, and giving access to experiential knowledge.

A second problem was negotiating the complexities of organising collaboration between a diverse range of stakeholders. This was overcome by reviewing and applying design, action research, and co-design tools to produce workshops that encouraged openminded thinking by engaging participants in creation and performance.

A final problem was understanding and taking action based on the complex and multifaceted concept of sustainability. This required the careful balancing of broader ecological, social, economic, and ecological factors, and was achieved by working closely with a large demographic of residents in two distinct spaces.

7.3 Learning Outcomes & Conclusion

In conclusion, this project achieved the complex goals set out in the purpose and aims, within the given timeframe. Its success demonstrates the role design can play in problem solving in broader cultural and ecological contexts. The design process evidences detailed, creative, and experimental exploration of contemporary theory and methods to conceptualise, visualise and produce a design outcome. Challenging opinions and creating awareness through design, this project identifies and supports positive lifestyle changes towards achieving sustainable development.

The written report, in a manner that is coherent, organised, and informative, shows the value of design as an exploratory method, and presents new knowledge that has implications for designers, researchers, and developers both in the field of co-living, and in the broader context of sustainability, and community generation.

7.4 Potential for Future Work

7.4.1 Continuation of this Project

To pursue this project further, it would be valuable to observe the long-term utilisation of the design outcome. Over time patterns of movement and action would be produced based on an increasing amount of data. This could also be similarly achieved by extending the scope of research, producing more units and placing them at different sites, unique in location, scale or demographic. In response to the findings, design development and decisions could be made in a more informed way, for example, how to categorise space, what artefacts and services to provide, and methods to integrate new residents. Publishing

successful examples, and guidelines for best practice would complete this work and make it relatable and accessible on a large scale. This is part of the value of the designed tool, in that it continues to function and produce information through its lifetime of use.

There is also the opportunity to analyse this tool in other environments, such as co-working, urban space projects, or other public developments such as schools and hospitals. This would generate equally interesting data, though the design of the box, and materials used, may have to be adapted.

7.4.2 Related Opportunities

This project, goes a small way towards answering just two questions within the vast context of co-living, design, and sustainable development. As the concept matures, the opportunities and demand for further research and development that supports its growth will provide stimulus for more projects of this nature.

A related line of research could be the exploration of the application of co-living for other demographics, for example single parents, the elderly, or within council provided housing. This could be performed with the creation of further Living Labs.

There is also a requirement for future research into how a sharing economy can be created without comprising our individual needs. This project supports co-living as way of challenging our negative preconceptions of shared housing, but this tackles a small aspect of unsustainable consumer habits. Others that could be explored include food and travel. Community projects and design interventions could generate information to this end.

There would also be value in testing how the co-living model can sustain long-term accommodation, and how this effects the requirements for space and artefacts.

7.5 Personal Summary

The project defined in this report is the culmination of an MFA Design Degree at Linnaeus University, Sweden. Split across two years of extensive and holistic study the course has focused on developing skills and understanding towards designing a sustainable future. This presented new and varied challenges that have helped me to appreciate the value of experimentation, questioning, and challenging norms, and, with this, has evidenced the role I can play within contemporary problem solving in broader contexts. This work has changed my attitude to what design can be, and what types of outcome hold value, showing me the role I can play as a designer, educator, and mediator. This is evident in the transition this project made from attempting to find a “solution”, to the creation and application of a pedagogical tool.

Reflecting on the trials and tribulations, it has been a hugely beneficial, if steep, learning curve to conclude my time in education. Remaining self-motivated whilst meeting the goals of a detailed and complex program outside my experiential knowledge, has made me confident and determined to thrive in a professional setting.

I strongly believe in the role this project, and its design outcome, can play in supporting contemporary co-living as it challenges traditional housing in the face of the complexity of sustainable development.

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Appendix A: Questionnaire

Demographic Group

Where do you currently reside?

pick country on a map (or mobile)

What best describes your home environment?

- urban -suburban -rural (or mobile)

Age

- under 18
- 18 to 30
- 30 to 45
- 45 to 60
- 60 or above

What is your status?

- Single
- In a relationship but no cohabiting
- Married or Domestic Partnership
- Married with children
- Divorced/ Separated

Professional/ Employment Status:

- Full time employment
- Part time employment
- Self employed/ freelance
- Out of work
- Home maker
- Student
- Retired
- Unable to work

Education history

- No schooling
- Up to but not including college
- College/ High School
- Trade/ Technical/ Vocational training
- Bachelors Degree
- Masters Degree
- Doctorate Degree

Have you ever lived in a co-living space? (inc definition)

Yes No

Co-living Residents (past or current)

Describe your experience of co-living?

What was your motivation for being a part of the co-living movement?

- Cost
- Sustainability
- Socialising and events
- Travel
- Improved/ simpler service
- Experimentation
- Requirement (for example college dormitory)
- Other (please specify:)

How long have you been a part of co-living?

- Less than a week
- 1-4 weeks
- 1-3 months
- 3-6 months
- 6 months- 1 year
- 1 year+

Did you experience any problems during your time co-living?

Describe:

What changes would you like to see in future living spaces?

Describe:

Non co-living residents

What does co-living mean to you?

Describe:

What best describes your attitude to sharing?

- I like to keep my space personal
- I would share with my immediate family
- I would share with wider family or close friends
- I am happy to share with people similar to me
- I am happy to share with anyone

Would you consider co-living?

Yes No

If no, what would prevent you from considering co-living?

Describe:

What best describes your current home?

- Rented flat
- Rented house
- Own flat
- Own house
- With parents
- Other (Please specify:)

How satisfied are you with your current housing situation?

Scale from 1 to 100

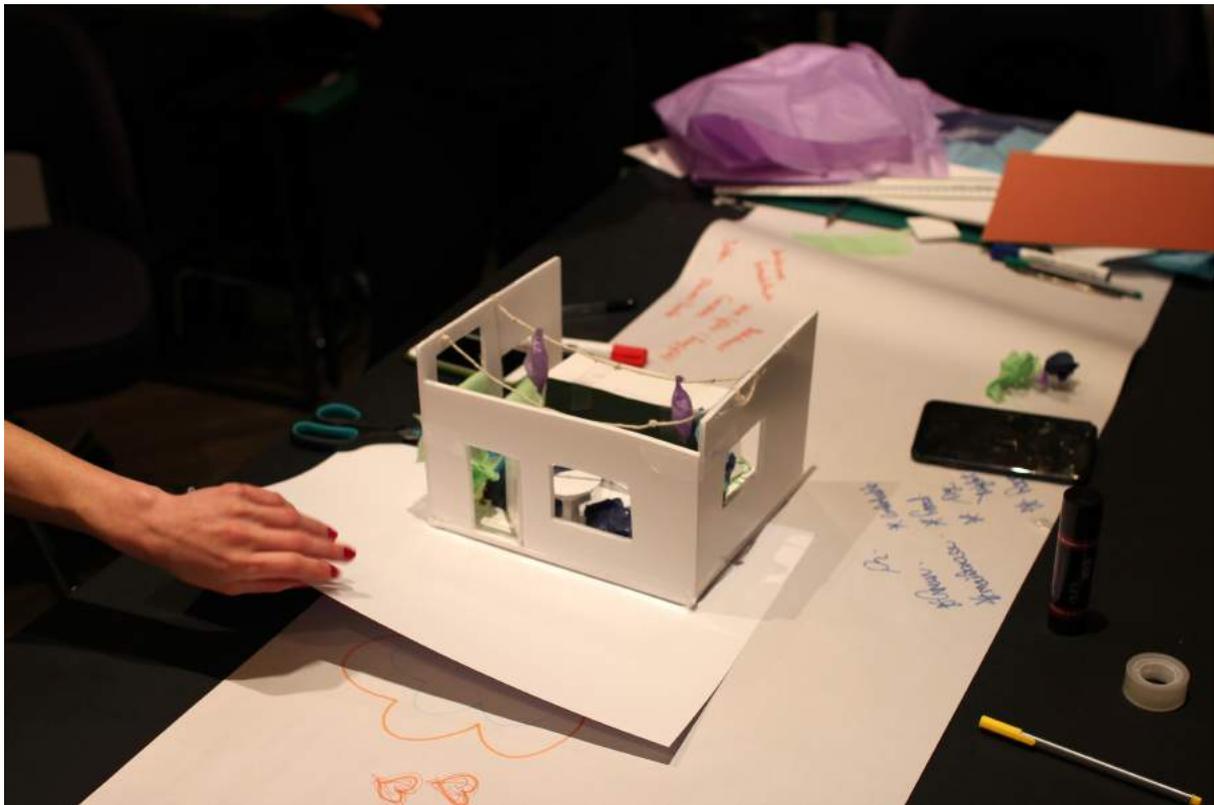
What changes would you like to see in future living spaces?

Describe:

Appendix B: Research & Data Collection

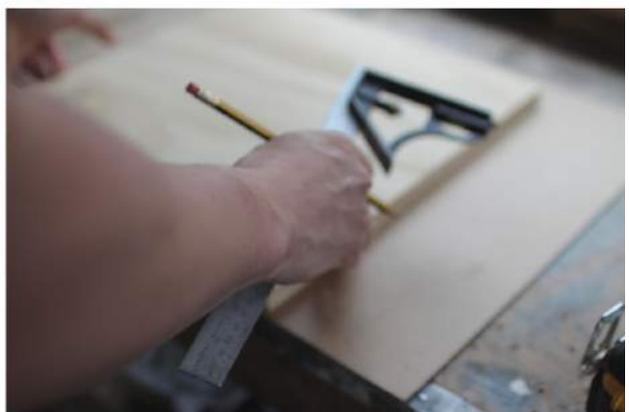


Appendix C: Collaboration & Exploration





Appendix D: Prototyping & Implementation



Appendix E: Size Testing



Appendix F: Proof of Concept











Appendix G: Product Shots





Appendix H: Roam and Unit 6 Comparison Sheet

	Roam	Unit 6
Layout	5 Floors inc. kitchen, co-working room, 4 multi-purpose rooms and lounge	1 Floor inc. Kitchen, large communal room
Resident No.	34	10
Cost Per Week	£650	£200
Location	Chelsea, London	Borehamwood, London
Services	Cleaning Furnished Bed linen & Towels All Bills Hi-speed WiFi Community Events Full time On-site Staff Professional Kitchen All Ensuite	Furnished Water, Gas, & Electric
Minimum Tenancy	One Night	One Month
Structure	Converted Victorian Building	Converted Warehouse



Roam Multi-purpose Room



Unit 6 Multi-purpose Room

Appendix I: Day in the Life

Typically, a day at a co-living space involves morning and afternoon work sessions, meetings, conference calls dependent on locations, lunch either with fellow residents or by yourself, breaks throughout the day, and a group dinner or evening activity. Here's an example of a typical day:

7:00 am – Wake up, head to the kitchen for tea, coffee and breakfast. Usually, the first up brews a cafetière for the other residents. This can turn into communal breakfasts. They most commonly use the kitchen space for this purpose.

9:00 am – Start work in the communal office/ multi-purpose space. Discuss work ideas and issues with housemates. Smaller rooms are used for calls/ meetings. General space is used for more relaxed work.

12:00 pm – Lunchtime. Normally in the kitchen for a break. Sometimes into the city.

2:00 pm – Most quiet time on site. Most common rooms empty.

3 - 6:30 pm – Majority continue to work. Some being to transition to relaxing or socialising.

7:30 pm – Dinner options differ day to day. A group from the house either head out to for a meal, go to an event (normally an invitation from another co-living resident), head to a pub or bar for a few drinks, or stay in for a movie night or group meal. This takes place mostly in the communal office, and kitchen.

Return to bedrooms.