

# **Cross-pollinating the evidence: A feasibility study into the therapeutic potential of beekeeping for adults with substance misuse issues.**

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## **Declaration**

This work has not been previously accepted in substance for any degree and is not being concurrently submitted in candidature for any degree.

Lindsay Cordery-Bruce  
8<sup>th</sup> June 2021

**Statement 1:** This thesis is the result of my own investigations, except where otherwise stated. Other sources are acknowledged giving explicit references. A full reference list is appended.

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**Statement 2:** I hereby give consent for my thesis, if accepted, to be available for photocopying and inter-library loan, and for the title and summary to be made available to outside organisations.

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## **Abstract**

Beekeeping could provide opportunities to address substance misuse, however the literature in this subject area is weak, with no formal evaluations using beekeeping as a complex intervention. A feasibility study was undertaken, utilising a mixed methods research design, to explore the therapeutic potential of beekeeping for adults with substance misuse issues and to establish whether definitive formal evaluation is possible. Forty-five participants (18 in a Control Group and 25 in an Intervention Group) completed the following quantitative measures over three time periods: the Warwickshire Edinburgh Mental Wellbeing Scale, the Office of National Statistics Subjective Wellbeing Questions, the SF36 health questionnaire, the Connectedness to Nature Scale and the Treatment Outcome Profile. These data were analysed using mixed ANOVAS to ascertain changes in wellbeing, quality of life scores, connectedness to nature and substance use frequency.

Eighteen participants from the Intervention Group then engaged in semi structured interviews about their experiences of beekeeping, which were analysed using Thematic Analysis. Significant improvements were seen in wellbeing, calmness, mental focus, mindfulness and recovery skills over time for both groups. However, it was only the Connectedness to Nature scores that showed significantly greater improvements in the Intervention Group compared with the Control Group.

Phenomenological meanings that participants projected onto the beekeeping activity provided powerful narratives and demonstrated connection with the bees beyond anthropomorphism. It is argued here that this depth of meaning may be a form of recovery capital in its own right. It is concluded that beekeeping may have potential therapeutic qualities for adults who have experienced substance misuse issues, with promising implications for future practice development. This study shows that beekeeping is acceptable to participants as an intervention, which warrants consideration for formal evaluation.

## Acknowledgements

This thesis is dedicated to the memory of Nick Hewitt, who died suddenly in 2020. A gentleman, an aspiring beekeeper, and a friend.

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## Figures and Tables Writ 1

Figure 1	Key elements of the development and evaluation Process	12
Figure 2	Thesis objectives and modules in relation to Craig et al 2019 development and evaluation process	18
Figure 3	Drug related deaths by region	22
Figure 4	Overview Sectors of Green Care	28
Figure 5	Stages of Change	30
Figure 6	Data Collection Process	49
Figure 7	SWEMWBS Wellbeing by Group	52
Figure 8	ONS Subjective Wellbeing by Group	53
Figure 9	SF-36 Wellbeing by Group	53
Figure 10	TOP Psychological Health by Group	54
Figure 11	Connectedness to Nature by Group	55
Figure 12	Drinking Days by Group	56
Figure 13	Drug Using Days by Group	56
Figure 14	Quality of Life by Group	57
Figure 15	Overall Experience Rating	59
Figure 16	Proposed publication and dissemination Timeline	96
Figure 17	Key elements of the development and Evaluation process	96
Table 1	Changes in practice	13-17
Table 2	Examples of key tasks and discussion points during practical beekeeping sessions	43
Table 3	Participant descriptive statistics	48
Table 4	Quantitative results	51

## Figures and Tables Writ 2

Figure 1	Buzzin Project Apiary Fence	116
Figure 2	Baby Bees Emerging	117
Figure 3	A Swarm of Bees During Pilot Data Collection	118
Figure 4	A Queen Bee Emerges	120
Figure 5	Different Types of Hive	121
Figure 6	Swarm Catch 1	122
Figure 7	Swarm Catch 2	123
Figure 8	Swarm Catch 3	123
Figure 9	Swarm Catch 4	124
Figure 10	Henry David Thoreau Quotation	127
Figure 11	Eureka moments throughout the Prof Doc	128
Figure 12	Micro Village Site Plan	129

## Contents

Declaration	2
Abstract	3
Acknowledgements	4
Figures and Tables	5
Contents	6
DOC8004 Writ 1      Project Report	
Chapter 1 – Project Overview	8
Professional Context	8
Rationale and Purpose of Study	10
Aims and Objectives	12
Original and Significant Contributions to Changes in Practice	13
The Relationship between the Present Study and MRC Guidance	17
Chapter Summaries	18
Chapter 1 Conclusion	19
Chapter 2 – Narrative Literature Review	20-32
Context	21
Drug and Alcohol Related Deaths	22
The Apiary as a Healing Environment	22
Key Theoretical Constructs	25
Achieving Change	29
A Note about Wellbeing	31
Chapter 2 Conclusion	32
Chapter 3 – Methodology	33-46
Overview of Pilot Methodology	35
Design of Current Study DOC8004	37
Recruitment	38
Quantitative Methods	39
Qualitative Methods	41
Procedure	41
Method of Analysis	44
Chapter 3 Conclusion	46
Chapter 4 - Results	47-71
Descriptive Statistics	47
Data Collection Process	49
Quantitative Results	51
Wellbeing Results	52
Psychological Health Results	53
Connectedness to Nature Results	54
Substance Misuse Frequency	55
Quality of Life Results	57

Key Quantitative Findings	57
Thematic Analysis	59
Theme 1 Improved Wellbeing	60
Theme 2 Connectedness to Nature	63
Theme 3 Parallels with Recovery Skills	64
Theme 4 Projection of Meaning	69
Key Qualitative Findings	70
Chapter 4 Conclusion	71
Chapter 5 – Discussion	72-99
Interpretation of Findings	72
Wellbeing	75
Connectedness to Nature	80
Parallels with Recovery Skills	83
Projection of Meaning	89
Limitations	90
Possible Implications for Policy, Practice and Change Management	91
Original and Significant Contributions to Change	94
Future Dissemination of the Work	95
Recommendations	96
Chapter 5 Conclusion	97
Chapter 6 – Conclusion	100
Writ 1 References	102-114
DOC8004 Writ 2 – Reflective Essay	115-131
Introduction – How it all Started	115
Catching the Buzz	116
Critical Reflections on Ethical, Political, Philosophical and Moral Issues throughout the Professional Doctorate	118
A Swarm of Ideas	119
To Bee or not to Bee – A Philosophical Journey	119
Directing Sunbeams – Changing My Own Practice	127
Conclusion and Chapter Summary	131
Writ 2 References	132-133
Appendices – Provided separately	

*"There's no rulebook for the world.  
It's in our heads, our collective human hive-mind.  
If there are rules, we're the ones making them.  
We can change them whenever we want"*  
Isaac Marion 2010

## **DOC8004 Writ 1 – Project Report**

### **1.1 Chapter 1 - Project Overview**

Within a troubling context of worsening poverty and widespread reporting of adverse childhood experiences, drug and alcohol-related deaths have increased at an alarming rate in Wales over the course of the last decade (Bevan Foundation, 2020; John et al, 2019). It is widely acknowledged that substance misuse issues are inextricably linked to experiences of complex trauma and the everyday challenges imposed by poverty and social exclusion (Danese et al, 2020). The current health care and criminal justice systems, designed to address substance misuse among the adult population, are widely criticised (Nutt, 2020). They are often deemed ineffective and negligent which has led to a strong movement calling for reform (Godlee & Hurlay, 2016; 2011; Nutt, 2020; Hari, 2015; Bowser et al, 2015; Watson, 2019). Is it argued here that green care approaches offer opportunities to enhance wellbeing among adults with substance misuse issues while simultaneously promoting positive conservation behaviours (Haubenhofer, et al, 2010). The green care activity of interest here is beekeeping, which may offer therapeutic additionality when compared to traditional treatment modalities.

### **1.2 Professional Context**

As a professional person operating within the substance misuse treatment and recovery field for over 20 years, an opportunity presents itself not only to address systemic barriers to overcoming these issues but also to contribute the development of new knowledge. There is currently a gap in professional practice as substance misuse support services consistently deliver inconsistent outcomes, with high drop out rates from treatment and recovery programs (Welsh Government, 2013). As a Chief Executive with policy level influence, the professional context surrounding this study makes driving systemic change possible. There is



a need for robust development of interventions which are both feasible and efficacious, and where the evidence is sufficiently robust in impact to influence policy and key decision makers. If indeed beekeeping is acceptable to people with substance misuse issues as a complex intervention, there is a possibility that treatment retention and outcomes may be improved. Anecdotally service users have explained that they often find the interventions available under the current system boring and this is one of the factors driving subsequent disengagement. The gap to be addressed, therefore is to develop creative interventions that capture the interest of those taking part, offering a realistic alternative or addition to more traditional treatment options and to ultimately improve recovery outcomes.

After launching a beekeeping project in 2014 called Buzzin, for adults in various stages of recovery from substance misuse issues, the therapeutic potential of this activity has become increasingly apparent. Although the initial intention of Buzzin was to provide a wholesome and interesting hobby to facilitate recovery, unexpected benefits were also observed. This raised questions about whether beekeeping can be offered and evaluated as a complex intervention as defined by the Medical Research Council (Craig et al, 2019). After turning to the contemporaneous literature, it became apparent there was very little available that documented the human relationship with honeybees, and nothing could be found within the last decade featuring the wellbeing benefits outside of medicine. Since then, therapeutic beekeeping projects have increased in popularity throughout the world, particularly over the course of the last five years. However, studies documenting their efficacy are largely anecdotal and mainly focus on community engagement, enhancing the wellbeing and employability of veterans as well as other vulnerable groups (Gomes, 2017; Borkowski, 2017; Roest, 2019). Moreover, studies focusing on the relationship between human wellbeing and green care have been criticised for lacking methodological rigour (Clearly et al, 2017, Haubenhof, 2010), relying exclusively on qualitative methods. Furthermore, it has been argued that this body of evidence is overly reliant on small samples (Davis et al, 2020; Bragg & Atkins, 2016). *“However, the evidence base for the impact of the outdoors on wellbeing is still in its infancy with most studies relying on qualitative methods or quantitative approaches with small participant numbers (commonly <20).”* Davis et al, 2020 pp 350.

This thesis documents a feasibility study, utilising a mixed research design to explore the potential outcomes of beekeeping as a complex intervention, its acceptability, and potential for formal evaluation.

### **1.3 Rationale and Purpose of the Study**

Following the MRC guidance for developing and evaluating complex interventions (Craig et al, 2019), it is necessary to dedicate appropriate time and resource to intervention development, feasibility study and the pilot phase before attempting more robust evaluation. Given the paucity of literature described, and lack of theoretical basis explaining how beekeeping interventions affect wellbeing, it is deemed necessary here to establish whether this is acceptable to participants as an intervention and whether future robust formal evaluation is feasible.

The literature raises important questions about what can be done differently to improve positive outcomes for adults with substance misuse issues. Although there are anecdotal indications that human-honeybee interactions improve human wellbeing, there is a lack of supporting literature. The few studies that have been undertaken relating to pollinators and wellbeing are often poorly defined, lack scientific rigour, and subsequently lead to unsubstantiated findings (Davis et al 2020). It has been argued that methodological frameworks for such research must be more clearly defined, drawing on samples of larger than twenty participants and moving beyond purely qualitative designs (Davies et al, 2020).

It is intended here to offer an indicative theoretical framework based on observations of beekeeping as a complex intervention for adults with substance misuse problems since the Buzzin project started in 2014. This thesis draws particularly on attention restoration theory (Kaplan, 1995) self determination theory, intrinsic value orientation (Cleary et al, 2017) and the development of recovery capital (Best & Aston, 2015; Parkin, 2016; Cano et al, 2017), which will be discussed fully in chapter two. The literature is very clear that green care interventions increase eudemonic wellbeing (Cleary et al, 2017; Hemmingway, 2016), but it remains unclear if these assumptions can be extended to include a phylogenetically different species, such as honeybees. The actual sensory experience of beekeeping remains largely undocumented, particularly in relation to visual stimuli and soundscapes (Emfield & Neider, 2014) and whether this has a role in attention restoration (Kaplan, 1995). Likewise, the role of

connection and relatedness is of relevance here (Cutcliffe & Travale, 2016), and whether connection with bees beyond conservation efforts is possible (Lloyd & Deans, 2017). Another subject of particular interest is the role of adventure and challenge when interacting with bees, as was identified in other green care activities (Hemingway, 2016), and what this may mean for people who have previously engaged in high risk lifestyle choices.

The potential of beekeeping as a complex intervention has serious implications for the substance misuse sector where there is a strong call for stringent performance management of interventions within a competitive commissioning environment. It is feared that the lack of robust research in this area may compromise recovery-promoting activities, such as beekeeping, due to lack of reliable evidence. The ultimate cost of this paucity of evidence is to the person attempting to achieve recovery as services operate within an environment of increasingly diminishing resources. This is within the context of an existing broken system and rapidly worsening levels of substance related harm in the community (John et al, 2019; Joyce & Ziliak, 2020). There is an urgent need for clarity as to how green care interventions work, why beekeeping is described as restorative, and what this could mean for improving recovery rates in Wales.

It is considered that a mixed methods feasibility study is necessary to ascertain how to measure improvements in wellbeing within a green care project based on beekeeping activities. Figure 1 illustrates that this study falls within the 'Feasibility and Piloting' element of the MRC model for evaluating complex interventions, with a strong focus on testing procedures and measurement tools, identifying barriers to recruitment and retention and determining sample size (Craig et al 2019). Quantitative data is needed to obtain repeated measures to monitor changes among the sample as objectively as possible using peer reviewed tools. Qualitative data is needed to obtain subjective interpretations, offering insights into why the quantitative data may have changed, and what the experience actually means for the people involved. These subjective insights also facilitate understanding of intervention acceptability.

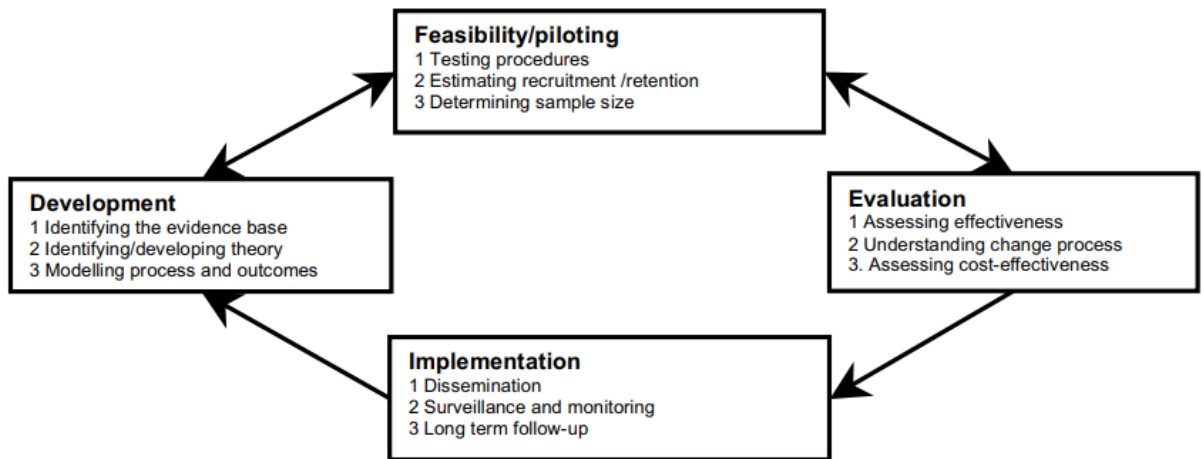


Figure 1 Key elements of the development and evaluation Process Craig et al 2019 p8

## 1.4 Aims and Objectives

**Aim** – To undertake formative work to identify opportunities to rigorously evaluate beekeeping as an intervention for improving wellbeing, skill development and building recovery opportunities in adults with substance misuse problems in Wales.

### Objectives

1. To undertake a narrative literature review in order to identify theoretical underpinnings connecting the intervention of beekeeping with improved recovery outcomes.
2. To design and implement an appropriate methodological protocol, incorporating mixed methods and peer reviewed measurement tools.
3. To interpret quantitative results to identify outcome measures for further evaluation.
4. To interpret qualitative results to ascertain acceptability of beekeeping as an intervention, possible barriers to future studies and feasibility of formal evaluation.

This thesis documents a feasibility study, utilising a mixed research design, to further explore the potential outcomes and acceptability of beekeeping as an intervention for adults with substance misuse issues and to make recommendations for future research.

## 1.5 Original and Significant Contribution to Changes in Practice

The academic process preceding this work was both valuable and rigorous. It required the completion of three preparatory modules, each consisting of several elements described in Table 1.

Module	Category of Change	Key literature sources	Implications for Practice
DOC7001	Proposing, implementing and evaluating change within the professional context	<p>Substance misuse as a globally important challenge IDPC 2016, United Nations 2015</p> <p>United Nations Agenda for Sustainable Development, which cites Wellbeing as its third of seventeen international priorities (UN, 2015).</p> <p>Substance misuse accounts for 1.5% of the global burden of disease and injecting drug use causes around 30% of new HIV infections outside of Africa (WHO 2016). In 2010, WHO estimated that 155-250 million people aged between 16-64 have used an illicit substance at least once in the past year. The number of people globally who are experiencing addiction is growing (Bowser et al, 2014).</p> <p>Best and Aston (2015) recommend a societal shift to the adoption of Positive Criminology, where a new non-offending identity is formed through personal development, celebrating the person's strengths and harnessing positive influences. Restorative activity, such as opportunities offered through green care and environmental projects may offer solutions to implement positive criminology in practice (Haubehofer et al 2010, Parkin, 2016).</p>	<p>This module explored the argument for doing things differently in front line services and how this links to the policy context for substance misuse strategy in Wales.</p> <p>This work highlights the paradox between the clinical and academic arguments; the promotion of evidence-based approaches while UK legal parameters actively prevent best practice.</p> <p>The full text for the Proposing Change essay can be found in Appendix A.</p> <p>Change is needed both systemically and on an individual project practice level for addressing substance misuse problems in the UK.</p>

		New legislation provides opportunities to drive change. Social services and Wellbeing (Wales) Act (SSWA, 2014) and also the Wellbeing of Future Generations (Wales) Act (WFGA, 2015)	
DOC8002	Gaining a better understanding of the professional context to propose change	<p>The literature search took place between 17<sup>th</sup> October 2017 and 28<sup>th</sup> December 2017. The initial pilot search resulted in the identification of 59,824 sources, which upon filtering were rejected. From this session it was identified that the most useful databases to search were METSearch, Scopus, Google Scholar and the Cochrane Database.</p> <p>The decision was taken to start again resulting in a total of 187 hours of searching, filtering, abstract scanning and reference chasing. This resulted in the inclusion of 128 sources referenced in this paper.</p> <p>The rate of drug and alcohol related deaths in the UK has been steadily increasing since records began in 1993 (John et al, 2019).</p> <p>It is evident that current societal mechanisms for identifying, engaging, and treating people with substance misuse conditions remain “spectacularly ineffective” (MacCoun &amp; Reuter, 2011, pg66).</p> <p>There is an abundance of literature providing evidence that interactions with nature and environmental connectedness can improve ailments and promote physical and mental wellbeing (Aldous, 2000; Allen, 2012; Annerstedt &amp; Wahrborg, 2011; Beery &amp; Wolf-Waltz, 2014; Caplan, 1967; Cleary, et al, 2017; Clinebell,</p>	<p>The search highlighted the paucity of literature, not only regarding the wellbeing benefits of beekeeping, but also the examination of human-honeybee interactions.</p> <p>The review offers a comprehensive overview of green care interventions and identifies that there is a knowledge gap. The full text of the literature review can be found in Appendix B.</p>

		<p>1996; de Bruin, et al, 2013; De Vries et al, 2003; Dorn &amp; Relf, 1995; Van den Berg et al, 2010; De Lacovo &amp; O'Connor, 2009; Drahota 2012; Elings, 2012, 2006; Elings &amp; Beerens, 2012; Elings &amp; Hassink, 2008; Ellingsen-Dalskau et al, 2016, 2016b; Fjeldauli &amp; Meistad, 2004; Frumkin, 2001; Gonzales et al, 2009; Gullone, 2000; Hassink &amp; Van Dijk, 2006; Hassink et al, 2017; Iancu, 2014; Kaplan, 1995; Katcher &amp; Beck, 1987; Kazdin, 2017; Kuo, 2004; Kwack &amp; Relf 2000; Latkowska, 2015; Lloyd &amp; Deans, 2017; Lohr &amp; Relf, 2000; Louv, 2012; Maller, Townsend, Pryor, Brown, &amp; St Leger, 2005; MIND, 2007; Muir, 1901, 1911; Nowak, 2005; Pretty et al, 2005; Raanaas, Patil, &amp; Hartig, 2011; Relf, 1992; Restall &amp; Conrad, 2015; Sempik et al, 2003; Shultis &amp; Hvengaard, 2016; Stilgoe, 2001; Ulrich, 1984; Wilson, 1984, 1993; Zylstra et al, 2014).</p>	
DOC8003 In 2 parts	Evaluating change that is already happening within the professional context	<p>The Connectedness to Nature Scale (CNS) was originally developed by Mayer and Frantz (2004) as a measure of subjective cognitive connection between people and nature (Pasca et al, 2017). The original questionnaire constituted 13 items, graded using a Likert scale of 1-5 and was found to have construct validity (Perrin &amp; Benassi, 2009). Pasca et al (2017) used Item Response Theory to ascertain response probabilities based on the real level of connectedness and found that several items on the scale could be eliminated to give a stronger measure of environmental connectedness.</p>	<p>The first part of this module concerns methodology practice and includes a full rationale for utilising a mixed-methods approach.</p> <p>This was deemed the most appropriate way to provide objective quantitative measures and to allow changes over time to be documented.</p> <p>The qualitative interpretation of participants is regarded as pivotal to understanding the therapeutic potential of</p>

		<p>The Warwickshire Edinburgh Mental Wellbeing Scale (WEMWBS) has been hailed as an industry standard tool in mental health and social care services (NEF 2012) especially when administered alongside the Office of National Statistics Subjective Wellbeing Questions and the Social Trust Question. This tool has been robustly evaluated and assessed as reliable with strong face validity (Taggart et al, 2016; NEF, 2012; Stewart-Brown et al, 2011).</p> <p>The most commonly used quality of life measure in green care research identified by Husk et al (2016) was SF-36. SF-36iii is a short form health survey originally developed by McHorney et al (1994) and aims to provide an indicator of overall health. Ware, Snow and Kesinski (1993) found that the tool has strong reliability and validity, particularly the sections on physical and mental health.</p> <p>When a tool is scientifically valid, assurances can be made about its ability to measure what it intends to measure, whereas reliability refers to the consistency of scores as the tool is used in different settings and points in time (Bachman &amp; Schutt, 2011).</p> <p>The Treatment Outcome Profile is the industry standard utilised in all services across England and Wales, which has undergone multiple revisions (Public Health England, 2017).</p> <p>Green and Thorogood (2009) identified that in-depth interviews are one of the most common sources of qualitative data within health research.</p>	<p>beekeeping, so semi structured interviews were also incorporated into the design. The full text of the methods essay can be found in Appendix C1.</p> <p>The second part, Preparing for Change, was a small pilot study designed to test the measurement tools, rehearse the data collection process, and explore options for data analysis. This enabled the quantitative tools, interview schedule, and site risk assessments to be refined before the final thesis.</p> <p>The full text of the Pilot Study can be found in Appendix C2.</p>
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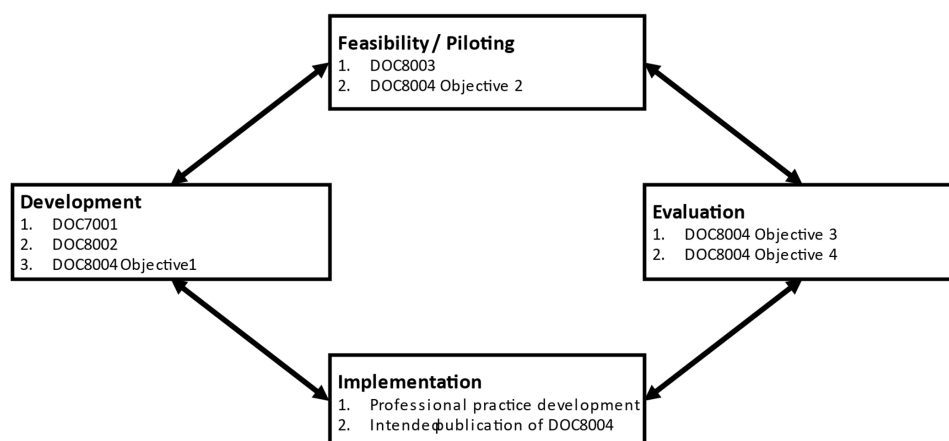
		<p><i>“Research ethics refers to the moral principles guiding research from its inception through to completion and publication of results” (BPS, 2014 pg 5). These moral principles outline our responsibilities as researchers to participants, stakeholders and wider society (Green &amp; Thorogood, 2009).</i></p>	
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*Table 1 – Changes in Practice*

The implications for practice outlined in Table 1 resulted in real changes which reached beyond academia. Firstly, this was applied through advocating strongly for novel approaches to therapeutic interventions to capture interest and improve engagement. Secondly, it was ensured that an evidence based approach is taken to the development and implementation of interventions in the Third Sector. Thirdly, by involving and integrating participants into the design approach, they are now best placed to facilitate future intervention throughout the design, implementation and evaluation phases. Most importantly, practice development has been undertaken by advocating for change through dissemination of this project via strong professional networks. The findings of this project have been discussed at the highest levels of government to explore how learning can be applied in related sectors, such as homelessness.

## **1.6 The Relationship between the Present study and MRC Guidance**

How the research objectives and stages of the academic process relate directly to the key elements of the development and evaluation process described by Craig et al (2019) are illustrated in Figure 2.



*Figure 2 Thesis objectives and modules in relation to Craig et al 2019 development and evaluation process*

## 1.7 Chapter Summaries

This thesis is the final academic piece in a Professional Doctorate programme and has been divided into six chapters.

Chapter One is the introduction to this thesis.

Chapter Two provides an updated narrative literature review summary, outlining the Welsh context and the emergence of anecdotal evidence regarding the wellbeing benefits of beekeeping (albeit limited). The key theoretical constructs underpinning the green care movement are cited, while a call for change in the way substance misuse recovery is facilitated is also made. The main theoretical models for connecting the intervention with positive wellbeing outcomes are also summarised.

Chapter Three provides a detailed overview of the method, quantitative measurement tools, qualitative techniques, and ethical considerations informing the study.

Chapter Four presents the research findings, consisting of a mixed ANOVA analysis of questionnaire data and a thematic analysis of interview data. These results ascertain acceptability of beekeeping as an intervention, possible barriers to future studies and feasibility of formal evaluation.

In Chapter Five these findings are synthesised and linked to the relevant literature. The contribution of this study to the development of new knowledge is highlighted here.

In Chapter 6 the conclusions of the feasibility study are set out, after which limitations are identified and recommendations for future research made.

## **1.8 Chapter 1 Conclusion**

This chapter has outlined how poverty and substance misuse is progressively worsening and current approaches to engage and retain those affected in treatment are failing. There is a convincing evidence base suggesting that green care interventions may offer alternative options for engaging people and improving treatment outcomes. The focus of this study is to undertake formative work to identify opportunities to rigorously evaluate beekeeping as an intervention for improving wellbeing, skill development and building recovery opportunities in adults with substance misuse problems in Wales. The theoretical underpinnings of beekeeping as an intervention require further development and this will be the focus of Chapter Two.

*“Our treasure lies in the beehive of our knowledge.  
We are perpetually on the way thither,  
being by nature winged insects  
and honey gatherers of the mind”  
Nietzsche 1887*

## **Chapter 2 – Narrative Literature Review**

### **2.1 Chapter Two Introduction**

The previous chapter provided an overview of how this thesis corresponds with the overall Professional Doctorate program and how this learning may be applied across a range of practice areas. Importantly, the overarching aim was stated, which is to undertake formative work to identify opportunities to rigorously evaluate beekeeping as an intervention for improving wellbeing, skill development and building recovery opportunities in adults with substance misuse problems in Wales. In keeping with the MRC guidance for developing and evaluating complex interventions (Craig et al, 2019), the following objectives were set. This chapter directly addresses objective one.

#### **Objectives**

1. To undertake a narrative literature review in order to identify theoretical underpinnings connecting the intervention of beekeeping with improved recovery outcomes.
2. To design and implement an appropriate methodological protocol, incorporating mixed methods and peer reviewed measurement tools.
3. To interpret quantitative results to identify outcome measures for further evaluation.
4. To interpret qualitative results to ascertain acceptability of beekeeping as an intervention, possible barriers to future studies and feasibility of formal evaluation.

The investigation of the therapeutic potential of beekeeping for adults with substance misuse problems cuts across several conceptual domains, within both the policy and academic arenas. The Welsh context is an interesting one in which to view the continuation of

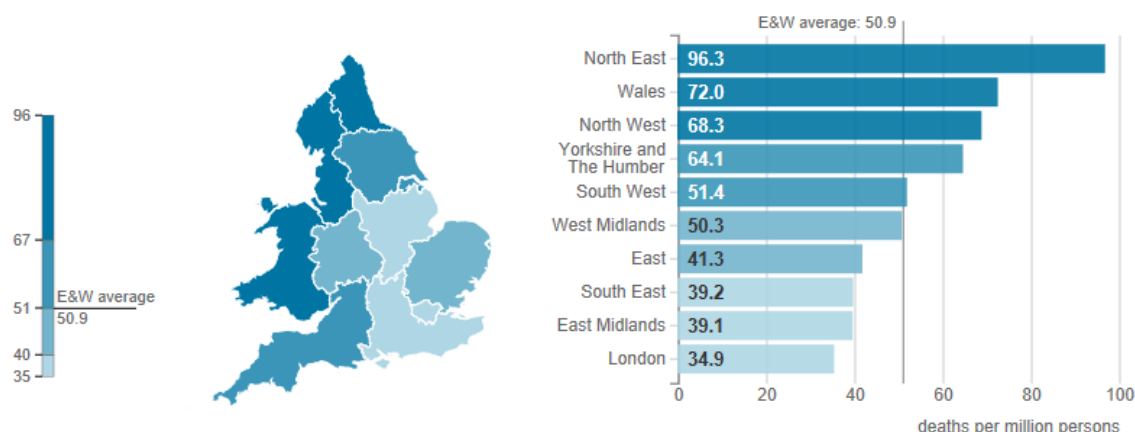
entrenched poverty and the development of substance misuse problems, particularly among people who have experienced complex trauma (PHW, 2015). The focus of this chapter is to undertake a narrative literature review in order to identify theoretical underpinnings connecting the intervention of beekeeping with improved recovery outcomes. This will involve an exploration of the emerging evidence from green care approaches, and how interventions involving nature and animalia compliment traditional treatment modalities. For clarity, the term green care *“encompasses interventions that aim to maintain or promote a person’s social, physical, mental and even educational wellbeing”* (Haubenhof et al, 2010, p 106).

## 2.2 Context

There are wide-ranging challenges facing Wales, which had a population of approximately 3,138,600 in 2018 (ONS, 2019). There have been ambitious legislative drivers to ensure that Wales becomes a nation where Prosperity for All (Welsh Government, 2017) is possible and that the wellbeing of future generations is safeguarded (WFGA, 2015). Although these ambitions are honourable and well intentioned, it must be acknowledged that many initiatives launched within this devolved region have been unsuccessful. For example, the ambition to end childhood poverty in Wales by 2020 failed to gain traction and (at the time of writing) 29% of Welsh children continue to live in poverty (Bevan Foundation, 2020), with some of this failure being attributed to a lack of shared ambition with UK central government (Bevan Foundation, 2020). The National Assembly for Wales Communities, Equalities and Local Government Committee (2015) reported that 25% of the Welsh population is living in poverty, which is a troubling backdrop to the emergence of substance misuse issues in the community. The situation is exacerbated by the prevalence of adults reporting Adverse Childhood Experiences, which stood at 47% in 2015 (PHW, 2015). The Public Health Wales Adverse Childhood Experiences (ACE) study found direct correlations between ACE and substance misuse, maladaptive sexual behaviour, and a range of other health inequalities. Higher incidences of adverse experiences were reported by those from the more deprived areas in Wales, further evidencing a link with poverty. Poverty may also restrict access to greenspace in favour of white affluent communities (Wolch et al, 2014).

The rate of drug and alcohol related deaths in the UK has been steadily increasing since records began in 1993 (John et al, 2019). In 2018 there were 4359 drug related deaths (an

increase of 16%) and Wales featured second highest by region, with 72 deaths recorded per million people in the population, as highlighted in Figure 3 (John et al, 2019). A similar pattern has emerged from alcohol related death data, with 7551 recorded in 2018, the second highest since records began. It is evident that current societal mechanisms for identifying, engaging, and treating people with substance misuse conditions remain “spectacularly ineffective” (MacCoun & Reuter, 2011, p66).



Source: Office for National Statistics

Figure 3 Drug Related Deaths 2018 by region (John et al, 2019)

This is taking place within the context of politically driven societal fragmentation, worsening poverty and increasing homelessness in Wales (Joyce & Ziliak, 2020; Spiller, 2019; The Wallich, 2018). There has been a clear call for change by both the general public and practitioners alike; to do things differently and to accept that traditional medical models of tackling substance misuse have failed (Nutt, 2020; Hari, 2015; Bowser et al, 2015; Watson, 2019). One of the proposed methods of offering alternative interventions is the emergence of green care options, one of which is beekeeping.

## 2.3 The Apiary as a Healing Environment

The Buzzin project in Cardiff, Wales was established in 2014 to offer an experimental enhancement to substance misuse treatment in response to emerging evidence that interactions with nature can improve wellbeing. This involved structured, practical beekeeping activities for adults with substance misuse issues as part of a Throughcare, Aftercare and Recovery Support (TARS) programme. Since then, there has been a growing interest in the therapeutic potential of beekeeping across the world, varying from specialist

veteran projects such as Heroes to Hives (Campion, 2019; McCormick, 2018; Borkowski, 2017) to community cohesion projects in Detroit (Roest, 2019). Campion (2019) documented how beekeeping has played a role in helping veterans to overcome not only complex trauma but also physical disabilities since the first world war (Phillips, 1919 cited in Campion, 2019). It is argued anecdotally that beekeeping encourages the development of emotional resilience, business skills, and a renewed focus on what life is about (Gomes, 2018). Borkowski (2017) described his own experience of exposure to complex trauma as a soldier and how it later affected him during retirement. It prompted him to launch the Wounded Warriors Project, where he found similar psychological and emotional improvements as a result of veterans interacting with bees. There are now similar programs available throughout the US (McCormick, 2018), with urban beekeeping projects becoming increasingly popular as they offer the additional benefits to humans of community cohesion, employment readiness and conservation benefits for honeybees (Roest, 2019).

This recent interest provides valuable anecdotal evidence to support the need for further research, although (so far) the literature fails to explain how or why human interaction with bees provides therapeutic benefits; the articles cited do not offer any methodological framework or theoretical contribution beyond raw description. Within the wider context of green care research, Davies et al (2020) point out that the majority of research undertaken to date has been conducted using only qualitative designs with participant samples of fewer than 20 people, limiting the generalisability of findings. It is for this reason that Davies et al (2020) argue that the evidence base for demonstrating the impact of outdoor activity, and how the variables come together to impact wellbeing, is still in its infancy. Further studies focussing specifically on the relationship between humans and honeybees are scarce, with only two key studies identified during a systematic literature search (Lloyd & Deans, 2017; Marx, 2017). Most methodologically robust scientific research is concerned with biological and chemical reactions to bee venom and other hive products, omitting any reference to psychosocial or behavioural impacts (Stanhope 2017).

Lloyd and Deans' (2017) action research project involved an education programme about Native Australian Bees. Activities included lectures, film evenings, guided habitat walks, and practical sessions constructing bee habitats. Although this study did not involve beekeeping, there are many parallels with the subject of interest, including the identification of wellbeing

benefits, and cultural impacts and emotional impacts (Lloyd & Deans 2017). A plethora of wellbeing benefits were reported, including feelings of connection to the environment, excitement and fear of being stung, positive emotions, feeling engaged with life, connection to other people, enthusiasm, gratitude, accomplishment, and meaning and purpose. Participants described how they wanted to thank the bees and expressed feelings of love towards them (Lloyd & Deans, 2017). They described feeling inspired by their involvement in the project, and expressed their intention to help bees in their plight for survival (Lloyd & Deans, 2017). It was assessed that the Lloyd and Deans (2017) case study reinforces the social value of community conservation projects and indicates that interaction with bees may provide benefits similar to that of other outdoor initiatives (Davies et al, 2020). Participants were able to bond over shared values which provided a basis for deeper relationships. It is anticipated that similar effects may be experienced by participants engaging in data collection for this thesis.

*“The more humans come to know about, appreciate and understand native bees the more likely they are to respect and protect them and their habitats.” (Lloyd & Deans, 2017, p 27).*

A further study conducted by Marx, (2017) explored the relationship between humans and honeybees through an online survey of beekeepers, followed by a small number of structured interviews. Although this was not conducted specifically with a forensic population, the findings are of interest and contribute to the developing evidence. The findings showed that 73.6% of the 121 beekeepers who responded described themselves as having attachment bonds with their bees which could be described as a “relationship” (Marx, 2017). The interview data identified three common themes: communication, risks and rewards, and co-creation. Beekeepers spoke freely about the importance of communication with bees and how they use calm, gentle and controlled movements to soothe the bees, bringing about a calm response from the colony (Marx, 2017). Emotional regulation and practicing calmness are key skills learned in substance misuse therapeutic settings, providing early indications that beekeeping may add value to recovery interventions. Participants in the Marx (2017) study described the risks and rewards of beekeeping resulting in feelings of achievement. Some of these feelings were derived from a fear of being stung and feeling reassured if they avoided being stung. Also identified was co-creation between the bees and the beekeeper, the creation of synergy and a sense of attachment (Marx, 2017). This supports earlier research into environmental



enhancement and human animal interactions, highlighting the wellbeing benefits of connectedness.

Although research on the therapeutic benefits of beekeeping is extremely limited, the anecdotal evidence that is available provides a compelling case for further exploration, particularly in relation to whether beekeeping constitutes an element of green care. How this relates to improving wellbeing, skill development and building recovery opportunities in adults with substance misuse problems requires further exploration and an overview of key theoretical constructs.

## **2.4 Key Theoretical Constructs**

There are several key constructs to be taken into consideration when examining the potential theoretical underpinnings connecting the intervention of beekeeping with improved recovery outcomes. This requires a triangulation of evidence from several subject areas and related topics. Clinebell (1996), for instance, introduced the concept of Eco-Therapy, where nature is incorporated intentionally to provide additional benefits to traditional therapeutic approaches. As the evidence base evolved and grew stronger internationally, the term 'green care' came to prominence (Hemingway et al, 2016), and suggested that interactions with nature can be used as an intervention to increase human wellbeing (Haubenhofner et al, 2010). However, preceding the development of this emerging evidence base were key constructs such as Attention Restoration Theory (Kaplan, 1995), Self Determination Theory (Deci & Ryan, 1985) and Intrinsic Value Orientation (Clearly, 2017). Before introducing these key constructs, the Biophilia Hypothesis (Wilson, 1984), provides useful context.

### **2.4.1 The Biophilia Hypothesis**

The Biophilia Hypothesis posits that it is within the natural instincts of humans to take an interest in nature and to interact with it (Beery et al, 2015; Wilson, 1984). This biophilic interest in nature is inherent within human biology and driven by nature (Clearly et al, 2017). Furthermore, it is argued that this ancestral appreciation of nature is linked to reproductive success and correlates with many survival benefits (Ulrich, 1993; Kahn 1995, 1997). Anthropologists describe how this connection to nature is spiritually stimulating and enhances inner spiritual development, offering further wellbeing benefits (Baars, 2005 cited in Elings &

Hassink, 2008). Pertinently, Wilson also developed an interest in bees, claiming that the waggle-dance, as a vehicle for communication, is one of the true revelations and mysteries of nature (Marx, 2017).

Although the Biophilia Hypothesis sparked broader academic interest in how humans interact and benefit from the natural world, it has been widely criticised for being too broad in concept yet too narrow in definition (Kahn et al, 2009; Sagan et al, 1993). The hypothesis fails to explain Natural Deficit Disorder, whereby it has been observed that humans are becoming increasingly disconnected and contemptuous of nature (Louv, 2008). It is questionable whether humans do indeed have an innate connection to nature when there is compelling evidence of humans systematically destroying the planet (Thunberg, 2019). It appears that humans have a tendency to identify independently of non-human nature, treating themselves as conceptually different and superior, leading to strongly held beliefs of separateness (Sampson, 2012). Moreover, this hypothesis fails to consider other variables affecting the human experience of natural phenomena such as culture, perception, and learning and developmental experiences (Clearly et al, 2017; Hinds & Sparkes, 2008). There is evidence that purist biophilia has failed to influence policy and while the planet continues to deteriorate this concept is rendered meaningless. The impact this has had on research development has led to inconsistencies between studies and methodological limitations (Joye & De Block, 2011; Joye & van den Berg, 2011).

#### **2.4.2 Attention Restoration Theory**

A green care project in Swansea cited Attention Restoration Theory as a contributing explanation for how participants derived a series of wellbeing benefits from their interaction with the outdoors (Davies et al, 2020). Here it is argued that the role of human-nature interactions is to overcome information processing fatigue in the urban environment and restore wellbeing (Kaplan, 1995). Directed attention requires conscious effort and, as we become more and more exposed to activities requiring this kind of attention through modern living, susceptibility to fatigue becomes inevitable (Kaplan, 1995). Kaplan (1995) highlighted undesirable consequences of over exposure to urban environments, including reduced problem-solving ability, reduction in sociability, increased irritability and lack of resistance to impulses. It is noteworthy that the aforementioned skills are pivotal in achieving long term recovery from substance misuse issues as *“directed attention [is] the key ingredient in human*

*effectiveness*” (Kaplan, 1995 p 173). When fatigued people become overwhelmed by the stimuli around them they become distracted and unable to plan ahead, resulting in short-termism (Kaplan, 1995). However, this can be overcome through interaction with nature, resulting in fascination and other mechanisms for mitigating stress, and promoting recovery. Green care initiatives promoting focussed attention as a skill have been found to be successful in clinical and forensic settings such as prisons (Moeller et al, 2018) and, in some cases, produced similar results to mental health day care services (Iancu et al, 2014).

### **2.4.3 Self-Determination Theory**

Self-Determination Theory provides an explanation as to how humans can either be active drivers of their own lives or passive observers, rejecting responsibility for growth and development (Ryan & Deci, 2000). It was originally argued that intrinsic motivation is ultimately driven by self-regulation, wellbeing, competence, autonomy, and relatedness (Ryan & Deci, 2000; Deci & Ryan, 1985). These ideas have been progressed further to demonstrate how interaction with nature offers biopsychosocial benefits, by acknowledging the value of feelings of relatedness. In a study of care farms in Norway, it was found that participants with mental health issues directly benefited from structure and flexibility provided by the activities, understanding and acknowledgement from others, guidance and positive feedback, interaction with nature and animals and reflections on personal functioning and their future (Ellingsen-Dalskau et al, 2016). Furthermore, all these benefits increased feelings of self-determination for participants, a sense of autonomy and control in their own lives, human functioning and subsequently, wellbeing (Ellingsen-Dalskau et al, 2016).

### **2.4.4 Intrinsic Value Orientation**

Whereas self-determination theory introduces the idea of a person gaining autonomy and empowerment through their relationship with nature, intrinsic value orientation explains how and why aligning behaviour with values is ultimately rewarding and restorative. Psychological discomfort is experienced when an individual behaves incongruently with their fundamental personal values, leading to a state known as cognitive dissonance (Festinger, 1962). This is commonly experienced among adults with substance misuse problems (Prochaska & DiClemente, 1983; Prochaska, DiClemente & Norcross, 1992). Clearly argues that when interactions with nature correlate with intrinsic value orientation, wellbeing outcomes improve (Cleary et al, 2017). Simple exposure to nature does not necessarily result

in a connection to it (Mantler & Logan, 2015); there must be active participatory engagement and values-based action (Shanahan, 2016) for this to be achieved. A key research study by Ellingsen-Dalskau et al (2016) found that care farming provided an opportunity for people to experience structure, connectedness with others (Iancu et al, 2014; van Niekerk, 2009; Provencher et al, 2002), values/behavioural alignment (Dunn et al, 2005; Hemingway et al, 2017), skill development (Hine, Peacock & Pretty, 2008), and feelings of value and appreciation (Dunn et al, 2008). This provides strong evidence that self-determinism leads to autonomy, wellbeing, and positive functioning within a green care setting (Ellingsen-Dalskau et al, 2016) and may offer insights into future research on beekeeping and adults with substance misuse issues. However, Ellingsen-Dalskau (2016) can be criticised for not adequately highlighting the role of focussed attention in green care settings, as suggested by Attention Restoration Theory (Kaplan, 1995).

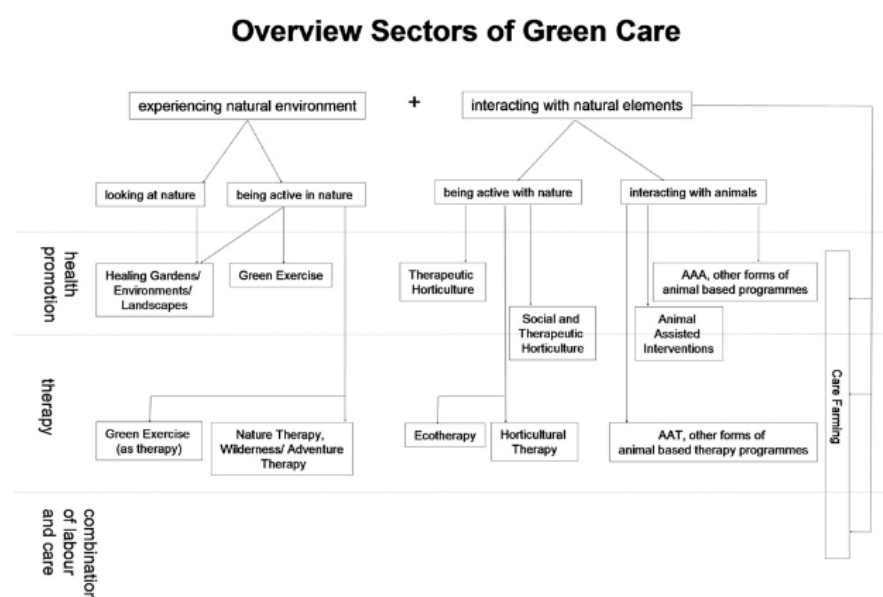


Figure 4 Overview Sectors of Green Care Haubenhofer 2010

Although it is claimed that interactions with nature have a general restorative and therapeutic effect (Maller et al, 2008; Bratman et al, 2012; Elings & Hassink, 2008; Kaplan, 1995; Snell & Simmonds, 2012; White et al, 2013; Hine, 2008; Zylstra et al, 2014), there are still shortcomings in the evidence which limit the extent to which interaction with nature improving wellbeing is explained (Cleary et al 2017). Although structured nature programmes have been documented as successful in substance misuse rehabilitative environments (Aslan, 2016) they have failed to draw convincing conclusions as to how these interventions work on

a neurological level, or indeed how they build recovery capital. This is a deficit which will be explored further in this research.

#### **2.4.5 Recovery Capital**

Recovery Capital refers to the internal and external resources a person needs to make sustainable changes and move on from misusing substances (Best & Aston, 2015; Parkin, 2016; Cano et al, 2017). Recovery is described as more than control over a substance or the avoidance of relapse; it is about general health improvement, quality of life, and community participation (Cano et al, 2017). It is argued that there are three main elements to building recovery capital (Best & Laudet, 2010; Cloud & Granfield, 2009):

- Personal Capital – This includes skills, positive feelings, distress tolerance, positive risk taking, self-esteem and resilience
- Social Capital – This includes friendships, support networks, meaningful activities, and any positive interactions with people
- Community Capital – This includes employment, training, suitable housing, and citizenship

Parkin (2016) further identified a fourth element, cultural capital, which includes a person's moral perspective, value systems, and the desire to achieve social conformity. Interestingly, this also includes interaction with nature and the outdoors (Parkin, 2016). The development of all types of recovery capital requires engagement in meaningful activity, leading to the formulation of new identities, a sense of hope, wellbeing and purpose in life (Cano et al, 2017).

### **2.5 Achieving Change**

The most popular behavioural change model referenced within the substance misuse field is the Transtheoretical Model of Change (Prochaska & DiClemente, 1983; Prochaska, DiClemente & Norcross, 1992). Here it is argued that behaviour change occurs in stages, over time, rather than being attributed to a specific event or moment (Prochaska et al, 2008). The stages are described as precontemplation, contemplation, preparation, action, and maintenance as illustrated in Figure 5.



*Figure 5 Stages of Change Prochaska et al 2008*

Those described as being in the precontemplation stage are deemed to be unmotivated, resistant and the least ready to make changes. This may be due to lack of information, apathy, or feelings of failure from previous unsuccessful attempts. A life changing event, such as the death of a friend or receiving troubling medical advice, may then prompt progression to the next stage, where they prepare to make changes. Coping strategies are developed and practiced during the action stage. If all goes to plan, the person progresses to the maintenance stage (where conscious effort is no longer required) and they fully integrate new health behaviours into their everyday life. It is noteworthy that there are similarities between the transtheoretical model of behavioural change and Lewin's (1947) model of change management, heavily referenced in business and industry. Lewin (1947) proposed that disequilibrium prompts change, which helps explain how people transition from the precontemplation to action stage in the transtheoretical model. There then follows a period of unfreezing old behaviours, creating new ones and then refreezing them, similar to the maintenance phase described by Prochaska et al (2008). Perhaps recovery is not just for individuals but also for organisations and broken care systems too.

Although the Transtheoretical Model has become widely accepted and actively used in substance misuse treatment for decades it is not without criticism. Adams and White (2004), asserted that stage progression is not the same as behaviour change, and health behaviours are too complex for the average person to gain insight as to where they fit on the cycle. By this they meant that it is rare for the average person to have the knowledge and the psychological insight to view their own behaviour in terms of designated stages. Adams and White (2004) also argued that the opportunities for behaviour change must exist for people to exercise self-determination, and these are often circumstantial. Brug et al (2005) analysed

this further and challenged Adams and White (2004). Brug et al (2005) argued that there is evidence of increased motivation and tangible behavioural changes as described by the Transtheoretical Model of Change, but more research is needed to ascertain the sustainability of such changes (Brug et al, 2005). The Recovery Framework for Wales progresses this further and highlights that, for people to progress towards sustainable change, there must be an opportunity for people to practice skills in real world settings if sustainable change is to translate beyond therapeutic settings (Welsh Government, 2013). It is proposed here that beekeeping may offer such an environment in which to practice these skills.

## 2.6 A Note About Wellbeing

The definition of wellbeing has been the subject of widespread debate because the same word is applied to describe a range of concepts, leading to confusion (Oades & Mossman, 2017). It is, therefore, essential to clearly articulate what this commonly used term means within the context of this study. There are different types of wellbeing described in the literature. Ryan's (2000) Self Determination Theory, for example, outlines the role of developing autonomous motivation through personal autonomy, competence, and relating to others. Alternatively, Seligman (2011) developed the "PERMA" theory of wellbeing; Positive emotions, Engagement, positive Relationships, Meaning and Accomplishment. Also, The Five Ways to Wellbeing developed by the New Economics Foundation (Aked et al, 2008) are widely cited in health literature and policy documents. These are Connect, Be Active, Keep Learning, Give to Others, and Take Notice (mindfulness) (Aked et al, 2008). According to the Social Services and Wellbeing Act, wellbeing relates to:

*““Well-being”, in relation to a person, means well-being in relation to any of the following— (a) physical and mental health and emotional well-being; (b) protection from abuse and neglect; (c) education, training and recreation; (d) domestic, family and personal relationships; (e) contribution made to society; (f) securing rights and entitlements; (g) social and economic well-being; (h) suitability of living accommodation. (3) In relation to a child, “well-being” also includes— (a) physical, intellectual, emotional, social and behavioural development; (b) “welfare” as that word is interpreted for the purposes of the Children Act 1989. (4) In relation*

*to an adult, “well-being” also includes— (a) control over day to day life; (b) participation in work”. (SSWA 2014, p 13).*

The common element between these approaches is the focus on improvement in quality of life, how someone’s life is going (Crisp, 2014), and ultimately the pursuit of happiness. The cognitive and behavioural processes an individual goes through to improve wellbeing, or to commence and maintain a recovery journey, offers useful insight as to how recovery capital is built among adults with substance misuse issues, and provides context around how this can be achieved through interactions with nature.

## **2.7 Chapter 2 Conclusion**

Increasing substance related deaths in Wales, worsening poverty, and widespread reporting of adverse childhood experience among the adult population provides a troubling context framing this feasibility study (Bevan Foundation, 2020; John et al, 2019). It has been argued for many years that existing health care and criminal justice based systems, designed to tackle substance misuse, are ineffective and in some cases actively promote relapse and failure (MacCoun & Reuter, 2011; Nutt, 2020; Hari, 2015; Bowser et al, 2015; Watson, 2019). Is it argued that green care approaches involving therapeutic interactions with nature offer something additional that is not currently available within traditional treatment modalities (Haubenhofer, et al, 2010). Green care approaches are underpinned by common concepts such as eco therapy (Clinebell, 1996) and the Biophilia Hypothesis (Wilson, 1984), where it is emphasised that humans instinctively draw restoration from interacting with their natural environment which offers an escape from the over-stimulation of chaotic urban settings. There are key theoretical underpinnings of relevance here, describing how people can achieve self-determination, attention restoration, intrinsic value orientation and build recovery capital to enable them to move on from substance misuse issues, build new identities, and improve recovery outcomes through their interaction with nature. This satisfies the MRC guidance (Craig et al 2019) in the Developmental Phase of determining whether beekeeping is an acceptable intervention for improving wellbeing, skill development and building recovery opportunities in adults with substance misuse problems in Wales.



Although there are a growing number of anecdotally effective beekeeping projects throughout the world, mostly focussing on enhancing the wellbeing and employability of veterans, there is enough evidence to justify further research into whether the apiary offers a therapeutic environment for adults with substance misuse issues. By applying the methodological rigour of a mixed research design, a feasibility study will be undertaken to render the insights needed to explain how this topic can be researched in the future, and to offer explanations as to the therapeutic potential of beekeeping for adults with substance misuse issues. Chapter Three will describe the process of designing and implementing an appropriate methodological protocol, incorporating mixed methods and peer reviewed measurement tools.

“All that is within reach of man  
is the observation of the analogy of the life of the bee  
with other manifestations of life”  
Mills 1766

## **Chapter 3 – Methodology**

### **3.1 Chapter 3 Introduction**

The previous chapter provided an overview of the Welsh context surrounding this feasibility study, highlighting that substance misuse presents a considerable social problem. The theoretical underpinnings of green care were also explained, providing further justification for the development of novel approaches to tackling substance misuse, such as beekeeping to improve recovery outcomes.

This chapter describes the formative work in developing the methodology and outlines the approach taken to evaluate the feasibility of using beekeeping as an intervention for improving wellbeing, skill development and building recovery opportunities in adults with substance misuse problems in Wales. Within the context of MRC guidance for developing and evaluating complex interventions (Craig et al, 2019), this chapter directly addresses objective two.

#### **Objectives**

1. To undertake a narrative literature review in order to identify theoretical underpinnings connecting the intervention of beekeeping with improved recovery outcomes.
2. To design and implement an appropriate methodological protocol, incorporating mixed methods and peer reviewed measurement tools.
3. To interpret quantitative results to identify outcome measures for further evaluation.
4. To interpret qualitative results to ascertain acceptability of beekeeping as an intervention, possible barriers to future studies and feasibility of formal evaluation.

## **3.2 Overview of Pilot Methodology**

**3.2.1** As previously described in Figure 2, a pilot study was undertaken to satisfy module DOC8003 Preparing for Change and to get ready for undertaking this feasibility study. This was conducted involving a small sample from a non-clinical and non-forensic background selected from beginner beekeepers known to the researcher. The focus of the pilot was defined by a series of hypotheses and research questions, which were later radically altered in line with academic development. The remainder of this section is extracted from the full report available in Appendix C2.

**Quantitative Hypotheses 1:** The Buzzin beekeeping activity significantly affects wellbeing and quality of life.

**Quantitative Hypotheses 2:** The Buzzin beekeeping activity significantly affects connectedness to nature.

**Quantitative Hypotheses 3:** Buzzin beekeeping activity significantly affects substance misuse and offending behaviour.

**Qualitative Research Question 1:** How is the sensory experience of beekeeping described and explained by Buzzin participants?

**Qualitative Research Question 2:** Do participants perceive an impact on wellbeing following beekeeping activities and what reasons do they give for this?

**Qualitative Research Question 3:** What are the parallels between beekeeping skills and recovery skills?

### **3.2.2. Quantitative Method Development**

Following extensive research, it was decided to practice the administration of a suite of psychometric measures to determine their suitability for further application. These included the Warwickshire Edinburgh Mental Wellbeing Scale (NEF, 2012), the Office of National Statistics Wellbeing Questions (NEF, 2012), the SF36 questionnaire (McHorney, 1994) and the Treatment Outcome Profile (PHE, 2017). These tools are described in further detail later in this chapter. The questionnaires were administered to the pilot sample before and after a structured practical beekeeping session, facilitated by a Master Beekeeper.

### **3.2.3 Qualitative Method Development**

A 2 hour **Professional Consultation Event** was held on the 3<sup>rd</sup> August 2018. Although the session was audio recorded the equipment failed and was unable to be transcribed. However,

detailed handwritten minutes were taken so data was not lost. The session was attended by a Consultant Clinical Psychologist, a Dr of Counselling Psychology, a Consultant Psychiatrist, a Specialist Community Public Health Nurse, a Buzzin Project Service User, the Buzzin Project lead Beekeeper, a Research Officer from a local Homelessness charity and the Assistant Chief Executive of a Substance Misuse Support Charity. All were issued with an information sheet and talked through it, the researcher verbally checked their understanding before issuing consent forms, which were then signed by participants. The researcher then delivered a 10 minute presentation providing background to the Buzzin project and the research aims before seeking views and guidance on useful questions to ask during the qualitative interview phase. From this session, the list of semi structured questions was developed for the pilot interviews. These were undertaken with all pilot participants in the days following the practical beekeeping session. The experience of piloting the interview schedule resulted in a significant revision to the questions to be used in the final thesis, including a list of prompts.

#### **3.2.4 – Pilot Analysis**

Assuming a normal distribution among the sample, a Paired Samples t-test was conducted to assess whether there was a significant difference in dependent variable scores before and after undertaking the beekeeping activity. At this stage the sample was too small to undertake more powerful statistical analysis, however the results showed promising signs of beneficial changes in wellbeing and connectedness to nature.

The Thematic Analysis checklist from Braun and Clarke (2006) was used for reference and as a quality assurance tool to analyse interview data. In total 8 themes were identified, with 16 subthemes. The findings confirmed that this was the appropriate methodological approach.

#### **3.2.5 Applying the learning from the Pilot Phase**

The pilot phase was very beneficial and equipped the researcher to make substantial methodological revisions. It was decided to administer the questionnaires at 4-weekly intervals to monitor change rather than to use purely as before and after measures. The suite of questionnaires used had typing errors, even though they were copied from the original source. This was corrected. More time was allowed for welcoming participants ahead of sessions and issuing protective equipment so that they didn't feel rushed. More reliable recording equipment was purchased for the interviews. The semi structured interview schedule was re-written with the useful addition of clear and consistent prompts. The aims

and objectives of the project were significantly revised to align with the MRC guidance (Craig et al, 2019). It became apparent from the pilot study that the subject of study is not yet at a stage of development to undertake advanced methodologies intended to draw solid conclusions. Firstly, the suitability and acceptability of beekeeping as a complex intervention must be ascertained. This took the main thesis project back a step on the MRC framework (Craig et al, 2019).

### **3.3 Design of Current Study DOC8004**

Building on the insights gained during the pilot phase, a mixed methods research design was selected to capture both qualitative and quantitative measures of the beekeeping experience. As such this feasibility study incorporates some aspects of process evaluation as outlined by Moore et al (2015) in that the study will evaluate an intervention using quantitative and qualitative methods to determine whether (i) the intervention can be delivered, (ii) the evaluation framework is effective and feasible to conduct and (iii) the evaluation measurement tools are able to show changes in the outcomes. Previous claims have been made that there is a false division between qualitative and quantitative research, and that methodological separation between them can never really be achieved (Green & Thorogood, 2009). Many have argued that the two approaches can be successfully combined (Clark & Ivankova, 2016).

*“The use of quantitative and qualitative approaches in combination provides a better understanding of research problems than either approach alone” (Creswell & Plano Clarke, 2008, p 5).*

This combination of methods can negate the limitations of each, giving rise to a more rounded data set and more wide-ranging insights (Creswell & Plano Clark, 2008; 2018). Quantitative numerical data highlights areas warranting further exploration and often sets the context for interpretation. Similarly, qualitative data can be numerically corroborated, enabling cross validation of findings and determining suitability of these methods for future research. The advantage of applying mixed methods is that data collection, analysis, and interpretation are more robust. This mixed methods approach also compliments an existential phenomenology epistemology. This may also provide a more pragmatic and comprehensive exploration of the opportunities to rigorously evaluate beekeeping as an intervention for improving wellbeing, skill development and building recovery opportunities in adults with substance misuse problems in Wales.

### **3.4 Recruitment**

Participants were invited to be involved in the feasibility study and were deemed eligible if they were accessing substance misuse support via the throughcare, aftercare and recovery support services in Cardiff and Vale of Glamorgan. This collection of services offers proactive interventions as people navigate their recovery from substance misuse issues. This may include medical treatment, group-based activity, counselling, volunteering, training and education. Beekeeping through the Buzzin project is currently offered as part of this package of services. Service users can pick and mix the services and activities most suitable for them at the point of referral.

There were two groups to be observed within the study, constituting an Intervention Group and a Control Group, both of which were selected from the different services offered under the throughcare, aftercare and recovery support service.

#### **3.4.1 Intervention Group**

The Intervention Group was recruited opportunistically from people who had already chosen to take part in beekeeping activities. The researcher was introduced to participants through the Buzzin Project Coordinator. Before commencement of the study, the Project Coordinator was fully briefed on the contents of the information sheet, with particular emphasis on the need to obtain voluntary consent and the freedom to withdraw from the study without giving a reason up until data analysis took place. Hardcopies of the information sheet, consent form and freedom to withdraw form were left with the Buzzin Project staff. As it is recognised that some participants may face challenges with literacy, a short video was made where the researcher verbally explained the content of the information provided.

#### **3.4.2 Control Group**

The Control Group were opportunistically sampled from those accessing aftercare recovery community activities which did not involve beekeeping. A Recovery Coordinator was briefed using the same process described in 3.4.1. Although the content of the information sheet was different for this group, the importance of informed voluntary consent was emphasised, as was the freedom to withdraw. The Recovery Coordinator was briefed by the researcher to administer the questionnaires at 4-weekly intervals, participant attendance allowing. Again a

short video was provided which contained a comprehensive explanation of the pilot study, what to expect, how their data would be used and stored and how their anonymity is protected. The researcher never met the Control Group participants and the questionnaires were administered by a trained member of staff employed by the recovery community.

### **3.5 Quantitative Methods**

A range of questionnaires were used to capture objective changes in wellbeing and related indicators.

The following areas were measured at baseline before the first beekeeping session, four weeks later, and after the final beekeeping activity session to enable a repeated measures analysis to be undertaken and to assess whether improvement had occurred in the following areas:

- Wellbeing
- Health
- Quality of Life
- Connectedness to Nature
- Substance misuse and recovery skills development

#### **3.5.1 Tools and measures**

The Warwickshire Edinburgh Mental Wellbeing Scale (WEMWBS) has been widely adopted as an industry standard tool in mental health and social care services (NEF 2012), especially when administered alongside the Office of National Statistics Subjective Wellbeing Questions and the Social Trust Question. Each provides a summative total, with a higher score indicating a positive result. This scale has been chosen due to the clarity of definition of wellbeing, robust reliability, its use in similar studies, and strong face validity (Taggart et al, 2016; NEF, 2012; Stewart-Brown et al, 2011).

The most frequently used quality of life measure in green care research identified by Husk et al (2016) is SF-36. SF-36iii is a short form health survey originally developed by McHorney et al (1994). The SF-36 aims to provide measurements of different aspects of health across eight health themes.

- Vitality

- physical functioning
- bodily pain
- general health perceptions
- physical role functions
- emotional role functions
- social role functions
- mental health.

The questionnaire requires scaled scores to determine how a participant perceives their current health. Ware, Snow and Kesinski (1993) found that the tool has strong reliability and validity in relation to physical and mental health.

The Connectedness to Nature Scale (CNS) was originally developed by Mayer and Frantz (2004) as a measure of subjective cognitive connection between people and nature (Pasca et al, 2017). The original questionnaire comprised of 13 items which were graded through a Likert scale ranging from 1-5. The CNS has excellent construct validity as confirmed by Perrin and Benassi (2009). Pasca et al (2017) used Item Response Theory to ascertain response probabilities based on the real level of connectedness. As a result of this, several items on the scale could be eliminated to give a stronger measure of environmental connectedness. For this reason the seven-item questionnaire was used in this feasibility study, which includes items 2,5,6,7,9,10 and 11 from the original Mayer and Frantz (2004) scale. The summative total of questionnaire scores is used, with a higher score indicating a stronger connection.

The Treatment Outcome Profile is widely used to measure substance misuse status as this is the industry standard utilised in all services across England and Wales (Public Health England, 2017). The tool measures drug and alcohol use over three time periods, in addition to consumption method and criminogenic activity. The items of particular interest here are:

- Substance use frequency measured by number of days used - reported separately for drugs and alcohol
- Self reported ratings of Psychological Health – on a scale of 1-20, with a higher score indicating a positive result
- Self reported Physical Health – also reported in a scale of 1-20
- Self reported Quality of Life rating – again on a scale of 1-20



The TOP Quality of Life scale will cross reference with the other quantitative measures.

### **3.6 Qualitative Methods**

Semi structured interviews followed the final beekeeping session to provide subjective explanations and personal interpretations. Interviews are a popular method and the most often used tool in health research for achieving this purpose (Green & Thorogood, 2009). A consistent structure, as recommended by Green and Thorogood (2009), ensured consistency between interviews while encouraging participants to elaborate on any areas of interest. The interviews were intended to capture the contextual account of the beekeeping experience and offer possible explanations for any changes in quantitative measures (Green & Thorogood, 2009).

In order to address the interventions feasibility, recovery skills development was explored through semi structured interviews to enable subjective interpretation of the experience, complimenting the quantitative data. The semi structured interview encourages the sharing of detailed narratives and allows for a personal perspective and version of truth (Green & Thorogood 2009). The structure approved by Green and Thorogood (2009) was stringently followed to ensure consistency between interviews while allowing flexibility to elaborate. It has been strongly argued that interviews offer a “relatively efficient way of generating data on almost all health topics” (Green & Thorogood 2009 pg 120-121). For the purposes of the present study semi structured interviews were to explore the human experience of beekeeping, how the was activity was perceived via the senses, and the phenomenological meanings attached by participants. The interview schedule used can be found in Appendix D.

### **3.7 Procedure**

Before any research activity was undertaken, ethical approval was sought and obtained on 18<sup>th</sup> April 2019 from the Cardiff Metropolitan University Ethics Committee (reference PGR-1245).

Practical beekeeping sessions commenced on Wednesday 15<sup>th</sup> May 2019 and ended Sunday 29<sup>th</sup> September 2019. Sessions were held every Wednesday, Friday and Saturday, and 2

sessions every Sunday. Wednesday and Friday sessions were delivered by the Buzzin Project Coordinator, the weekend sessions were delivered by the researcher.

The suite of quantitative psychometric tests were administered on the 15<sup>th</sup> May 2019, immediately before the first practical beekeeping session to establish baselines (Time 1). These measures were repeated 4 weeks later (Time 2) and then after the final practical session at the end of the beekeeping season at the end of September 2019 (Time 3).

In total 70 practical sessions were held, with participants free to switch between groups depending on which was most convenient. This equates to 140 hours of direct beekeeping experience. One session ran over the allocated time because we caught a swarm. During the season, participants experienced all aspects of honeybee husbandry, including instruction in and use of equipment, apiary safety, building hives and frames, hive inspections, queen marking, mite treatment, feeding, disease analysis, re-queening, over-winter preparations, and honey extraction.

### **3.7.1 Session content and delivery**

Due to beekeeping activities being so dependent on weather and the needs of the bees at the time of inspection, each session naturally varied. However, Table 2 provides an overview of the key tasks involved and how metaphor was used to instigate discussions about recovery skills.

### **3.7.2 Data Collection Challenges**

Data collection was interrupted due to a biohazard risk as European Foul Brood (EFB) was discovered within a 5-mile radius of the research sites. EFB is a bacterial disease resulting in deformation of brood at the larval stage, wing deformities, and in worst cases colony collapse. This meant that the researcher did not have access to apiaries between 24<sup>th</sup> July 2019 and 6<sup>th</sup> September 2019. All apiaries including the researcher's private colonies had to be inspected by the Department for Agriculture before data collection could continue. This break in consistency did have an impact on the sample and some participants did not return. Fortunately, the research colonies were not affected by the disease and data collection was able to continue.

<b>Table 2 – Examples of key tasks and discussion points during beekeeping practical sessions</b>			
	<b>Key husbandry duties</b>	<b>Example of metaphor</b>	<b>Recovery skills discussed</b>
<b>Early season April - May</b>	<p>Calmness and conduct around the bees</p> <p>Hefting the hive (checking weight)</p> <p>Checking food stores</p> <p>Checking and building equipment</p>	<p>If you're stressed the bees will be stressed.</p> <p>Readiness for the season</p> <p>Strength to survive</p> <p>Being prepared</p> <p>Team work</p>	<p>Mindfulness and emotional regulation.</p> <p>Preparing to change – moving from Contemplation to Action</p> <p>Have you prepared for recovery? i.e clear goal setting</p> <p>Relationships with people and how addiction sabotages this.</p> <p>Support networks</p>
<b>Mid season June - August</b>	<p>Hive inspections</p> <p>Observation of waggle dance</p> <p>Swarm management</p> <p>Eliminating queen cells (to prevent swarming)</p> <p>Wasp Management</p>	<p>Being organised like the bees</p> <p>Communication can be hard but bees manage it through dancing in the dark</p> <p>Finding a new home – moving on</p> <p>Sometimes the bees fly away</p> <p>The importance of ending toxic relationships even though it's hard</p> <p>Persistence of negative influences (people and thoughts)</p>	<p>Organisational skills</p> <p>Improving communication skills.</p> <p>Saying what you mean.</p> <p>How will things be different once you move on from substances?</p> <p>Dealing with loss.</p> <p>Changing the people around you to ensure recovery success</p> <p>Assertiveness and mindfulness. Identifying negative thoughts and changing them.</p>

<b>Late season</b> <b>September</b>	Honey Harvest	Achieving goals	Resisting immediate gratification pays off.
		Avoiding self sabotage	Allowing yourself to feel pride
	Treating parasites	Recovery health check	Setting new goals. Moving from Action phase to recovery maintenance.
	Preparing the hive for winter	Protecting what has been achieved. Protecting others as well as ourselves.	Conserving bees / conserving recovery. Contributing to society.

### 3.7.2 Semi-Structured Interviews

Upon completing the beekeeping season on 29<sup>th</sup> September 2019, quantitative data collection ceased for both groups. Intervention Group participants were then invited to take part in a semi structured interview. Interviews took place between 1<sup>st</sup> October 2019 and 31<sup>st</sup> December 2019, recorded using a Dictaphone, and transcribed for analysis. Separate consent was sought for the interview element of this work, with the right to withdraw emphasised as well as a full explanation of how privacy was protected. The full interview schedule was designed with reference to guidance from King and Horrocks (2010) and can be accessed in Appendix D.

## 3.8 Methods of Analysis

### 3.8.1 Quantitative Analysis

Pearson's Chi Square analysis was used to determine whether there was a significant relationship between gender (male / female) and the group allocation (Control / Intervention) (Field, 2009). A t-test was conducted to determine whether there was a significant difference between age profiles and group allocation.

Mixed ANOVAs were used to determine the difference in scores collected at baseline (Time 1), and the two subsequent follow-up tests at 4 weeks later (Time 2) and following the final practical session (Time 3). Planned comparisons then assessed whether the scores difference between Time 1 and Time 2 in the Intervention Group was statistically different from the scores difference between time 1 and time 2 in the Control Group, and then the same from Time 2 to Time 3. This approach is recommended as an efficient means to reduce the influence of omitted variables, important given observed differences between Control and Intervention Groups.

### **3.8.2 Qualitative Analysis**

Thematic Analysis was undertaken to gain qualitative insights and interpretations from participant interviews and to enhance the findings from questionnaire data, by identifying similarities and differences in participants interpretations of the beekeeping experience. This was a key component in identifying recovery skill development, the meanings projected onto the experience and the suitability of beekeeping as a complex intervention.

The Thematic Analysis followed the six phase method by Braun and Clarke (2006).

1. Familiarisation with the data – this involved reading the transcripts a number of times.
2. Generation of initial codes, briefly summarising key ideas – the transcript of each participant was numbered and key quotes were arranged under colour coded headings to identify similarities and differences.
3. Searching for themes. This was mapped visually as recommended by Coolican (2014) using Post-it notes and flip chart paper.
4. Rigorous theme review and potential themes refined to produce a list of major themes and sub-themes – Initially thirty five themes were identified and shortlisted to twenty.
5. Theme definition and naming – the transcripts were re-read to ensure that interpretation had not drifted from the original statements made by participants. Some themes were completely removed due to restrictions on word count.
6. Alteration and refining of themes – final arrangement of four overarching themes with seven sub-themes. This list was compared again with the original transcripts to ensure that original meanings were not diluted.

### **Chapter 3 Conclusion**

In order to undertake formative work to identify opportunities to rigorously evaluate beekeeping as an intervention for improving wellbeing, skill development and building recovery opportunities in adults with substance misuse problems in Wales, an appropriate methodological protocol, incorporating mixed methods and peer reviewed measurement tools was designed. A mixed methods design was assessed as the most appropriate means to gather evidence about the suitability of beekeeping as a complex intervention for adults with substance misuse issues. Following ethical clearance, the quantitative questionnaire tools selected were the Warwickshire Edinburgh Mental Wellbeing Scale, the Office of National Statistics Subjective Wellbeing Questions, the SF-36 health questionnaire, the Connectedness to Nature Scale, and the Treatment Outcome Profile. Quantitative measures were recorded over three time intervals to ascertain changes in wellbeing, quality of life scores, connectedness to nature, and substance use frequency. Participants from the Intervention Group went on to engage in semi structured interviews to capture personal meaning and interpretations of their beekeeping experience.

The results of the study will be presented in the next chapter.

*"Listen to the bees  
And let them guide you."  
Brother Adam*

## **Chapter 4 – Results**

### **4.1 Chapter 4 Introduction**

The previous chapter detailed the methodological rationale and adopted approach for establishing the acceptability of beekeeping as a complex intervention for improving wellbeing, skill development and building recovery opportunities in adults with substance misuse problems in Wales. A mixed methods design has been chosen, incorporating a suite of quantitative psychometric questionnaires and post intervention semi structured interviews.

Within the context of MRC guidance for developing and evaluating complex interventions (Craig et al, 2019), this chapter reports the results of the formative work, which will subsequently inform the interpretative phase in order to achieve objectives 3 and 4.


### **Objectives**

1. To undertake a narrative literature review in order to identify theoretical underpinnings connecting the intervention of beekeeping with improved recovery outcomes.
2. To design and implement an appropriate methodological protocol, incorporating mixed methods and peer reviewed measurement tools.
3. To interpret quantitative results to identify outcome measures for further evaluation.
4. To interpret qualitative results to ascertain acceptability of beekeeping as an intervention, possible barriers to future studies and feasibility of formal evaluation.

### **4.2 Descriptive Statistics**

The final analytic sample (N=43) included 25 in the Intervention Group and 18 in the Control Group. Although the original aim was to achieve a 50/50 split between both groups, the Intervention Group constituted 58% of the overall sample, whereas the Control Group was 42%.

**Table 3 – Participant Descriptive Statistics**

	<b>Intervention Group</b>		<b>Control Group</b>	
<b>Total participants</b>	25	58%	18	42%
<b>Male</b>	12	48%	11	61%
<b>Female</b>	13	52%	7	39%
<b>Chi Square Gender / Group</b>	$\chi^2 = 0.723, p = 0.395$			
<b>Mean age (Years)</b>	43.62 SD 9.72		38.22 SD 12.47	
<b>Accessing other services</b>	11	44%	15	83%
<b>Volunteering</b>	7	28%	13	72%
<b>Abstinent Six Months or Longer</b>	4	16%	15	84%
<b>Still using</b>	21	84%	3	17%
<b>Drugs</b>	6	24%	4	22%
<b>Alcohol</b>	2	8%	8	44%
<b>Polydrug use</b>	5	20%	6	33%
<b>No substance use</b>	4	16%	0	0%
<b>Dual Diagnosis</b>	9	35%	10	55%
				

Referring to Table 3, the Intervention Group participants were 48% male and 52% female, whereas the Control Group was 61% male and 39% female, but this difference was not statistically significant ( $\chi^2 = 0.723, p = 0.395$ ). The Intervention Group age profile was slightly higher than the Control Group by 5 years but this difference was not statistically significant. A large proportion of each group were accessing other services in addition to the interventions tested, with 44% of the Intervention Group and 83% of the Control Group accessing other intervention in addition to the Throughcare Aftercare and Recovery Support (TARS) service.

There was a higher proportion (84%) in the Intervention Group who were still misusing substances at the beginning of the study, compared to the Control Group (17%). The Control Group had a higher proportion of people who had achieved abstinence prior to starting (84%), compared to the Intervention Group (16%). Moreover, at the beginning of the study, a higher



proportion of the Control Group (55%) self-reported dual diagnosis issues, with co-occurring substance misuse and mental health problems compared to the Intervention Group (35%).

As Figure 6 illustrates, the questionnaires were issued to a sample of 68 participants with 25 participants disengaged, leaving 43 completed questionnaires. Control Group data for 15 participants was provided to the researcher without identification markers such as identification numbers, initials or the “About me” sheet and consequently could not be matched to earlier data. These were discarded.

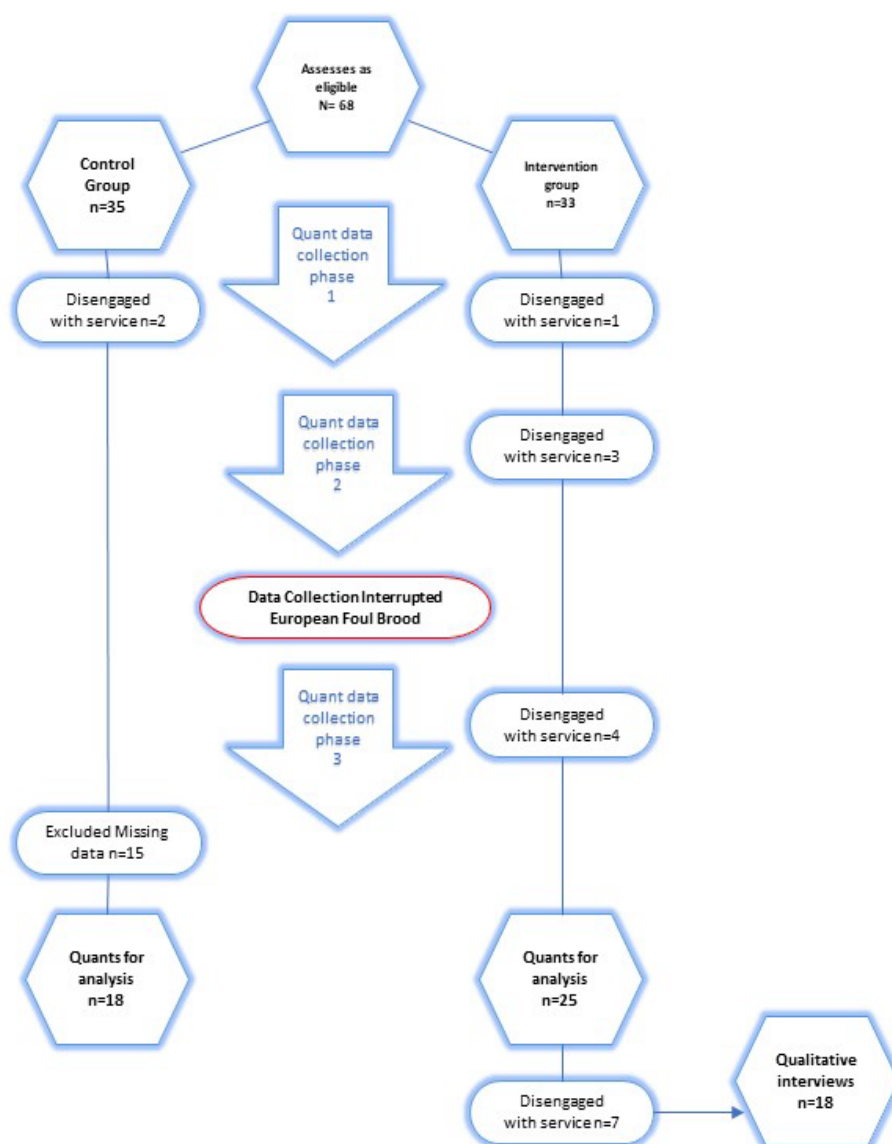


Figure 6 Data Collection Process

### **4.3 Quantitative Results**

The results of the mixed ANOVA analyses are summarised in Table 4. ANOVA results are reported with sphericity assumed, however, corrections using Greenhouse-Geisser and Huynh-Feldt do not affect the significance of the univariate results. It should also be noted that multi variate results did not differ from univariate results using Wilks Lambda. All results have been included for transparency. Statistically significant results are shaded in green and results which were almost statistically significant are shaded in yellow for illustrative purposes.

Key measurements from psychometrics	Tests of Within Subjects Effects		Tests of Between Subjects Effects	Multivariate Tests		Planned contrasts Group effects on the <i>difference</i> from Time 1 to Time 2 and from Time 2 to Time 3	
	Time overall	Time / condition interaction	Effect of Condition	Time Overall*	Time / condition interaction*	Time 1 – Time 2	Time 2 – Time 3
Connectedness to Nature Scale	F (2) = 23.021, P = <0.001	F (2, 40) = 22.766, P = < 0.001	F (1,41) = 5.924, P = <0.05	F (2,40) = 24.336, p < 0.001	F (2,40) = 21.969, P < 0.001	F (1,41) = 8.937, P < 0.05	F (1,41) = 20.745, p = < 0.001
SWEMWBS Total	F (2,41) = 12.947, P = < 0.001	F (2,41) = 0.326, P = 0.723	F (1,41) = 1.946, P = 0.171	F (2,40) = 8.960, P < 0.01	F (2,40) = .444, P = 0.645	F (1,41) = 0.871, P = 0.356	F (1,41) = 0.002, P = 0.968
SF36 emo wellbeing	F (2,41) = 10.496, P = < 0.001	F (2, 41) = 0.018, P = 0.982	F (1,41) = 1.874, P = 0.178	F (2,40) = 8.023, P < 0.01	F (2,40) = 0.020, P = 0.980	F (1,41) = 0.040, P = 0.843	F (1,41) = 0.006, P = 0.940
SF36 health	F (2,41) = 6.820, P = <0.005	F (2,41) = 2.723, P = 0.072	F (1,41) = 0.899, P = 0.348	F (2,40) = 6.492, P = < 0.005	F (2,40) = 2.336, P = 0.110	F (1,41) = 1.597, P = 0.213	F (1,41) = 1.377, P = 0.247
SF36 Physical Functioning	F (2,41) = 10.934, P = < 0.001	F (2,41) = 1.547, P = 0.219	F (1,41) = 3.185, P = 0.082	F (2,40) = 8.023, P = 0.001	F (2,40) = 2.321, P = 0.111	F (1,41) = 0.169, P = 0.683	F (1,41) = 3.183, P = 0.082
SF36 Role Limit Physical	F (2,40) = 8.313, P = 0.001	F (2,40) = 0.737, P = 0.482	F (1,40) = 1.704, P = 0.199	F (2,39) = 7.577, P = < 0.005	F (2,39) = 0.854, P = 0.433	F (1,40) = 0.972, P = 0.330	F (1,40) = 1.460, P = 0.234
SF36 Role Limit Psych	F (2,40) = 5.249, P = < 0.05	F (2,40) = 0.104, P = 0.901	F (1,40) = 8.240, p = <0.05	F (2,39) = 5.296, P = < 0.05	F (2,39) = 0.111, P = 0.895	F (1,40) = 0.031, P = 0.861	F (1,40) = 0.078, P = 0.782
SF36 Energy / Fatigue	F (2,41) = 2.350, P = 0.102	F (2,41) = 1.944, P = 0.150	F (1,41) = 4.140, P = < 0.05	F (2,40) = 2.817, P = 0.072	F (2,40) = 1.598, p = 0.215	F (1,41) = 0.256, P = 0.616	F (1,41) = 1.766, P = 0.191
SF36 Social Functioning	F (2,40) = 5.957, P = <0.005	F (2,40) = 1.540, P = 0.220	F (1,41) = 2.691, P = 0.109	F (2,40) = 5.844, P = < 0.05	F (2,40) = 1.460, P = 0.244	F (1,41) = 1.435, P = 0.238	F (1,41) = 0.227, P = 0.636
SF36 Pain	F (2,40) = 8.899, P = < 0.001	F (2,40) = 0.151, P = 0.861	F (1,41) = 0.365, P = 0.549	F (2,39) = 8.889, P = 0.001	F (2,39) = 0.169, P = 0.845	F (1,40) = 0.016, P = 0.899	F (1,40) = 0.189, P = 0.666
ONS Wellbeing	F (2,41) = 7.236, p = 0.001	F (2,41) = 1.509, p = 0.227	F (1,41) = 3.345, P = 0.075	F (2,40) = 7.029, P = < 0.05	F (2,40) = 1.442, P = 0.249	F (1,41) = 0.130, P = 0.721	F (1,41) = 1.654, P = 0.206
Social Trust	F (2,41) = 11.558, P = <0.001	F (2,41) = 2.411, P = 0.096	F (1,41) = 0.037, P = 0.849	F (2,40) = 9.131, p = < 0.05	F (2,40) = 1.727, P = 0.191	F (1,41) = 2.999, p = 0.091	F (1,41) = 0.441, p = 0.511
Drink Days	F (2,41) = 2.998, P = 0.055	F (2,41) = 1.787, P = 0.175	F (1,41) = 13.426, P = 0.001	F (2,40) = 3.542, p = < 0.05	F (2,40) = 1.509, P = 0.233	F (1,41) = 2.717, P = 0.107	F (1,41) = 0.423, P = 0.519
Drug Days	F (2,41) = 5.046, P = < 0.05	F (2,41) = 0.424, P = 0.656	F (1,41) = 1.226, P = 0.275	F (2,40) = 4.111, P = < 0.05	F (2,40) = 0.434, P = 0.651	F (1,41) = 0.707, P = 0.405	F (1,41) = 0.603, P = 0.442
TOP Psych Health	F (2,40) = 19.973, P = < 0.001	F (2,41) = 3.970, P = 0.05	F (1,41) = 5.543, P = < 0.05	F (2,40) = 19.52, P = < 0.001	F (2,40) = 5.015, p = < 0.05	F (1,41) = 6.893, P = < 0.05	F (1,41) = 0.021, P = 0.887
TOP Physical Health	F (2,40) = 22.765, P = < 0.001	F (2,40) = 0.001, P = 0.999	F (1,41) = 2.027, P = 0.162	F (2,40) = 22.618, P = < 0.01	F (2,40) = 0.002, p = 0.998	F (1,41) = 0.003, P = 0.956	F (1,41) = 0.001, P = 0.971
Top Quality of Life	F (2,41) = 37.805, P = < 0.001	F (2,41) = 3.634, P = <0.05	F (1,41) = 2.921, P = 0.095	F (2,40) = 38.052, P = < 0.05	F (2,40) = 4.470, P = < 0.05	F (1,41) = 6.701, P = < 0.05	F (1,41) = 0.019, P = 0.891

Table 4: Quantitative Results

Table 4 highlights that there were statistically significant improvements for all participants across many of the indicators measured. However, in many cases the results showed no statistically significant differences in the improvements between groups. Statistically significant results will now be discussed further.

## 4.4 Wellbeing

Wellbeing was measured by three different tools: the Short Warwickshire Edinburgh Mental Wellbeing Scale (Figure 7), the Office of National Statistics Subjective Wellbeing Questions (Figure 8) and the SF-36 (Figure 9). All three tools showed a significant improvement in wellbeing over time for both groups, as measured by WEMWBS and SF-36  $p = < 0.01$  respectively. The ONS wellbeing improvements were also statistically significant at  $< 0.05$ . However, there was no statistically significant interaction between time (1,2,3) and group (control, intervention). Thus, the improvements in scores over time did not differ between the two groups.

The results of the three wellbeing measures suggest that beekeeping may be acceptable to participants as a complex intervention, showing promising improvements. However, these improvements were no greater than improvements shown in the control group.

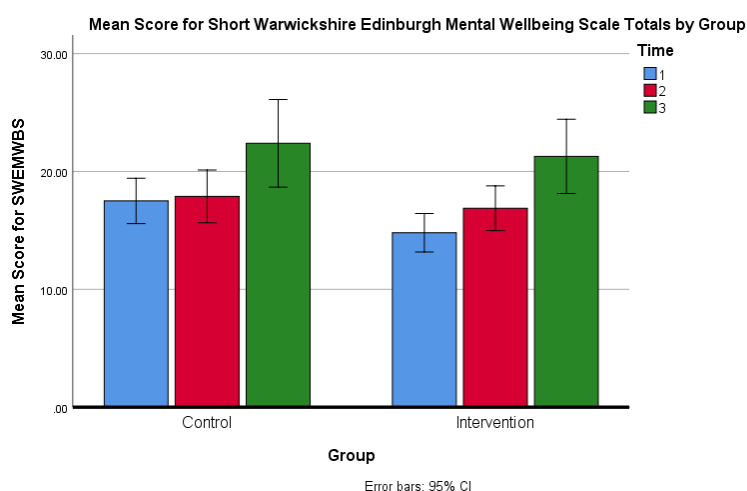


Figure 7 SWEMWBS by Group

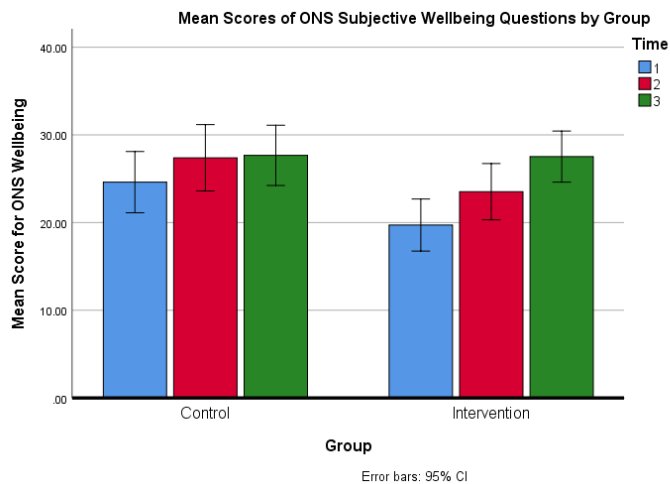


Figure 8 ONS Subjective Wellbeing by Group

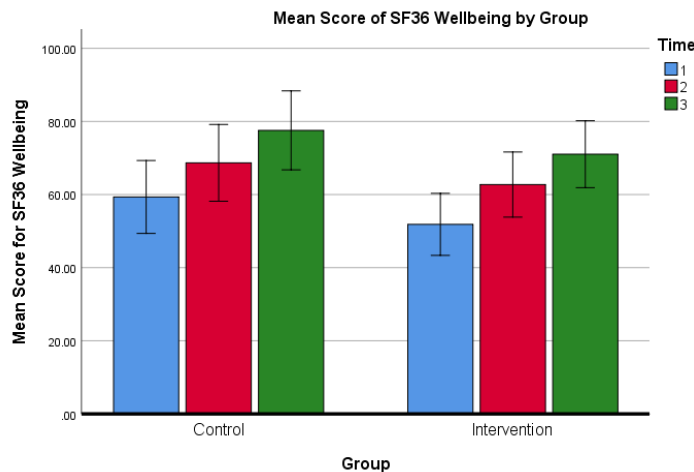


Figure 9 SF36 Wellbeing by Group

## 4.5 Psychological Health

Figure 10 shows the Treatment Outcome Profile Scores for psychological health, over time (1,2,3) and by group (Control, Intervention). There is a significant effect of Time on TOP psychological health scores ( $p < 0.001$ ) and a significant interaction between time and group ( $p < 0.05$ ). Differences in means suggest a difference between the samples at Time 1, with an increasing effect in the Intervention Group. The planned contrasts results show that the difference from Time 1 to Time 2 by group is statistically significant  $F(1,41) = 6.893$ ,  $p < 0.05$ . Thus, suggesting improvements in TOP psychological scores between time 1 and time 2 were significantly greater for the Intervention group compared with the control group.

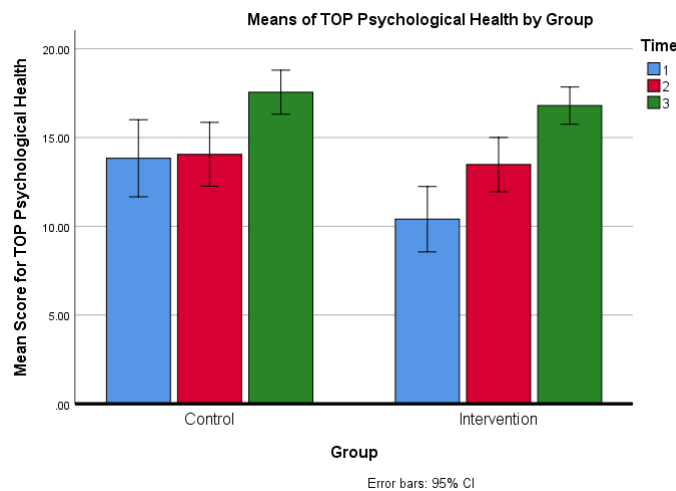


Figure 10 TOP Psychological Health by Group

## 4.6 Connectedness to Nature

Figure 11 illustrates there was an overall effect of time on connection to nature scores and a significant interaction between time and group  $p < 0.001$ . The planned contrasts showed that for the Intervention Group there was a significant increase in connection to nature between Time 1 and Time 2  $p < 0.05$ .

These results provide further promising indications that the intervention may be acceptable as a complex intervention as it elicited greater connectedness to nature in the Intervention Group than in the Control Group. This evidence demonstrates that further research is warranted within MRC (Craig et al, 2019) guidance to explore how connectedness to nature improves following beekeeping activities.

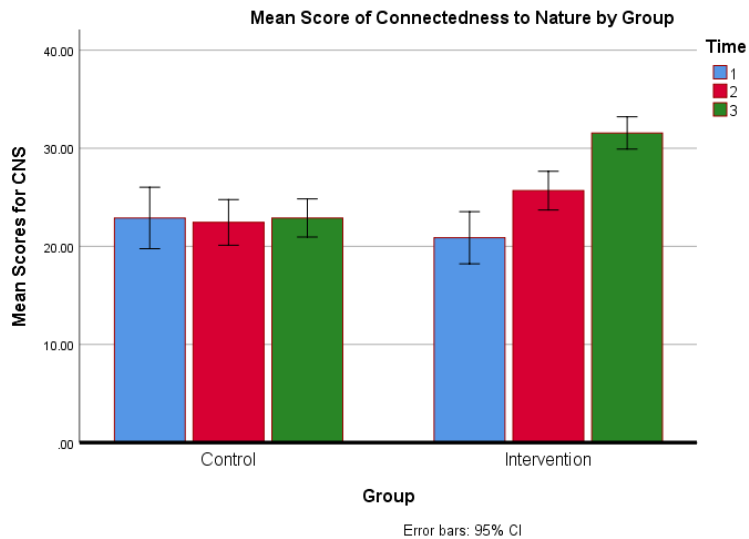


Figure 11 Connectedness to Nature by Group

## 4.7 Substance Misuse

Figure 12 illustrates that there was an overall reduction in the number of days where alcohol was consumed across the sample, but this marginally missed the significance threshold,  $p = 0.055$ . However, there was no significant difference when the groups were compared over time,  $p = 0.175$ . This is because a larger proportion of the Control Group were abstinent. The low scores in the control group make it difficult to compare across groups statistically.

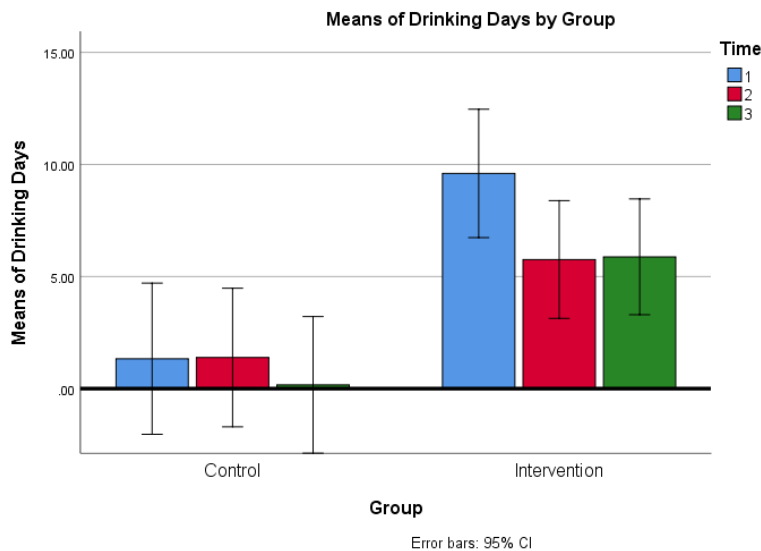


Figure 12 Drinking Days by Group

Figure 13 shows an overall significant decrease in the number of days illicit drugs were used across the whole sample,  $p = < 0.05$ . Again, there was no significant difference when the groups were compared over time,  $p = 0.656$ . The variance in scores indicated by the error bars on the graph to the left should be noted, illustrating a wide variance in scores.

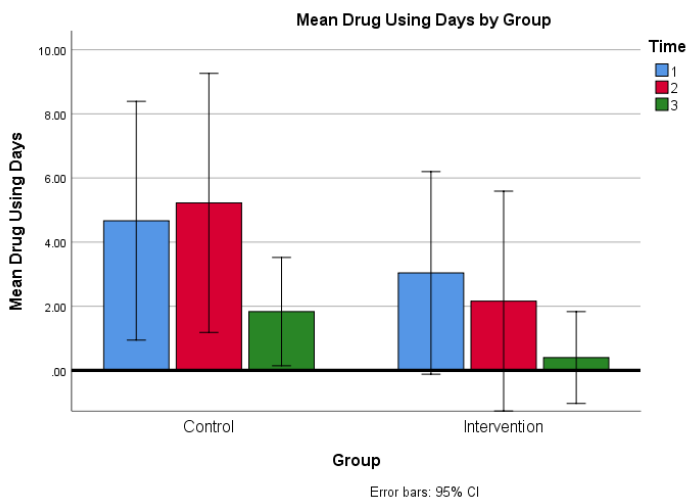


Figure 13 Drug Using Days by Group

These results show promise that beekeeping may be acceptable as a complex intervention for the Intervention Group. Likewise, there is a strong indication that drug and alcohol use frequency as an outcome measure is appropriate for further evaluation. Despite limitations and variance in scores, the intervention did elicit a reduction of substance misuse in the Intervention Group but there was no difference when compared



to the Control Group. Due to the high variance in these measures of substance use, a larger sample would be needed to measure any changes as a result of an intervention.

## 4.8 Quality of Life

The Treatment Outcome Profile scores for Quality of Life showed a statistically significant improvement across the entirety of the sample,  $p < 0.001$ . There was a statistically significant interaction between group and time, indicating that in the Intervention Group scores improved from time 1 to time 2 to a greater extent compared with the Control Group ( $p < 0.05$ ). However, the difference in scores between time 2 and time 3 was not significant,  $p = 0.891$ . These findings indicate that the TOP Quality of Life measure offers a feasible option for further evaluation.

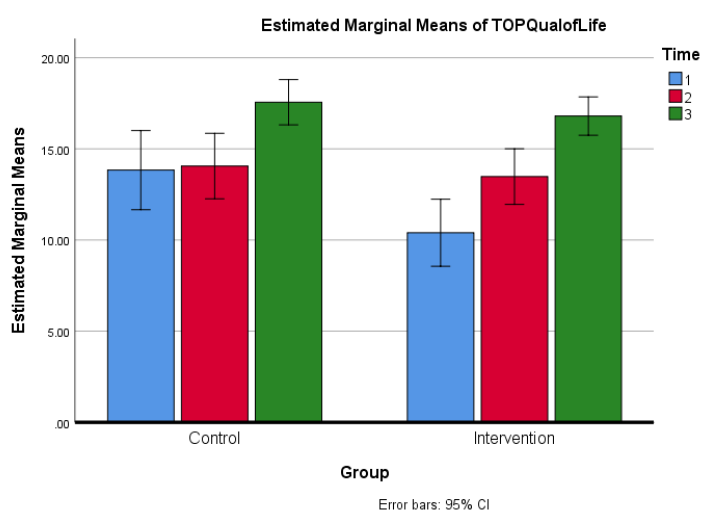


Figure 14 Quality of Life by Group

## 4.9 Key Quantitative Findings

The quantitative psychometric tools used are appropriate and useful as outcome measures for further evaluation as stated in objective 3.

There is a suggestion that beekeeping is acceptable to participants as a complex intervention, with potential improvements in health, wellbeing, and quality of life in adults with substance misuse problem. Furthermore, early indications suggest that participation in beekeeping activities may improve connectedness to nature in adults with substance misuse problems in Wales.

The quantitative element of the methodology applied provides a positive contribution to formative work to identify opportunities to rigorously evaluate beekeeping as an intervention for improving wellbeing, skill development and building recovery opportunities.

## 4.10 Thematic Analysis

As illustrated in Figure 6, 18 participants were opportunistically selected from the Intervention Group for semi structured interview. It was initially intended to interview 20 participants, but 3 people could not be contacted after leaving their temporary accommodation, 1 was still street homeless and could not be found, 2 did not respond to



*Figure 15 Overall Experience Rating*

the researchers request before the deadline and 1 returned to prison. Overall, the audio recordings of the interviews produced more than 12 hours of oral material for analysis.

All 18 participants unanimously described beekeeping as an overall positive and unique experience. All participants would recommend beekeeping to others if they were struggling with their wellbeing. Their narratives, outlined through the themes below, offer further evidence of the potential acceptability of beekeeping as an intervention, possible barriers to future studies and the feasibility of formal evaluation.

From the Thematic Analysis of the data a total of 4 interconnecting themes were identified, and seven sub-themes, which not only confirm the quantitative findings discussed, but provide rich additionality. Due to the word constraints of the thesis only selected verbatim quotations are presented to illustrate each subtheme, interwoven between the author's interpretive commentary:

### Theme 1 – Improved Wellbeing

#### Subtheme 1:1 Focus and Mindfulness

#### Subtheme 1:2 Lasting Calming Effect

Subtheme 1:3 Therapeutic Benefits

Subtheme 1:4 A Sense of Purpose

Theme 2 – Connectedness to Nature

Theme 3 – Parallels with Recovery Skills

Subtheme 3:1 Belonging and Connection

Subtheme 3:2 Coping Skill Development

Subtheme 3:3 Sensation Seeking and Controlled Risk

Theme 4 – Meaning Projection

Please note that all participants were numbered at the very beginning of the study and although n=18, some participants had already been allocated a higher number at the outset of the study. These labels offer no numerical value and are purely identification markers.

#### **4.11 Theme 1 – Improved Wellbeing**

The theme of improved wellbeing was by far the strongest in the analysis, with every participant reporting wellbeing improvement across a variety of subthemes. This has positive implications for the potential acceptability of beekeeping as a complex intervention. All participants interviewed reported feelings of getting better, feeling better and seeing improvements in each other, both physically and psychologically. There appeared to be a clear emotional transition for participants, from feeling anxious and sometimes fearful at the point of engagement, to feeling positive and happy by the end. As **Participant 21** put it:

*“I guess I was quite fearful, scared of everything and on the flip side, it was go between being terrified of everything to not really feeling anything at all which is almost just as bad. Now, I look forward to things, I feel good about things. I feel focused, I feel a lot more happy. I feel quite happy like genuinely sort of happy.”*

Improved wellbeing was identified as a consequence of the overall beekeeping experience. Upon exploring this further with participants, the reasons for improved wellbeing were described as increased focus and mindfulness, a lasting calming effect, therapeutic benefits and providing a sense of purpose.

- **Sub-Theme 1:1 Focus and Mindfulness.** Many described how they were able to leave their problems at the door, forget about the things that were troubling them and just focus entirely on the bees, which resulted in feelings of wellbeing.

**Participant 4** – “I think because you're thinking about something else. You forget about your own feelings. That must have an effect physically on you then. Your brain must send some kind of message to the rest of the body... or something like that.”

The increased focus on the bees and the subsequent escapism this provided ultimately led to feelings of calmness, which was expected. However, the longevity of the calming effect was greater than expected.

- **Sub-Theme 1:2 – A Lasting Calming Effect.** Participant 14 described a “beekeeping afterglow”. For some participants the calming effect lasted for a number of days which was beneficial to their overall feelings of wellbeing.

**Participant 2** – “Even when you come out of the hive, you're still taken back by it and for like the whole day's been an escape... Yes, a good couple of days and it's like, "Okay I've just escaped from my mind for a couple of days". Then go back in and do it again.”

- **Subtheme 1:3 Therapeutic Benefits** – The resulting physical and psychological calm from beekeeping was described as having therapeutic benefits for the participants and interviewees were able to describe likenesses easily. Some members of the group reported very negative past experiences around accessing talking therapies and other interventions such as Electro Convulsive Therapy.

**Participant 17** - *"...because it's emotionally calming, which is something that you need to be. I think you have to be, uh, you have to have of course a well-balanced emotional equilibrium, in order to get by from day to day. Of course, therapy helps with that. The bees do that wonderfully. Probably better than any therapists do actually."*

Others described feeling surprised by the therapeutic qualities of beekeeping, which led to them thinking about nature differently, as sustaining life and acknowledging that humans are nothing without it.

**Participant 22** – *"Nature gives life. Nature is life. Without nature where would you be? You will be lifeless. You know what I mean? We wouldn't be able to survive, would we?... It was therapeutic. That was a whole different thing. That was something I wasn't used to. It was my first time and I bloody loved it."*

Participants described beekeeping as a strengths-based approach; the focus is on the things they can do to help and things they do well, not on what is perceived to be wrong with them or psychological deficits. For many the purpose of the activity changed from seeking recovery from substance misuse and mental health issues, to taking part in something bigger than themselves. This resulted in a strong feeling of purpose, inextricably linked to the participants' feelings of improved wellbeing.

**Subtheme 1:4 A Sense of Purpose** - Participants reported that beekeeping gave them a sense of purpose, added meaning to their lives, and in some cases became a reason to get up in the morning. For one participant beekeeping became her reason to continue living after experiencing intense suicidal ideation during the data collection period. The sense of purpose involved doing something good for themselves, the group, the community, and for nature.

**Participant 14** - *"It's fun, but it is it's nice to feel like you're doing something that's got a purpose. It's not just for you it's not just for the bees. There is a much bigger picture of beekeeping and for the good of the human race."*

A key aspect was the contribution the participants felt they were making to bee conservation and protecting the species. All were aware of the struggles faced by bees and a sense of the joint purposes of protection and preventing harm to the bees developed strongly. As the knowledge gained increased over time, it appeared to intensify the participants experience of this subtheme.

**Participant 2** – *“It was positive to what I expected, and the outcome has been great. It’s like you get a sense of purpose for helping them keep going. I was like, “Okay, am actually helping them plan their way without actually [unintelligible 00:06:52] and it’s for my own health as well.” I thought, “This is great.” I don’t look back, [to drug use] it’s part of the reason I don’t.”*

Participants described that this renewed sense of purpose, focus, mindfulness, and calm directly resulted in a deeper sense of connectedness to nature, and for some this was described as a spiritual experience which had further positive implications for improving wellbeing. The findings of Theme 1 suggest that beekeeping may be acceptable as an intervention, with strong feasibility for formal evaluation.

#### **4.12 Theme 2 – Connectedness to Nature**

All participants reported feeling a stronger connection to nature as a result of the beekeeping experience, although it is acknowledged that a prior interest in nature attracted many of them to the activity in the first place. Some participants reported being generally more mindful, looking more closely and making more effort to spend more time in nature independently of the project. Participant 9 described the experience as reaching her on a “soul level”.

**Participant 6** – *“I loved it. I think overall I found that I was much more in touch with nature generally. Yes, I found much greater affinity with nature through the process. Yes, I would say that’s my overall.”*

Some described a sense of connecting to something bigger than themselves and feeling part of a bigger picture. Some mentioned that this made their issues and challenges seem

smaller, put into context, which made things seem more manageable. There was a strong sense of returning to a primitive way of living and valuing what is important.

**Participant 21** – *“There's a comfort, I guess more than just feels like I'm getting back to some primal emotion that you didn't even realize you've got. You didn't know you had it and it's gone away and it feels like you're reconnecting with something. It's really quite hard to explain. That's what I feel. It's like something deep and primal that's embedded in this that is essential to our life force, and we just forget it sometimes and you feel like you're reconnecting with that again. I guess it's the fact that you're actually working with another life form or creature or something and there's a symbiosis”.*

That symbiosis with nature, and being at one with the bees, appeared to offer spiritual enhancement, feelings of love and enlightenment that complimented and amplified the reported feelings of improved wellbeing.

**Participant 7** – *“Just pure calming and in a way enlightenment sort of thing, if that's the word?... No, for the sound. For that, just spiritually. Spiritually, they just made me more of a spiritual person that I have become... Yes, literally they've - Love is the key and they helped amplify that in me. If you know what I mean? Yes, and they give love back and it's like, Now, I just want this. I love the bees anyway and I think maybe they sense that and what they gave back to me was, help me amplify it clearly.”*

For the Intervention Group, increased feelings of wellbeing and connectedness to nature had implications for their recovery from substance misuse and mental health symptoms. This may provide further evidence of intervention acceptability and formal evaluation feasibility.

#### **4.13 Theme 3 – Parallels with Recovery Skills**

All participants interviewed were able to draw parallels between the skills learned and practiced in beekeeping and recovery skills for reducing substance misuse, maintaining sobriety and mental wellbeing. This included the development of social capital, emotional management, relapse prevention skills, being organised, communication, patience,



attention to detail, preparing to return to employment, and general problem solving. One participant described finding a new sense of hope for the future as a result of the beekeeping activity. This further strengthens the early indication that beekeeping may be acceptable as a complex intervention and therefore feasible for formal evaluation.

**Participant 2** – *“It’s just keeping me grounded and helping me stay sober. Which is quite hard.”*

For others, they described how they felt ready to move on from substance misuse but had not actively taken steps to do so. However, engaging in the beekeeping activity acted as a catalyst for doing so; participants 7 and 9 have accessed residential rehabilitation following the project and set goals to become abstinent.

**Participant 21** – *“The ability to do it [achieve recovery] I think was there. It was like a locked door with potential behind it. I didn’t have the key, didn’t have it. Then coming here was like the key was handed to me. It allowed me then to - That’s what it felt like. Because I don’t really think about it. It did save me in a way. Because I wasn’t going anywhere good.”*

Beekeeping appeared to offer a safe setting for practicing skills that are key for reducing substance misuse and maintaining recovery. Building a sense of trust and belonging with the group was pivotal here.

- **Subtheme 3:1 – Belonging, Connection and Trust** - 17 out of the 18 participants reported the group dynamic as a positive thing, enhancing their beekeeping experience. However, this appeared to go beyond a shared experience and led to development of trust, a sense of being in it together, and ultimately being part of a team with the bees. The word ‘connect’, or a variation of it, was used by the participants 157 times during the interviews.

**Participant 11** - *“Yes. Again, I think being part of a team helps. It was the same when I came off the streets and I got involved with [homeless charity] ... I think that helped me because that made me feel like I’m being a part of society again and I was part of the team, which again gave me a massive confidence boost. You don’t just feel like a client then... I think*

*working as part of a team and feeling valued is massive for overcoming addiction and things like that because it's so easy to relapse if you don't feel like you're part of society or if you're not worth anything."*

The group dynamic appeared to enhance feelings of safety, self-worth, and consideration for others. The participants came together and encouraged each other, reassured each other, showed consideration, helped each other, and communicated throughout. There were no interpersonal conflicts in any of the beekeeping sessions. This may indicate that the group-based nature of the activity is of interest in future formal evaluation.

**Participant 16** – *"I think the group made the experience. I think the people within it, the group, I think that all made. Yes... It's more to do with the social interaction side of it. I was going to say it was like a safe type of group. It wasn't - I'm trying to think how now to explain this one. Even though it was mainly unknown people, there was something safe within that group. It was as if the beekeeping experience has brought the whole group together, so you're all wanting the same or similar outcomes. Yes, you have to have the social element of it as well to get that outcome."*

The participants described having previously experienced difficulty trusting people but felt that the skills learned with the group were beneficial in terms of developing and practicing trust.

**Participant 2** – *"...before it was like, I was looking over my shoulder thinking everyone was against me, but if I could do the beekeeping and I found people who were on the same boat, not everyone is against you. I was like, alright. There is people on your side. You don't have to keep looking on your shoulder."*

- **Subtheme 3:2 Coping Skill Development** – Many of the participants reported that the skills learned and practiced while beekeeping resulted in the development of coping skills which were used outside of the apiary to maintain wellbeing. The feelings of belonging, connectedness, and trust provided a platform for participants

to practice the skills needed to socialise and build relationships without the use of substances. This is known as Social Recovery Capital.

**Participant 15** – *“when I stopped drinking, I had to figure out how to be with people again without getting drunk in their company. I'm sure that's a very common problem that people have. You have to learn how to be in company of people when you're to socialising with drugs or whatever you've been addicted to. You have to relearn how to mix with people.”*

After participants had practiced mixing and socialising with people within a safe environment, they were able to open up and talk about difficult experiences. This links directly with Subtheme 1:3 and enhances the therapeutic benefit of the experience.

**Participant 1** – [about managing emotions] *“It's like learning, learn more about yourself as well and it's learned by the other people as well. See how far, you can go and then be brave to talk about your experiences. First yes, I wouldn't think I've done talking about your past and all that but now I'm more able to do it. This is great. It's a bit nerve-wracking but I feel confident I can do it anywhere, yes.”*

Others described increased feelings of resilience as a result of overcoming their initial fears. Participants developed and practiced emotional regulation skills and subsequently applied them in real life settings following the study. This is known as development of Personal Recovery Capital.

**Participant 14** - *“I think building resilience, more so than anything in the fact that yes, I was scared, but it became a rewarding experience and I think other challenges that I might face probably I'd be more willing and less frightened to do it because of this experience. It showed me that I can be calm and cool under pressure even when I thought I'd probably couldn't... I think now I probably would put myself in other situations, like even going round to the office when I felt really low and then going upstairs and speaking to people. For a long time, I'd avoid that because it was just too much.”*

For some this resulted in an increased ability to manage anxiety and overcome procrastination. This has positive implications for the long-term maintenance of recovery because personal issues are less likely to escalate, this being a relapse trigger for many.

**Participant 16** – *“Certainly keeping anxiety under control is certainly great. [laughs] Having to be calmer, to be, yes. Not letting - I was going to say to a certain extent anything that causes - if that has caused me any anxiety, I deal with it at the time now rather than let it build... Now if anything starts right, as to causing me anxieties I address it at the time. I do not allow it to multiply. I think that's been a good, really, really good experience. I was going to say, I'm starting to get to this point. It's like, 'I'll solve the thing. Let's just go for it.'”*

The development of recovery capital and coping skills is resoundingly positive and participants described recovery benefits from the emotional stimulation experienced as a result of the beekeeping activity.

- **Subtheme 3:3 – Sensation Seeking and Controlled Risk** The participants interviewed unanimously described the feeling of positive stimulation from being exposed to an element of danger and controlled risk. This may add an option for additional quantitative outcome measures for future formal evaluation. For many, the experience of fear is a positive thing, like when people partake in extreme sports or watch a horror movie. Participants reported particularly enjoying the sessions where the weather was less than perfect because they knew the bees would be feisty and more protective of their hives. Participants reported enjoying the increased element of risk and likened it to chasing a high in other ways, such as drug use. They enjoyed interacting with angry bees as much as they enjoyed interacting with calm bees. The word ‘excitement’ was used 123 times during the interviews. One of the most rewarding things reported was the controlled element to the risk; participants reported feeling reassured that, although they were exposed to an activity where things can go wrong, safety controls were in place and it was not bad for them.

**Participant 14** - *“I think it's like the adrenaline rush from previous drink and drunk chasing highs, definitely, but it was a more controlled excitement and exhilaration. I think it was addictive to go back and do it again the next week but it's a way of getting a high as opposed*

*to doing something that is probably detrimental to me and other people. I would imagine it's far less risky doing the beekeeping [laughs]... It's a controlled risk, but there is an element of danger in there... For me, is definitely the rush of it makes it even more appealing. I mean, [unintelligible 00:48:09] one day it could be quite unexciting, and then another time you could have two or three really angry hives. Everyone wants a piece of the action”.*

Not all participants were present when an opportunity arose to catch a swarm of bees that left the apiary and landed on a building site next door. Those who were involved described an exciting experience. Participant 7 reported feelings similar to other excitement and stimulation he experienced while offending.

**Participant 7** – [Referring to climbing under a fence to catch a swarm] *“Yes, that was awesome, that was a highlight as well. I felt like I was burgling when I wasn’t burgling [laughs]... eventually we got ‘em... It was fun. It was really fun.”*

#### **4.14 Theme 4 – Projection of Meaning**

Some of the participants projected human meanings onto the bees and onto their interactions with the bees. This is perhaps the strongest indicator of intervention acceptability. This appeared to go beyond mere anthropomorphism. The beekeeping experience offered opportunities for healing, overcoming challenges, and moving forward from strong emotions such as grief. The most moving account was given by Participant 17, who named a queen bee after his fiancé who sadly passed away two years earlier.

**Participant 17** – *“It was quite emotional for me but in a good way. On the 24th of July, we went out a few of us to do a hive inspection in hive one. We knew it had the Queen because there were eggs, but we haven't been able to see her. I've never seen a new queen in my life. Everybody was looking and I was the first one to spot her... Of course, the tradition here is the first one that spots a new queen gets to name her, which was great. It was the 24th of July and it was two years ago to that day that my fiancé died... Hive one now has a queen Kay, because that was her name... **Interviewer:** That's absolutely beautiful. Thank you for sharing that. **Participant 17:** I thought that's just wonderful, isn't it? You can't write something like that because people wouldn't believe it..... **Interviewer:** Yes, sorry, I'm blown*

away by that. **Participant 17:** *I was too at the time... That's a very, very powerful moment. Those are bees they gave me so much that day and they continue to. Just wonderful but it's giving me that little bit of an extra bond. When I see myself being part of the project long term, I'm really just in love with them now and I know it sits well with everybody else, they're great people... I explained it to everybody and they were pretty amazed by it as well and I couldn't believe it... suddenly a group of bees cleared and there she was... there is the Queen. 24th of July, amazing. I like to think that she's [Kay] immortalized in there in life."*

Other participants found closure from some of the things that had previously held them back. They found freedom from substance misuse, homelessness, and complex trauma as a result. For Participant 9 this means identifying that she wishes to move on from living in temporary accommodation.

**Participant 9** – *"It was amazing, yes [when we caught and re-hived a swarm]. When we put them in that green box thing, I wasn't going under that fence, I watched from the other side. There's no way I'm going in the fence. That green box is like me being in a hostel, then you got them in a new hive. That's me that. I want to get out of the hostel and into my hive."* [this led to applying for a place in rehab].

#### **4.15 Key Qualitative Findings**

The interview data not only confirmed the findings presented in the quantitative results section, but also offered considerable additionality confirming the possible acceptability of beekeeping as a complex intervention to the Intervention Group. The explanations offered during the interviews show a strong theme of improved wellbeing due to enhanced focus and mindfulness, lasting calming effects, therapeutic benefits, and a sense of purpose. A number of parallels were also drawn between beekeeping skills and recovery skills during the analysis. Participants clearly articulating improved social skills and development of coping skills, such as emotional resilience and problem solving. The theme of Sensation Seeking provides insights into how beekeeping may assist participants in maintaining recovery by providing an alternative means of stimulation. The beekeeping activity was significant for the participants because of the human meanings they were able to project onto the experience. This went beyond anthropomorphism, providing a metaphorical

framework for people in recovery to relate it to their own situation. This had implications for the quality of life of the participants, which corroborates and enhances the quantitative findings.

The interplay between the themes and subthemes suggests the building of recovery capital and skill development during the beekeeping activity, which were described as transferable to other areas of life outside of the apiary.

#### **4.16 Chapter 4 Conclusion**

Analysis of both qualitative and quantitative data suggests that the methodology applied was appropriate and clearly identified outcome measures to be used in future formal evaluation. Wellbeing improved among both the Intervention Group and the Control Group during the data collection period, although this result was not statistically significant when the groups were compared over time. There were significant increases in connectedness to nature for the Intervention group compared to the Control Group and these findings were later enhanced by the interview data. Moreover, the sub-theme of sensation seeking offers a possible additional quantitative outcome measure to be included in future formal evaluation as it can be psychometrically measured (Zuckerman, 1994).

It seems that the Intervention Group experienced an accelerated improvement in quality of life, which reached comparable levels to the Control Group, further strengthening the suggestion that beekeeping may be acceptable as a complex intervention. Further, both quantitative and qualitative data demonstrated a decrease in substance misuse while others solidified their recovery. There was large variance in the data and the groups were not congruent in terms of their substance use at the start of the study.

The research objective of ascertaining the acceptability of beekeeping as an intervention, and feasibility of formal evaluation has been achieved. No particular indications of barriers to future studies were identified specifically from the data results. Further opportunities to rigorously evaluate beekeeping as an intervention for improving wellbeing, skill development and building recovery opportunities in adults with substance misuse problems in Wales have been identified.

The next chapter will provide an in-depth interpretation of these findings.

*“For so work the honeybees,  
creatures that rule in nature  
teach the act of order  
to a peopled kingdom “*  
William Shakespeare

## **Chapter 5 – Discussion**

### **5.1 Chapter 5 Introduction**

The previous chapter reported the results of the feasibility study undertaken, indicating that the outcome measures used are appropriate to inform the future formal evaluation of beekeeping as an intervention for improving wellbeing, skill development and building recovery opportunities in adults with substance misuse problems in Wales. These early findings suggest that beekeeping may be acceptable as a complex intervention for those who took part in the practical sessions. However, Chapter 4 only partially fulfils the requirements of objectives 3 and 4 under the MRC framework (Craig et al, 2019).

This chapter will build on this preliminary work to interpret quantitative results to identify outcome measures for further evaluation and also to interpret qualitative results to ascertain acceptability of beekeeping as an intervention, possible barriers to future studies and feasibility of formal evaluation.

### **5.2 Interpretation of the findings**

Mixed methods were used to gather both quantitative and qualitative data. The subsequent findings suggest that the methodological protocol used was appropriate to achieve the overarching aim and objectives of this feasibility study, including the application of peer reviewed measurement tools.

#### **5.2.1 Quantitative Findings**

The quantitative psychometric measures used before, during and after the beekeeping activity clearly identify outcome measures for future formal evaluation. These are wellbeing, health, physical and psychological functioning, social functioning, pain management, social trust, and quality of life when considering change over time exclusively. The quantitative scores of the beekeeping activity sample were compared with



the Control Group from a highly effective recovery community (Alwyn & Thomas, 2014). The results revealed significant improvements in many of the outcome measures in both the Control and Intervention groups. There were, however, limited evidence for statistically significant greater improvements in the beekeeping group as compared with the Control group. One possible explanation for this is that the groups were at different stages of their recovery at the outset of the study, with the beekeeping group displaying more chaotic behaviour, higher levels of substance misuse, and less stable living conditions throughout the data collection period. This is a clear limitation of the study as the groups did not share equivalency in terms of their recovery progress or housing stability at the outset of the study. The beekeeping group reported a lower state of wellbeing and a higher state of illness at the outset. It is encouraging, however, that although the improvements observed in the beekeeping group were in the main not statistically significantly higher than the Control Group, the graphs in Chapter 4 illustrate that they appear to show some improvement. This may have implications for practice development which will be discussed later.

The quantitative data also confirmed that the Control and Intervention Groups were at very different phases of recovery and chaotic substance misuse. The analysis showed that the number of drinking days reduced for the beekeeping group but that this was not statistically significant when compared to a control sample who were virtually abstinent. This difference is a further weakness of the study. The number of drug using days followed a similar pattern. This highlights that more meaningful findings may have been drawn from a treatment naïve Control Group, i.e., a group that has never accessed services and is still actively using substances, which should be noted for the design of future formal evaluation studies. It must also be emphasised that there was broad variance in scores among both groups for drinking days and drug using days. In addition to this 44% of the Intervention Group and 83% of the Control Group were accessing other support services, which may not only explain why they are at different recovery stages but also makes it more difficult to determine whether it is the actual intervention influencing the scores. Due to these limitations the results pertaining to substance misuse must be interpreted cautiously and explored further through future formal evaluation studies. This argument will be revisited when compared with the Parallels with Recovery Skills qualitative theme drawn out from the interviews.

The quantitative analysis highlighted four key areas of interest which warranted further exploration by qualitative means: wellbeing, connectedness to nature, psychological health and levels of substance use, which were then mirrored and enhanced by the qualitative findings.

### **5.2.2 Qualitative Findings**

The qualitative methods were applied to ascertain acceptability of beekeeping as an intervention, possible barriers to future studies and feasibility of formal evaluation. The tentative possible improvements described in 3.2.1 were not only corroborated by the semi structured interviews, but enhanced the findings, describing the mechanisms that may have brought about change. Participants were able to describe in depth, their interpretation of how beekeeping had impacted on their wellbeing, recovery from substance misuse, and overall quality of life. The advantage of using mixed methods is that they not only establish what changed for participants, but also allow an understanding of why and how they attached meanings to these changes.

The qualitative thematic analysis of interview data also proved to be an appropriate methodology and identified four overarching themes: Wellbeing, Connectedness to Nature, Parallels with Recovery Skills, and Meaning Projection. Two of these overarching themes had a number of subthemes, which added richness to the analysis and were a means to capture the subjective interpretations of participants. The theme of Wellbeing was sub themed by reports of focus and mindfulness, a lasting calming effect of the activity on participants, clear descriptions of therapeutic benefits, and a renewed sense of purpose. The recovery skills theme was sub themed by a sense of belonging and connection, coping skill development, and sensation seeking behaviour. Connectedness to Nature and subjective Meaning Projection were standalone overarching themes without subthemes. These themes will now be described more fully within the context of the quantitative findings and linked to the relevant evidence.

### 5.3 Wellbeing

Wellbeing was measured using three different tools, the Warwickshire Edinburgh Subjective Wellbeing Questions, the Office of National Statistics questionnaire (ONS) and the Treatment Outcome Profile, all of which provided appropriate outcome measures for future research. The results showed that there was a significant increase for the Intervention Group as well as the Control Group. Although this was not statistically significant when the groups were compared over time, it is pleasing to see that wellbeing increased. It is noteworthy that the difference between Time 1 and Time 2 on the ONS measure was almost statistically significant and may add value in future formal evaluation studies. It also highlights weaknesses about the suitability of the Control Group and whether a more suitable comparison could be drawn with a treatment naive sample. 'Treatment naïve' is a sector term used to describe people who misuse substances but are not currently engaging in any medical or psychosocial intervention. Although the effect of time on condition interaction was not statistically significant, the theme of wellbeing featured with such prominence for all the participants interviewed that this warrants further exploration. Moreover, quantitative measures of psychological health were taken using the Treatment Outcome Profile tool and further suggest improvement. In terms of self-reported psychological health, which is a pivotal part of wellbeing (Husk et al, 2016), there was not only a statistically significant increase for both groups, but there was also a significant difference when the groups were compared between Time 1 and Time 2. It is proposed here that this provides an early indication of potential impact on perceptions of increased wellbeing.

Only the Intervention Group progressed to the semi structured interview stage due to limitations of access and willingness to adhere to the remit of this project. The participants interviewed described verbally what was quantitatively illustrated in Table 4; a strong increase in feelings of wellbeing across a range of indicators, such as enhanced mindfulness, ability to focus, escaping from problems, lasting feelings of calmness, therapeutic benefits, and a new sense of purpose. Although this is a formative study, this replicated the findings of many previous studies exploring the wellbeing benefits of interacting with nature and animals. Such benefits are argued to be wide ranging, including spiritual connectedness, reduction in recidivism, reduction of aggressive and antisocial

behaviour, as well as general increases in feelings of happiness (Bratman, 2012; James et al, 2016; Maas et al, 2009; Maller et al, 2008; Nielsen & Hansen, 2007; Richardson et al, 2010; Younan, 2016; Zelenski et al, 2012). This feasibility study tentatively supports previous findings that interaction with nature has a general restorative and therapeutic effect in relation to wellbeing (Maller et al, 2008; Bratman et al, 2012; Elings & Hassink, 2008; Kaplan, 1995; Snell & Simmonds, 2012; White et al, 2013; Hine, 2008; Zylstra et al, 2014). This is suggested initially through the quantitative questionnaire results and then intimated further through the qualitative semi structured interview data.

### **5.3.1 Subtheme 1:1 Focus and Mindfulness.**

Many interviewed participants spoke of enhanced mindfulness, a sense of leaving their problems at the door, and a soothing ability to focus purely on the bees instead of their personal problems. This evidence supports Attention Restoration Theory, introduced in Chapter 2, which describes how focussed attention helps to overcome information processing fatigue to restore wellbeing (Kaplan, 1995). Moreover, lack of skill in focusing and maintaining directed attention can lead to long term undesirable consequences and cognitive deficits, such as impaired problem solving, reduction in sociability, and lack of resistance to impulses (Kaplan, 1995). The participants in this study described clearly how easily they found it to focus and how this came as a surprise to them, especially those suffering from chronic anxiety. It is suggested here that because they were fascinated by the bees and found themselves in awe of them, mindfulness and focussed attention came easily and involuntarily (Kaplan, 1995). Similarly, Hassink et al (2017) cited distraction from problems as one of the most successful components of care farming. These findings indicate that an improved ability to focus, and the ability to practice this skill through beekeeping, may have positive implications in the long term for those attempting to recover from substance misuse. Previous studies have found that children with attention deficit disorders are thirty-four times more likely to develop a substance misuse disorder (Sundquist et al, 2015). However, exploratory studies have suggested that mindfulness-based interventions, and subsequent introspection, play an important role in regulatory behaviour and inhibiting urges to misuse substances (Price et al, 2020). Participants described this as being like taking a break from the monotony of constantly managing their problems, which then induced feelings of calm. Introspection appeared to be achieved as a result of the immersive sensory experience described by participants. This allowed them

to feel truly present and in the moment. The vibrant buzz sound alone has been said to ricochet through the bodies of bees and people, allowing them to co-exist in a common world (Moore & Kosut, 2013). This may confirm that Attention Restoration Theory (Kaplan, 1995) is perhaps a key theoretical construct in explaining the perceived increase in wellbeing.

### **5.3.2 Subtheme 1:2 A Lasting Calming Effect.**

Participants described feelings of calmness as a route to enhanced wellbeing and these reports were unanimous within the beekeeping group. Emfield and Neider (2014) found that exposure to soothing visual and auditory stimuli in natural settings improved cognitive performance and feelings of calm. The soothing sounds of the hive are said to be meditative (Moore & Kosut, 2013). Polyvagal Theory (Porges, 2007) suggests that feelings of calmness occur when the vagus nerve is stimulated, counteracting the fight or flight response following exposure to dangerous stimuli (Huttunen & Mednick, 2018). Stimulation of the ventral vagal system has been found to lower the heart rate, promote self-soothing behaviour, increase social skills (Huttunen & Mednick, 2018), and promote feelings of compassion (Porges, 2017). One participant likened the calming effect to that experienced during yoga practice (which has also been linked to Polyvagal Theory) noting the emergence of enhanced resilience, improved self-regulation, and prosocial behaviours (Sullivan et al, 2018). Other practices that improve vagal tone are laughing, slow breathing and interestingly, humming (Norecliffe-Kaufmann, 2019). This raises questions for neuropsychologists as to whether the humming of bees stimulates the vagus nerve, thereby inducing a calming effect. Although it is beyond the scope of this project to measure levels of vagal nerve stimulation, reports from participants indicate that calmness and related skill development may have been achieved, so this may warrant further investigation in future evaluation research. Philosophical explanations of calmness take this a stage further and offer insights into the cognitive perceptions of what calmness means for people. Polyvagal theory offers a perspective about how calmness is biologically stimulated, but further studies have been undertaken exploring how humans attach subjective meaning to this experience. Kambartel (2017) asserts that feelings of calmness are based on how people perceive their locus of control, their ability to accept the autonomy of others, rational conduct, and hope. Achieving an understanding of what we can control, and radical acceptance of things that are futile, leads to “gelassenheit”, which

is a German term for “calmness of the soul” (Kambartel, 2017). This sentiment was echoed by the participants interviewed, with participant 7 describing how he can now enter rehab and trust that things will be ok following his high attendance at the beekeeping sessions. This provides an interesting link to Self Determination Theory (Ryan & Deci, 2000; Deci & Ryan, 1985), previously introduced, whereby intrinsic motivation is improved by an increase in perceived control. It is further suggested that Self Determination Theory may offer a second key theoretical explanatory concept.

*“I know that everything is going to be all right now. I don't worry about if it is or if it ain't. I know we will be and the time thing is not - I know it's not going to be long, but don't worry about the actual time business about it, it's coming. Concentrate on one thing at a time, sort of thing. Like the bees do.”*

The calming effect was reported by participants to last for up to a few days at a time, which was also observed in anthropological studies (Moore & Kosut, 2013), due to the reported emotional impact of the beekeeping experience. This supports previous findings from a Detroit project in which beekeeping was described as “the new yoga” (Roest, 2019, pg21).

### **5.3.3 Subtheme 1:3 Therapeutic benefits.**

Enhanced wellbeing, characterised by feelings of lasting calmness, was reported to have a therapeutic effect on participants. The people interviewed had varying levels of experience of talking therapies and psychosocial interventions, with some describing positive previous experiences. However, twelve participants reported previous negative experiences of talking therapies and psychiatric treatment and stated that the beekeeping activity had more therapeutic impact than traditional approaches. There are many studies showing that interaction with nature has a restorative and therapeutic effect (Maller et al, 2008; Bratman et al, 2012; Elings & Hassink, 2008; Kaplan, 1995; Snell & Simmonds, 2012; White et al, 2013; Hine, 2008; Zylstra et al 2014). Furthermore, it is claimed that in some cases, interactions with nature produce similar positive results as attendance at mental health day care settings (Iancu et al, 2014). This was tentatively supported by participants in this feasibility study describing how the beekeeping activity had benefited them more than traditional therapy. The Cambridge dictionary defines ‘therapeutic’ as something which has a healing effect increasing health and happiness (Cambridge, 2011), and the findings of

the current study may support descriptions given by anthropologists that beekeeping is a therapeutic experience (Moore & Kosut, 2013). It is argued that the constant sounds stimulate, calm, and soothe (Moore & Kosut, 2013), which also impact the vagus nerve. The quantitative findings extrapolated from questionnaire data tentatively suggest that the beekeeping experience may have had a therapeutic effect, with self-reported quality of life measures achieving statistically significant improvements. Moreover, the condition interaction was statistically significant between Time 1 and Time 2, strengthening the case for further formal evaluation.

#### **5.3.4 Subtheme 1:4 A Sense of Purpose.**

Participants described a strong feeling of a renewed sense of purpose centred around caring for the bees, protecting them, caring for the wider environment, and engaging with longer term conservation efforts. Participants essentially felt compelled to help the bees through a sense of moral responsibility and that it was within their power to do something. Moore and Kosut (2013) argue that by observing the truly altruistic nature of the bee and their awe-inspiring qualities, beekeepers are provoked to question the human/insect dynamic. The more people learn about the bees, the more they challenge the concept of the beekeeper as superior. It is almost like the bees are too good for humans and if they came to harm, we would mourn them (Moore & Kosut, 2013). This resonated strongly among participants interviewed, who demonstrated acute awareness of the plight of the honeybee, their importance in nature, and the devastating impact on humans should they be destroyed. A sense of responsibility was described by participants similar to what Moore and Kosut (2013) described as interspecies paternalism. This sense of responsibility can also be linked to the benefits of peer support, where people with common life challenges (such as substance misuse) become a vital source of support and hope (Weinberg, 2013). Weinberg (2013) described the role of hope, meaning, and purpose in his work with veterans and how these elements are inextricably linked with achieving positive recovery outcomes. This provides further strength to the possibility of Self Determination Theory (Ryan & Deci, 2000; Deci & Ryan, 1985) and Intrinsic Value Orientation (Cleary et al, 2017) offering elements of explanation. As previously described in Chapter 2, Intrinsic Value Orientation takes place when a person's values are congruent with their behaviour (Cleary et al, 2017), thus easing the distress experienced by cognitive dissonance (Festinger, 1962). Moreover, it is well documented that increased engagement with activities that are

deemed meaningful increases recovery success among people with drug and alcohol problems (Cano et al, 2017). Through obtaining a renewed sense of purpose the Intervention group demonstrated that they were able to move on from the challenges holding them back, and to hope for something better for themselves. Furthermore, Weinberg (2013) points out that achieving a sense of purpose requires more than mere survival; it must involve learning, relationships, work or volunteering, spirituality, laughter, nature, and helping others. All of these components were unanimously described by participants in the interviews in this feasibility study and provides a potential explanation for the emotional transition taking place during the process of discovering a renewed sense of purpose (Cano et al, 2017; Roest, 2019). This has also been linked to the development of new identities, with Participant 22 clearly stating...

*"I'm a beekeeper now, not a disabled person... because I've been in like having mental health treatment since I was about 11 years old. You do start to feel that you're not so much of a person, you're just a symptom. I've got something else now."*

The perceived development of a closer relationship with nature and a renewed appreciation of the natural world was inextricably linked to enhanced wellbeing for the participants in the Intervention group.

### **5.3.5 Connectedness to Nature**

Quantitatively, connectedness to nature was measured using the shortened seven question version of the Connectedness to Nature Scale developed by Pasca et al (2017). This provided the strongest statistically significant finding of the entire project, highlighting that not only did connectedness to nature increase for the Intervention Group but that there was also a significant difference in planned contrasts. Thus, it can be confirmed that the effect of condition interaction is statistically significant, and it can be suggested that beekeeping may positively increase connectedness to nature. These changes were not witnessed in the Control Group which was set apart from beekeeping as an intervention activity. Due to the limitations of the study and the disparity between group samples, further formal evaluation is needed to draw firm conclusions. The reason an increase in



connectedness to nature occurred, and the subjective interpretation of the mechanisms leading to change, were described by participants through semi structured interviews.

Connectedness to Nature emerged as a prevalent theme during Thematic Analysis. The experience of connectedness to nature as reported by the participants may provide further evidence for the findings of Ellingsen-Dalskau et al (2016) who explored the implications of care farming, need satisfaction, and self-determination. Self Determination Theory highlights the value of feelings of relatedness and how interactions with nature correlate with intrinsic value orientation (Cleary et al, 2017). The feeling of doing the right thing and acting congruently with personal values enhanced not only the personal experience of participants but also the quality of their friendships with others (Shanahan, 2016; Dunn et al, 2005; Hemingway et al, 2017).

There is a plethora of evidence suggesting that connectedness to nature has wellbeing effects (Zylstra et al, 2014; Husk et al, 2016), increases feelings of happiness, and has restorative therapeutic effects (Kaplan, 1995). Snell and Simmonds (2012) found that exposure to nature alone does not necessarily indicate an increase in connectedness to nature, but rather must incorporate mindfulness, meaningfulness, self-actualisation, happiness, and vitality to have maximum effect. People must actively engage with nature for green care approaches to be effective, rather than merely observing it (Shanahan, 2016; Mantler & Logan, 2015). This highlights the potential interplay between the themes defined in the qualitative analysis as participants described how increases in feelings of wellbeing and full participation resulted in increased connectedness to nature. Participants went on to describe how they were then able to project meanings onto the beekeeping experience that were beyond anthropomorphism. The potential increase in wellbeing, development of coping skills, and social capital described by participants provides tentative further evidence that beekeeping could be considered an intervention under the umbrella term of 'green care' (Hemmingway et al, 2016).

The relationship that participants built with the bees provides further suggestion that interaction with animals provides an additional value as part of a person's connectedness to nature. Participants described the bees as friends, family, and non-judgemental allies, which was previously discussed by Hassink (2010) and Redisson (2012) in relation to other

animals. This feasibility study offers the added perspective that these feelings may extend to relationships with insects as well as mammals, and that the depth of the interaction potentially goes beyond the wellbeing and community benefits of bee-themed education as described by Lloyd and Deans (2017). Lloyd and Deans action research study found that learning about bees promoted community engagement, understanding of local ecology, enhanced personal wellbeing, and positive conservation behaviour. They also described feelings of love for the bees, fascination, empathy with their plight, and feelings of gratitude towards the bees which were also replicated here. There were reports of strong appreciation of the importance of what Martusewics, Lupinacci and Schnakenberg (2010) described as “ecojustice” and the need to do right by the bees. The participants in the present study described a deeper experience in which they felt privileged to be invited into the hidden world of the honeybee and interacted with them at far closer physical proximity than those in the Lloyd and Deans (2017) study. Many interviewees described how they felt equal to the bees without the assumed power dynamics of pet and keeper. The participants seemed to re-evaluate their relationship with nature and described a heightened sense of awareness of all living things. Many commented that humans have a lot to learn from bees in terms of values, societal structures, work ethic, and community. In this feasibility study the bees were perceived as the masters and the beekeepers were their apprentices. Although Marx (2017) described humans as having a different cultural affiliation with animals to insects because they are so phylogenetically different, this was perhaps not the case here. Participants not only described their love for the bees as equivalent to other animals, but also equivalent to other humans they were closely connected with. It is suggested that this may be due to closely communicating with the bees, a sense of achievement, and descriptions of co-producing in the hive space, which was also found by Marx (2017).

The number of bees also appeared to engender a sense of awe in participants, whereas most previous green care studies have focussed on relationships with only a few animals at a time. Cunnicliffe and Travale (2016) highlighted the importance of connection to nature in the delivery and procurement of green care wellbeing interventions. Clearly et al (2017) called for more research on the psychological mechanisms behind wellbeing enhancement resulting from these activities given the lack in the literature evaluating some of these approaches. This feasibility study attempts to offer at least a partial explanation

as to why and encourages further exploration of how this may link with Poly Vagal Theory (Porges 2007). It is suggested here that these findings suggest beekeeping may be acceptable as a complex intervention.

## **5.4 Parallels with Recovery Skills**

The overarching aim of the feasibility study in hand is to undertake formative work to identify opportunities to rigorously evaluate beekeeping as an intervention for improving wellbeing, skill development and building recovery opportunities in adults with substance misuse problems in Wales. Here, the potential development of skills to achieve recovery while partaking in beekeeping as a complex intervention is of particular interest. The definition of recovery from substance misuse issues has been debated in literature for decades. Where this concept was previously viewed in terms of relapse and abstinence, it has been reframed over the years to encompass a broader definition that incorporates global health and participation in communities (Cano et al, 2017). This involves developing emotional and cognitive internal resources to cope, as well as the development of access to external resources such as relationships and services. In mental health terms recovery was given to encompass not only observable changes (such as a reduction in symptoms) but also experiential processes such as changing identity, quality of life, hope, and belonging (Slade, 2010). This change in thinking led Best and Laudet (2010) to coin the term Recovery Capital which essentially means developing the resources that someone needs to overcome substance misuse and associated biopsychosocial challenges. Engaging in meaningful activity and longevity of engagement are essential in achieving recovery from substance misuse (Cano et al, 2017). Recovery Capital encompasses three subcategories (Best and Laudet, 2010):

- Personal Capital – This includes skills, positive feelings, distress tolerance, positive risk taking, self-esteem, and resilience
- Social Capital – This includes friendships, support networks, meaningful activities, and any positive interactions with people
- Community Capital – This includes things like employment, training, suitable housing, citizenship and, it is argued here, access to green space and interactions with nature

Interactions with nature result in enhanced wellbeing due to feelings of connection (Cleary et al, 2017), which is a biological need (Baumeister, 1995; Cohen et al, 2000; Cohen, 2004, 1998). They are essential components of green care (Cutcliffe & Travale, 2016) as the natural environment leads to a stronger sense of community for people seeking recovery (Cano et al, 2017; Ellingsen-Dalskau et al, 2016, 2016b; Iancu et al, 2014; Pedersen et al, 2012; Hassink et al, 2010). This self-deterministic blend of satisfaction of needs, autonomy, and support leads to wellbeing, skill development, and positive functioning (Ellingsen-Dalskau et al, 2016; Cano et al, 2017). Kaplan (1995) asserted that interaction with nature and natural environments is a key mechanism for mitigating stress and promoting recovery. He went on to describe how the interplay between the components of fascination, attention restoration a sense of being away, the extent and richness of the environment, and the compatibility of the experience with the values of an individual, provide a holistic restorative experience. The participants in Marx (2017) study described how the emotional regulation skills required to remain calm are essential to successful beekeeping.

Beekeeping is potentially therapeutically useful in developing recovery skills when used in aftercare settings and may offer benefits equivalent to other green care interventions (Elings and Hassink, 2008) for people with substance misuse issues (Tober et al, 2013). The findings of the thematic analysis suggests that beekeeping may facilitate the building of recovery capital as described by Best and Laudet (2010). These findings, coupled with the quantitative results measuring a statistically significant increase in quality-of-life ratings, further increase the potential of the effect, strengthening the possibility of beekeeping acceptability as a complex intervention.

#### **5.4.1 Subtheme 3:1 Belonging and Connection**

The way participants reported that they bonded over a shared experience, facing danger and adversity together, was described as a powerful component of the beekeeping sessions. Participants described how the group-based nature of the activity was valuable to them, helping them feel supported by a strong sense of camaraderie. This accords with the findings of Weinberg (2013) who described peer support and sharing an activity with others who have experienced similar traumas, as leading to a shared sense of survival and pride in what they have overcome. It is argued that this in turn enhances feelings of hope,

optimism, and resilience, serving again to strengthen new identities and a sense of purpose (Weinberg, 2013). It provides tentative evidence that social recovery capital may have been developed by participants in the beekeeping activity, enhancing their overall sense of belonging and wellbeing (Cano et al, 2017). Friendships with others were also found to be a powerful factor in the Lloyds and Deans study (2017), where participants developed shared values promoting bee conservation. Participants in the present study attached high value to feeling like an equal in relation to their fellow beekeepers, without the distraction of power dynamics. This sense of equality, of being valued as a human being within the context of jointly taking care of nature, was described as almost as important as interacting with the bees themselves. It was reported that the act of everybody wearing the same protective equipment reinforced this sense of equality, trust, belonging, shared identity, and connection. As Participant 8 put it:

*“It was like a different environment. It didn’t matter what the conversation we had before outside and the state you were outside. Inside the compound with the bees, we were all the same... you go in and you arrive. You’ve got your genes or whatever, your situation, your shit going, and you talk openly about it or not. We’re all aware we all have issues. We get changed. We enter with a suit. We are all exactly the same people.”* Participant 8.

Relationships were not only established among beekeeping participants but there were also clear reports of feeling socially and spiritually connected to the bees. Our emotional relationship with bees has been well documented through not only literature, but prehistoric petroglyphs, biblical references, and cave paintings, all portraying longstanding human respect and awe (Moore & Kosut, 2013). Through working with bees, anthropologists have observed that interspecies intimacy can develop, resulting in a transformational attachment for the human participant (Moore & Kosut, 2013). The present study may provide contradictory findings to Moore and Kosut (2013) in that the bees were not at all viewed as pets but as ecological equals with participants. Moreover, participants described bees in juxtaposition to close friends and family members. It is therefore suggested here that connection to animals and other living things may contribute to the development of social recovery capital, improving wellbeing, quality of life perception, and stronger recovery outcomes. This warrants further formal evaluation.

#### 5.4.2 Subtheme 3:2 Coping skill development

An essential part of personal recovery capital development is the acquisition and practice of a variety of skills (Cano, et al, 2017). These skills involve self-management, putting plans into action and, most importantly of all, applying those skills in real world settings. It was heartening to hear how participants perceived that had attained improved resilience skills through the beekeeping experience; through overcoming their initial fears, then realising that they can apply this to other areas of their life. One participant returned to work following long term sickness leave because she now has the confidence to overcome fear, whilst another has stopped procrastinating. It is noteworthy that the skills beekeeping participants acquired and practiced in the apiary are often those which are sought by employers so have the potential to improve long term recovery sustainment. It has been suggested that recovery only becomes self-sustaining after about five years of making improvements (Dennis et al, 2005). In its entirety, the list of coping skills reportedly developed were emotional management, relapse prevention skills, organisational skills, communication, patience, attention to detail, problem solving, taking action, resilience, and hope. According to Cano et al (2017) these are all components of recovery and wellbeing, acquired by developing all types of recovery capital. Two participants entered residential rehabilitation following the beekeeping experience, having previously resisted this as a course of action. For some participants they felt that the skills they needed were there the whole time and the beekeeping experience helped unlock their recovery potential, allowing them to take action. Participant 21 described it as:

*“The ability to do it [achieve recovery] I think was there. It was like a locked door with potential behind it. I didn't have the key, didn't have it. Then coming here was like the key was handed to me. It allowed me then to - That's what it felt like. Because I don't really think about it. It did save me in a way. Because I wasn't going anywhere good.”* Participant 21.

The findings presented here may not only solidify previous claims that interaction with nature promotes skill development, but anthropologists have also described how the bees themselves become the educator (Moore & Kosut, 2013). This means that skill development is achieved through non-traditional classroom-based methods and becomes altogether more exciting.

#### **5.4.3 Subtheme 3:3 Sensation Seeking and controlled risk.**

A strong subtheme to emerge from the qualitative data was the importance of sensation seeking as part of the beekeeping experience and how the novelty of the experience magnified a sense of achievement and wellbeing. Participants described strong stimulation similar to that of substance misuse and offending and attributed this to a sense of danger and “wanting a piece of the action”. Sensation seeking was defined by Zuckerman (1994 p 27) as:

*“the seeking of varied, novel, complex and intense situations and experiences, and the willingness to take physical, social, legal and financial risks for the sake of such experience”.*

In previous studies, the notion of sensation seeking has been negatively associated with uncalculated risk taking, impulsivity, and maladaptive coping strategies such as substance misuse (Horvath and Zuckerman, 1993; Baumeister and Heatherton, 1996; Holmes et al, 2016; Roberti, 2004). It was argued that sensation seeking resulted in negative risky behaviours due to emotional regulation issues and an inability to control impulsiveness. As an element of sensation seeking has been biologically determined, with changes in neurological structures and cortical thickness being cited as contributing factors, it was previously argued that the development of maladaptive behaviours is almost inevitable (Holmes et al, 2016).

Alternatively, more recent evidence has arisen challenging this view and instead asserting that sensation seeking and risk taking can have positive wellbeing benefits for those with such propensities (McKay et al, 2018; Churchyard & Buchanan, 2017; Ravert et al, 2009; Ravert et al, 2013). Churchyard and Buchanan (2017) found that provided the activity was fitting to an individual’s strengths, interests, and inclinations, the experimental behaviour linked to sensation seeking improved resilience, life satisfaction, strength of self-concept, and quality of life. Cano et al (2017) support the notion that risk taking is a positive component of recovery capital development. This may corroborate the statistically significant quantitative findings that psychological health and self-reported quality of life scores improved and provides an interesting line of inquiry for future research. Moreover, the emotional transition from fear to excitement was described by participants as a positive feature of the sensation seeking element (Moore & Kosut, 2013). This finding supports the

studies of Lloyd and Deans (2017) and Marx (2017) who also described the fear of being stung as a positive emotional experience. Lee and Andrade (2015) found that fear, which arises from uncertainty and potential danger, can induce risk taking as much as risk aversion. Since fear is very similar to excitement in terms of physical and emotional arousal (Smith & Ellsworth, 1985) it can be cognitively re-appraised to reduce the perception of potential harm or loss outcomes (Sokol-Hessner et al, 2009; Panno et al, 2013). This cognitive re-appraisal changes the meaning of the experience and perception of the stimulus, subsequently resulting in fear being re-labelled as excitement (Lee et al, 2015). This may partially explain reports by participants that they entered the beekeeping activity feeling one thing and left feeling something entirely more positive. Thus, sensation seeking is identified as a potential outcome measure for further evaluation, which can be undertaken either quantitatively or qualitatively.

The work of McKay et al (2018) supports this tentative finding and here it is argued that sensation seeking supports healthy development by providing opportunities to build resilience and develop resources to cope with adversity. This supports the findings outlined in the Recovery Skills Theme, where participants described their enhanced self-belief and willingness to tackle difficult problems. As the emotional transition from fear to excitement takes place, threats become re-defined as challenges (McKay et al, 2018) and increases confidence in perceptions of ability to cope, which also positively impacted on quality-of-life scores in the McKay study (McKay et al, 2018). This may also link with feelings of self-determination and intrinsic value orientation. Hemingway et al (2016) emphasised the importance of adventure and challenge in green care settings which serve to “Break(ing) down cotton wool culture” (Hemingway, 2016 p 27). Ellingsen-Dalskau et al, (2016b) described the importance of challenge to prepare people for reintegration into ordinary life. These activities not only help the people partaking in them but also the local economy (Latkowska, 2015). Interestingly, the participants spoke at length about feelings of love for the bees, which has also been argued to be rooted in fear of things going wrong (Moore & Kosut, 2013).

One participant clearly described how the beekeeping activity unlocked his recovery potential and this led to action that “saved him”. Sensation seeking as a concept has interesting implications for practice and suggests that there may be benefits in exposing



people with substance misuse problems to controlled risk as part of recovery skill development. This may satisfy a biologically pre-determined risk appetite in a safe way, leading to increased self-belief and ability to accept relapse triggers as challenges to be conquered rather than overwhelming powerful threats. Beekeeping may provide such an opportunity and is, therefore, argued to be potentially acceptable as a complex intervention.

## **5.5 Projection of meaning**

The role of humans projecting meaning onto natural phenomena has long been acknowledged as a fundamental trait of human intelligence and has been of interest to linguists and philosophers alike (Marsen, 2008). Even Aristotle concerned himself with the divinity of bees and the way they order their world (Lehoux, 2019). The human propensity to create meaning lies in our determination to understand the world around us, our role within it, and implications for the self (Marsen, 2008). The use of metaphor, connotation, and emotive expression contributes to the development of symbolism, allowing human interpreters to attribute meaning. This was first conceptualised by Merlau-Ponty (1945) in his writings on existential phenomenology. Here the qualities of the perceiving subject interact with the qualities of the object being perceived, enabling humans to feel integrated as part of the world rather than knowledgeable external observers of it. This may have been the case for Participant 17, who essentially immortalised his deceased fiancé by naming a queen bee after her, enabling him to move on from his grief. Howell et al (2013) found that the projection of meaning mediates the association between connectedness to nature and wellbeing. This transcendence beyond the self and feeling of connection to something bigger elevates wellbeing and enhances meaning significance, increasing life satisfaction and positive emotions (Howell et al, 2013). Participants described feelings of deep satisfaction knowing that they were doing something good for themselves, for the bees, and for humanity as a whole. People have been projecting their own meanings onto bees for centuries, often resulting in the development of new purpose motives such as conservation (Wilson, 2004).

Once people have a renewed sense of purpose it alters the way they see the world and makes it possible for them to re-write their own narrative (Weinberg, 2013). For Participant

9, part of this was daring to dream for something more, knowing that she can move on from hostel life and emergency accommodation to finding a 'hive' of her own. In that moment she was not entirely thinking about rehoming swarming bees, she was thinking about rehoming herself and taking the essential steps needed to progress her own recovery. The symbolism of catching a swarm of bees reached her where other attempts at persuading her to change had failed. The participants interviewed appeared to project their own meanings and interpretations onto the bees to an extent beyond anthropomorphism. Using the metaphor of finding a hive that Participant 9 can call home appeared to accelerate her sense of hope, allowing her to rediscover what is important, and finding the resolve to take action. As a result of taking part in the beekeeping experience, Participant 9 accessed a residential rehabilitation facility.

It is argued in the present study that for the participants interviewed, projection of meaning went beyond anthropomorphism, perhaps becoming a definable subcategory of recovery capital in its own right. This not only provides further evidence of the potential for beekeeping to be accepted as a complex intervention but also demonstrates the feasibility for formal evaluation.

## **5.6 Limitations**

The current feasibility study offers some useful insights as to how the therapeutic benefit of beekeeping can be explored further in future research. There are limitations, however, such as there being a low probability of producing replicable findings because of the small sample size. Moreover, because the experience of nature is subjective it is almost impossible to quantify (Grimwood, 2017). Every time a hive is opened, the bees determine which husbandry duties must be performed, reducing the replicability of the practical sessions. The recovery community provided a high benchmark as a Control Group and this may have skewed the data, masking the potential significance of the Intervention group results. However, this feasibility study has shown that the recovery community Control Group has provided a useful reference point from which to design future studies. It is recommended this research is replicated with a treatment naïve Control Group sample, with a higher level of equivalency between groups relating to age, housing security and recovery stage. An unexpected limitation was the interruption of the data collection phase

due to the presence of European Foul Brood, after which two participants lost momentum and disengaged. Bacterial diseases are unfortunately part of beekeeping and the unexpected should be entirely expected; the outbreak was unhelpful but was an example of an uncontrollable event that needs to be accepted.

## **5.7 Possible implications for policy, practice and change management**

The potential practice implications of this feasibility study are far reaching and if future studies confirm these findings, they may ultimately challenge traditional substance misuse treatment modalities based purely on medical models. There have been numerous and repeated calls for change (Bowser, 2014). If there were a renewed focus in the substance misuse sector on stimulating the vagus nerve, providing settings where the neuroscience of feeling safe can be successfully manipulated, and creating opportunities for people to find existential phenomenological meaning in their activities, it is argued here that perhaps wellbeing outcomes and recovery capital development would improve. To achieve the maximum impact there may need to be an acknowledgement within the social care sector that many people have an innate need to engage positively with risk, and that there may be an opportunity here to develop this through beekeeping, but also through other activities which have a similar effect depending on the findings of formal evaluation. In the current treatment system, there is limited opportunity to attribute meaning or to draw parallels with the wider human experience. What beekeeping may offer participants is a reprieve from form filling, risk assessments, boring appointments, labelling, and being directed along a predetermined treatment pathway. This has also been a great strength of recovery communities where the range of activities available serves to stimulate interest and provide a platform on which to challenge old identities, while building meaningful relationships. The findings of this feasibility study suggest that beekeeping may offer something additional for those who are engaging in chaotic drug and alcohol use. Moreover, should findings be replicated in more robust future studies, it potentially serves to reinforce the recovery skills of those who have achieved abstinence and consider themselves in long term recovery. Beekeeping as an activity may offer a viable and potentially popular option as part of a wider suite of recovery activities.

This approach supports several goals of the Wellbeing of Future Generations (Wales) Act (WFGA, 2015), which provides a convincing legislative tool for driving change and addressing the social problems affecting Wales. It is well documented that there is a high proportion (47%) of Welsh adults who have experienced adverse childhood events (PHW, 2015), which considerably increases the likelihood of substance misuse as an adult (Enoch, 2011). Future studies may also contribute to our understanding of the potential role of beekeeping and similar recovery activities in universal prevention of substance misuse issues, as well as long term recovery capital development. However, for any of this to be effective there must be an ideological shift so that the focus is no longer on what is wrong with people but on what people need to exist as a whole person (Watson, 2019).

*“The truth is that there is little point talking about how damaging the present system is if we are just going to be sorry about it and not do anything.” (Watson, 2019 p 5).*

For future systemic change to fully take effect it is beneficial to explore conceptual models for managed change, develop an understanding of the psychosocial dynamics at play, and define new goals for a reformed system (Schein, 2004). Kurt Lewin (1947) is the widely accredited author when it comes to understanding the underlying principles of driving meaningful change, implementing the change management process, and then embedding change in the long term. He argued that humans develop systems in an effort to maintain equilibrium and maximise autonomy. The subsequent systems which emerge from this are based on shared assumptions, attitudes, and values, which provide stability and meaning for individuals operating within the system (Lewin, 1947). There have been many changes and shifts within the substance misuse sector, particularly within the last decade, where the concept of recovery capital has gained traction and credibility compared to purely medical models (Cano et al, 2017). The Drop the Disorder movement is also gathering momentum in Wales, encouraging social care professionals to challenge a diagnosis-based culture, calling instead for focus on empathy, self-definition, and strength-based recovery (Watson, 2019). According to Lewin (1947), as the environment changes and new evidence emerges, disequilibrium is caused which challenges the integrity of the system. This disequilibrium has been increasingly witnessed over the last five years with clear calls for change and systems reform (Hari, 2015; Watson, 2019; Nutt, 2020) with some referring to existing systems as structural violence (Bressan, 2014). Once this disequilibrium reaches

uncomfortable levels, motivation to change occurs causing an 'unfreezing' of the old system (Lewin, 1947). For this to take effect there must be enough disconfirming information to cause discomfort, the achievement of goals at risk to an extent that results in emotional investment in change, and the possibility of solving a problem must be a credible and feasible outcome (Schein, 2004).

Lewin (1947) went on to describe how a process of cognitive restructuring must take place following the unfreezing process. This involves learning new skills and concepts in alignment with the new system. Once cognitive redefinition has occurred behaviour change can commence, and new systems and processes can be trialled. This is not dissimilar to the cognitive redefinition described by participants in the Intervention group. Eventually the new behaviour and systems become re-frozen, new beliefs stabilize, and the change becomes regarded as the new normal (Schein, 2004). Although Lewin (1947) provides an easily understood framework outlining the intricacies of change management, it is considered too simplistic to drive real change within the substance misuse treatment settings of the UK. Although there is a strong sector-wide will to improve outcomes for those who misuse substances, and ultimately to reduce substance related deaths, there are strong legislative and political factors ensuring that this is very difficult to accomplish. An example of this is the devolutionary powers of the Welsh Government; the Health portfolio is devolved but Criminal Justice remains within the remit of UK Central Government, causing substance misuse to essentially sit across two governments. Therefore, the Welsh Government are free to implement health initiatives, but progress is marred by the continued enforcement of the Misuse of Drugs Act (1974) which ultimately undermines local efforts. The change concepts of Langley et al (1996) provide seventy useful stages focusing on waste elimination, time management, risk sharing, and relationship development as pivotal systemic management stages (Nelson et al, 2007). These add value given the level of political influencing needed to progress potential future recommendations from formal evaluations or for beekeeping to become a mainstream recovery activity option. However, although this presents challenges, there is positive cross-party support for increasing wellbeing and tackling substance misuse, as well as protecting the environment and honeybee conservation. It is argued here that these things can be powerfully brought together and mutually strengthen the argument for humans and bees to save each other.

## **5.8 Original and Significant Contributions to Change**

Although the findings of this feasibility study are tentative, it is assessed that there is enough potential to take steps for practice improvement and contribute to change, particularly in relation to driving innovation for tackling substance use. Due to the professional status of the researcher opportunities have presented themselves for advocating strongly for novel approaches to therapeutic interventions to capture interest and improve engagement. This led to fruitful discussions with the Chief of South Wales police, the Welsh Minister for Health, Substance Misuse Area Planning boards, health boards, substance misuse charities and universities about the potential to develop Enhanced Harm Reduction Facilities. Enhanced Harm Reduction Centres are essentially facilities where people can use substances safely. This approach is subject to contentious debate, with strong opposition from Westminster. As things stand, a multi-agency proposal is being developed to make these ground breaking differences in the way we engage substance users in Wales. It is being proposed that green care is offered as part of the EHRC, with evaluation from the university partners.

An evidence-based approach is needed to develop and implement interventions offered by Third Sector service providers. The researcher, in her professional capacity has acquired rent free use of a field and built an apiary with 5 hives. The season began with 2 hives, and the focus has been on breeding them to enable the development of a beekeeping project for people who are or have recently experienced homelessness. Although this new apiary, the staff facilitating have anecdotally reported feelings of improved wellbeing, suggesting that there may be benefits for professionals working with challenging groups as well as for the groups themselves. Following the recent sale of the NewLink Wales building, their bees are also cited in the same apiary. This provides a potential excellent site for the pilot phase of this study. The apiary will open to homeless clients from May 2021. So far it has proved a valuable asset for engaging donors to the charity.

Some of the participants have chosen to progress into volunteering with the charity managed by the researcher and have joined a shadow board as key advisers for future project development. By involving and integrating participants into the design approach,

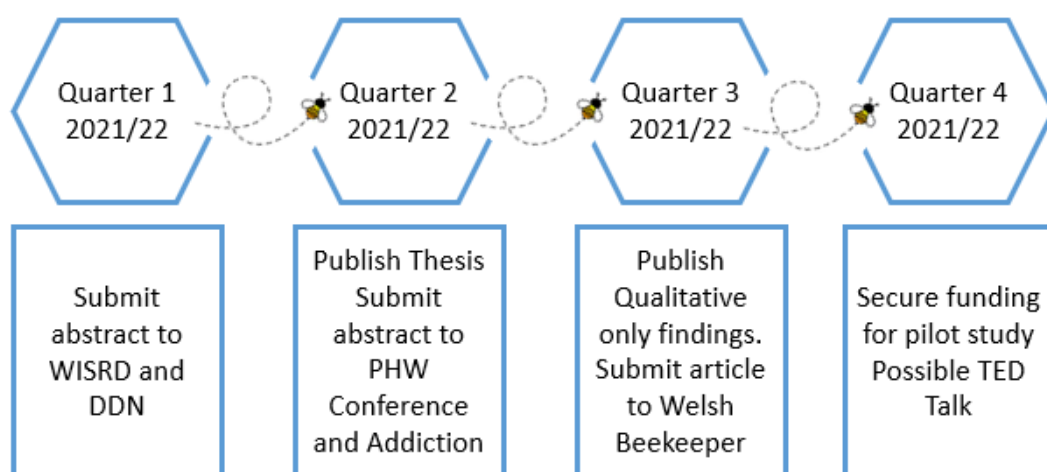
they are now best placed to facilitate future intervention throughout the design, implementation and evaluation phases.

Most importantly, practice development has been undertaken by advocating for change through dissemination of this project via strong professional networks. The findings of this project have been discussed at the highest levels of government to explore how learning can be applied in related sectors, such as homelessness. During 2020, the Minister for Housing and Regeneration selected twelve experts from around Wales to design the policy context for ending homelessness. The researcher was fortunate to be selected as part of this group. As a result, there has been key discussions about the role of the vagus nerve and the neuroscience of feeling safe while designing future services nationally. Using services to create opportunities for Attention Restoration, Self Determination Intrinsic Value Orientation have been discussed as part of wider work to improve the psychological impact of services.

## **5.9 Future Dissemination of the Work**

In order to illustrate how this work has extended the forefront of the discipline and how the original research and advanced scholarship is of a quality to satisfy peer review, it is intended to undertake a series of publications and future projects. Dissemination has already commenced through professional networks and influencing opportunities as described in 5.8, including early discussions with potential project funders. The researcher is already well established on the Welsh conference circuit with opportunities to present at the All-Wales Public Health conference, and WISERD Wales Institute of Social and Economic Research conference having presented there three times before. The researcher has been approached by TED Talks Cardiff and is awaiting a date once pandemic restrictions are lifted. Publication is planned with approaches to be made to the Drink and Drug News sector publication as well as academic, peer reviewed journals such as Addiction, with a change of emphasis for Beeworld and Welsh Beekeeper. A proposed timeline is given in Figure 16.

Figure 16 Proposed Publication and Dissemination Timeline



It is an aspiration of the researcher to undertake a pilot study and progress to formal evaluation, however this is dependent on conflicting professional obligations and the ability to attract resources to finance such projects.

## 5.10 Recommendations

This feasibility study provides a solid basis on which to progress opportunities to rigorously evaluate beekeeping as an intervention for improving wellbeing, skill development and building recovery opportunities in adults with substance misuse problems in Wales, in accordance with NMC guidelines (Craig et al, 2019). However, before progressing onto the evaluation stage, further pilot work is needed to determine suitable sample sizes.

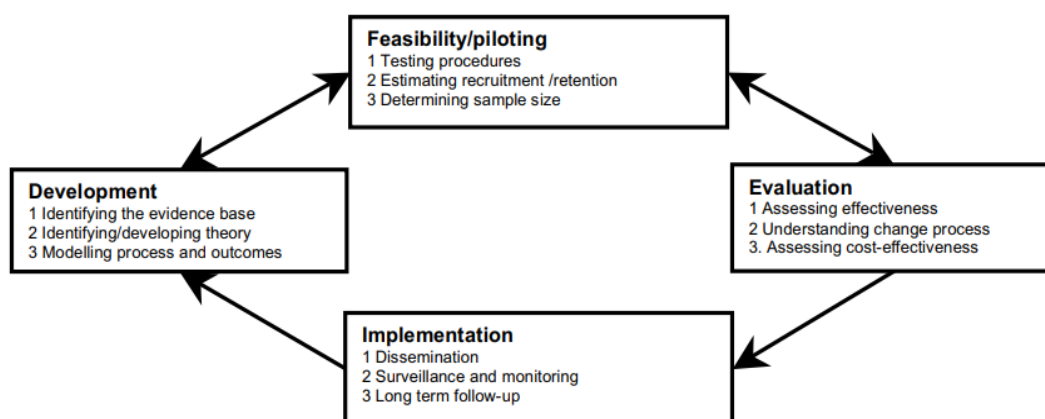


Figure 17 Key elements of the development and evaluation process Craig et al 2019 p8



Although initial work has been completed to inform a Process Evaluation, there was not the scope within this thesis to undertake this rigorously. It is recommended that this is undertaken in future research.

A challenge to overcome would be the transport arrangements of participants, especially if beekeeping activities are replicated in rural settings. This was identified as a key barrier to future research as stipulated in objective 4. Budgetary allocation is required to assist those experiencing extreme poverty, which is inevitably the case with chaotic substance using populations. The current feasibility study cost approximately £1000 in travel expenses and equipment.

Future formal evaluation may benefit from using the Warwickshire Edinburgh Mental Wellbeing Scale, the SF-36, the Office of National Statistics Subjective wellbeing measures and the Treatment Outcome Profile outcome measures in future projects. Indeed, it is also recommended that these tools may offer value in the evaluation of services, potentially influencing future practice within the social care sector as described above. It may be beneficial to future studies to quantitatively measure some of the key themes identified through the thematic analysis, such as sensation seeking and risk taking.

It is recommended to also measure whether there is a 'dosing effect' whereby the more exposure participants have to the beekeeping activity the greater the potential wellbeing and quality of life benefits (Cano et al, 2017). It has also been claimed that it takes on average five years for recovery to be sustained (Dennis et al, 2005). There may be value in replicating follow-up studies in accordance with this timeframe to establish if the recovery benefits of beekeeping are effective in the long term.

## **5.11 Chapter 5 Conclusion**

From the data gathered during this mixed methods feasibility study and the analysis undertaken, no cause and effect conclusions can be drawn. However, there are positive indications that future outcome measures have been identified to inform future pilot and

evaluations studies. Moreover, the findings indicate the acceptability of beekeeping as an intervention, possible barriers to future studies and feasibility of formal evaluation.

Both the questionnaire data and the interview data revealed that wellbeing of participants improved, even if this was not significant, when the Control and Intervention Groups were compared over time. Improved wellbeing was a constant theme to emerge from the interviews, with participants citing an enhanced ability to focus and achieve mindfulness as a key component. Moreover, wellbeing improvements were attributed to a lasting calming effect indicating that beekeeping may stimulate the vagus nerve, ultimately counteracting fear responses. Participants reported real life changes outside of the data collection context, with many describing a renewed sense of purpose which challenged old negative identities. Beekeeping was also reported as impacting, in a therapeutic sense, on changes in the lives of participants, such as in their reduced substance misuse, returning to work, and engagement with rehabilitation.

Connectedness to nature was by far the strongest improvement observed and confirmed through statistically significant increases in questionnaire results for the Intervention group compared with the Control group and thematic prominence in interview data. Participants described feeling equal to the bees, feeling love for them, and accessing more green spaces as a result.

There was exploratory evidence of skill development and there may be many parallels between recovery skills and beekeeping skills if this is replicated in future more robust studies. This was observed across personal, social, and community recovery capital domains, with participants describing how they tackle problems and manage their emotions differently now. A potential implication for service development is enabling biologically predetermined needs for sensation seeking and positive risk taking to be catered for. It is argued here that this may enable adults with substance misuse issues to build the emotional regulation and risk management skills that are essential to fight cravings and maintain recovery. The phenomenological meanings that participants projected onto their beekeeping experience provided powerful narratives and demonstrated connection with the bees, perhaps beyond anthropomorphism. This depth

of meaning, and how this can be stimulated through recovery activities, may be a form of recovery capital in its own right.

## Chapter 6 Conclusion

### 6.1 To return to the Aim and Objectives.

A thesis cannot end without a succinct and short conclusion chapter. This one briefly outlines the work completed and key findings in relation to the stated Aim and Objectives of the study. The overarching research Aim was *'To undertake formative work to identify opportunities to rigorously evaluate beekeeping as an intervention for improving wellbeing, skill development and building recovery opportunities in adults with substance misuse problems in Wales.'* It is concluded that the feasibility study presented has achieved this, by addressing the following objectives:

Objective 1 required the researcher *'To undertake a narrative literature review in order to identify theoretical underpinnings connecting the intervention of beekeeping with improved recovery outcomes.'* Following a narrative literature review, the key constructs of Attention Restoration (Kaplan, 1995), Self Determination (Ryan & Deci, 2000; Deci & Ryan, 1985; Ellingsen-Dalskau et al, 2016), Intrinsic Value Orientation (Cleary et al, 2017), Recovery Capital (Best & Aston, 2015; Parkin, 2016; Cano et al, 2017) and later Poly Vagal Theory (Porgues, 2017) may provide valuable theoretical underpinnings connecting the intervention of beekeeping with improved recovery outcomes.

Objective 2 required the researcher *'To design and implement an appropriate methodological protocol, incorporating mixed methods and peer reviewed measurement tools.'* The methodological protocol designed and implemented was appropriate to achieve the aim of the study, which followed the MRC framework put forward by Craig et al (2019). The design incorporated mixed methods and peer reviewed measurement tools. The quantitative tools were the Warwickshire Edinburgh Mental Wellbeing Scale, the Office of National Statistics Subjective Wellbeing Questions, the SF-36, The Treatment Outcome Profile and the Connectedness to Nature Scale. The qualitative tool was semi-structured interviews.

The third objective set out *‘To interpret quantitative results to identify outcome measures for further evaluation’*. The following outcome measures for further evaluation are suggested:

- Wellbeing
- Health
- Quality of life
- Connectedness to nature
- Vitality
- Physical functioning
- Bodily pain
- General health perceptions
- Physical role functions
- Emotional role functions
- Social role functions
- Mental health
- Substance use frequency measured by number of days used
- Self-reported ratings of psychological health
- Self-reported physical health
- Self-reported quality of life rating

Finally, Objective 4, required the researcher *‘To interpret qualitative results to ascertain acceptability of beekeeping as an intervention, possible barriers to future studies and feasibility of formal evaluation.’* The qualitative findings strongly ascertain acceptability of beekeeping as an intervention and excellent feasibility for formal evaluation. There were few possible barriers to future studies identified, with the main concerns being sampling and budgetary constraints.

## **6.2 A final word...**

Overall, it remains premature to make definitive recommendations for future practice and there are serious challenges and obstacles within the policy and political environment. This feasibility study highlights that things can be done differently. It is hoped that these findings contribute positively to addressing growing unrest and dissatisfaction in a broken system.

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*"The happiness of the bee and the dolphin is to exist.  
For man it is to know that and wonder at it."*  
Jaques Yves Cousteau 1953

## **DOC8004 Writ 2 – Reflective Essay**

### **1.1 Introduction – how it all started**

My love story with bees started about six years ago and although it sounds really cheesy, I had a dream. Literally. It's true! I had a dream that the charity I was CEO of at the time opened a bee farm, called it Buzzin, and produced honey with the whole thing being run and overseen by people in various stages of recovery from substance misuse problems. I even dreamt of the qualifications framework and risk strategy that would accompany the project. Perhaps this was a fortunate side effect of delivering substance misuse therapeutic interventions for over 20 years. Perhaps I should just get out more. The next day I mentioned this to my colleague and good friend, John, whose role at the time was to develop business for the charity. We decided it was too good an idea to waste so wrote an optimistic funding bid to a foundation trust not really expecting anything to come of it. To our surprise we secured £50,000 for equipment, livestock, and a staff member to oversee the project. It was 'unbeelievable'. From the bottom of our car park, two hives grew into 10 and the project is still running very successfully. However, to this day nobody has been able to provide me with a satisfactory explanation for how beekeeping works to improve wellbeing or for why I witnessed transformational changes in people when I worked with them in the apiary. This is what prompted my research project. In this chapter I will share personal anecdotes from the Buzzin project that have allowed me to reflect on and explain how my development as a researcher has been guided, how my ontological position evolved, and the impact this experience has had on my practice.



*Figure 1 Buzzin Project Apiary Fence*

## **1.2 Catching the buzz**

When I first established the Buzzin project my intention was to provide something cool and different for people who either identify as in recovery or working towards recovery from substance misuse issues, to do. When people stop using drugs and alcohol there is often a gap left in their lives. They suddenly have no social network, nothing to do with their time, and often forget what their original identity was before they started using. These are the main things that lead to relapse because under these circumstances people feel like it's not worth changing. A rush of negative emotions that were previously blocked out by substances come flooding back and they find themselves confronted with painful previous traumas. Obviously, there are a lot of evidence-based interventions out there to help people develop resilience and coping skills, but these require practice to be effective beyond the artificiality of the therapy room. Moreover, I found myself frustrated that the care and activity packages we offered people were considerably less fun than taking substances. I was also frustrated that people had to undertake endless assessments, fulfil criteria, and navigate complex bureaucratic systems to access activities that are good for them. The philosophy behind Buzzin was that people could access it instantly, self-refer and just come along to do something new and fun! Once people started getting involved, I observed some behaviours I wasn't expecting, which led to the thought that maybe something special was going on with the bees. Maybe humans and bees can save each other. I could probably write a whole thesis just on the things I have observed before my research took place, but I've selected two of my favourite case studies for the purpose of illustration.



*Figure 2 Baby bees emerging from cells like a new idea*

**1.2.1 Case 1** – a female participant of Eastern decent in her late 20s with a history of chronic alcohol misuse joined the project one day. She joined while we were still setting up, building our beehives from flat pack kits ready for the livestock to arrive. Her reluctance to join in was palpable and upon exploring this with her she explained that it was forbidden in her culture for women to handle tools as it would risk her securing a future husband. We respected her decision but over the coming weeks she overcame her reluctance and got more and more involved. Once we started the beekeeping she faced her fears, grew in confidence, and decided that her future husband will have to respect her wishes and interests as much as his own. She became what can only be described as a total badass. In the end it was hard to get the hammer off her for others to use. She credited the bees for her transformation and now has her own hive.

**1.2.2 Case 2** – an older gent who had been street drinking and rough sleeping for decades surprised us all one day and attended a session. I'd been trying to engage him for years without success and our conversations almost always ended with him saying "you're a lovely lady now fuck off!". He was very quiet at first but gradually came out of his shell and became increasingly fascinated by the bees. They seemed to reach him in ways that people couldn't. It is common practice to move bees around the frame by blowing gently on them and one day I had to explain to him that bees hate the smell of alcohol, so he didn't upset them. The next session he attended sober. It was the first time he had gone a day without alcohol in 45 years because he loved the bees more than he loved himself. He now has a home and although he is still drinking, he also volunteers at a local community allotment.



This is how I caught the buzz. Not only because of how people changed but because I felt it too. I couldn't stop thinking about how and why people react to bees in this way. I observed that the apiary offers a real-world environment for people to practice the recovery skills they learn in therapeutic settings. Most notably was the need to remain calm when handling the bees – if you get stressed then they get stressed and that's when stings happen. The perfect incentive for emotional regulation! I turned to the literature and found nothing. This was both a blessing and a curse!



Figure 3 A swarm of bees during pilot data collection

### **1.3 Critical Reflections on ethical, political, philosophical and moral issues throughout the Professional Doctorate**

Nature author, Susan Brackney once said “For better or for worse, honeybees are often much too busy to be bothered with personal reflection” (2010, p37). Researchers, however, must embrace reflection as a pivotal part of the Professional Doctorate experience and this encompasses ethical, political, philosophical and moral issues. Section 1.3 provides an overview of how my thinking evolved and developed in these key areas throughout the academic programme.

### **1.3.1 A swarm of ideas**

The lack of available literature meant I had a flurry of ideas but no particular focus for what I wanted to learn or how I would contribute to knowledge. My first challenge as a researcher was dealing with the uncontrollable swarm of ideas in my head and getting them on paper for my long-suffering supervision team to make sense of. We had long conversations about how much is too much. In my early research design stages I wanted to measure physiological changes, take blood tests, compare cortisol levels, heart rates and Galvanic skin responses. If I had the resources, an enormous research grant and a research team I would also have measured sound frequencies and taken neurological photographs of how the brain responds. All this as well as examining the wellbeing benefits, subjective interpretations, and health benefits of beekeeping.

The feedback on this was hard to swallow and I had a tough time narrowing my ideas down. I eventually settled on the therapeutic potential of beekeeping for adults with substance misuse problems. However, it was only when I completed the pilot study module (DOC8003) and gathered data that the magnitude of this learning point really hit home. Even in the final thesis I produced far more data than I could include in my final report. I was unprepared for the level of resentment I felt when I had to cut so many findings, all of which felt equally pivotal. I moped around for days feeling like I'd just murdered a puppy. My ideas are still swarming but I'm optimistic that those I've managed to hive off have produced a coherent contribution to understanding the impact of bees on humans.

### **1.3.2 To bee or not to bee - a philosophical journey**

A further challenge affecting my experience of this research was the philosophical transition I had to undertake in identifying the most appropriate ontological position, which seemed to shift every time I read something new. For me, there appeared to be incongruence between the writings on epistemology and practice development in care settings for people with substance misuse issues (Zimbalist, 1977) and this raised important questions about whether I wanted to produce something purely scientifically valid or produce something that is actually useful in real practice. At the time I felt that social researchers often treat these two positions as if they are mutually exclusive (Creswell &

Plano Clarke, 2008; Feilzer, 2010) and I did not want to limit myself in this project. I am mindful that the key difference between a PhD and a Professional Doctorate is the applicability of research findings to real practice. It is pleasing that ontological and epistemological thinking has progressed in the fields of health and social care, becoming more sophisticated and applicable to practice (Anastas, 2012). At the point of trialling my measurement tools and undertaking a small pilot project, I found myself drawn to Pragmatism as a useful paradigm.

Pragmatism regards theories and beliefs as only useful if they have a practical application. The thing I liked the most about Pragmatism was the amount of focus on the research question and flexibility to combine methods. At first this position was met with suspicion and I found myself arguing with my own conscience about whether this was just a cop out so I could just do whatever I wanted. Feilzer (2010) described how pragmatism doesn't allow itself to be bogged down with complex concepts such as what constitutes truth and reality and instead concentrates on what the researcher actually wants to find out. Given the lack of previous writing on the subject of interest, and the complete lack of previous literature guiding the formulation of my research questions, this position became more and more appealing.



Figure 4 A queen bee emerges in the safety my hands

Pragmatism champions not only a logical approach to problem solving but producing research that is useful rather than purely descriptive (Feilzer, 2010).



My professional role transition also sits comfortably with pragmatism as a paradigm, which gives equal value to multiple perspectives (Creswell & Plano Clarke, 2008; 2018). It also encouraged me to choose a mixed method design. For me quantitative research had remained uncharted territory since my undergraduate days and I didn't feel like a fully-fledged researcher until I conquered this fear. I've always been terrible with numbers and the thought of doing statistics at this level utterly terrified me. I guess if I'm asking research participants to overcome their fears and interact with bees, I should be willing to do the same. The shame of doing it wrong would endure for far longer than any sting and this formed the basis of my avoidance. Due to my emotional closeness to the research topic, I felt it was important to at least try to obtain objective data to compliment the subjective data. Pragmatism helped me focus on what is practical within the research setting to address the research questions fully.



*Figure 5 Like research methods, different types of hives are equally effective. They all keep bees!*

For Tashakkori and Teddlie (2003), this focus on the research questions held prominence over the researcher's philosophical stance. Therefore, researchers should not have to choose between epistemological and ontological positions, as they all have value according to the context. I agree strongly that, as long as research is practical and social good can be derived from the findings, that is the most important thing (Haack & Lane 2005). I do, however, accept that many people will disagree with me and that pragmatism has been criticised for being too values based (Anastas, 2012). The fact is that what I do for a living



Figure 6 Swarm catch 1

is unapologetically values-based so why fight it? For this research project my subjectivity is my superpower. *“Contemporary epistemologies do not require that non-experimental or even non-empirical sources of knowledge be discredited – this helps bring research and practice back together again.”* (Anastas, 2012 pg 158).

In my search for solid philosophical underpinnings to my project I found that I cared far less about what epistemologists think. I wanted to know what beekeepers think. As I progressed through data collection, I was confronted not only with thoughts but also the projection of complex meanings that reached beyond anthropomorphism. This was challenging because I had not anticipated that the research participants would engage at such a deep level. During one of the beekeeping practical sessions a swarm started to travel out of the apiary and landed on a bramble branch on disused land next door. We decided as a team that we would go and catch them, bring them back to the apiary, and re-home them in a new hive. In that moment I underestimated what that routine task in beekeeping husbandry would mean for Participant 9.

I very gently and carefully picked up a cluster of bees and scooped them into the green box. I was lucky to catch the queen at the first attempt and, like soldiers, the bees turned and started to march to the door, which is normally blocked with the yellow stopper. They follow pheromones given off by the queen, known as queen substance and which guides them into their new (temporary) home.

I carefully carried the green box under a fence and back to the apiary. I showed the group how to assemble a new hive and ensure everything is in order before we put the bees in.



Figure 7 swarm catch 2

Some of the bees held on to frames that I had inside the green box and had already made themselves cosy. Others were more reluctant and had to be poured and shaken in. They don't particularly enjoy this, but it doesn't hurt them. At this stage the bees are just happy they've found a new home.



Figure 8 Swarm Catch 3

I'm in the embarrassing pink wellies. Participant 9 is holding the smoker and using it to gently move bees out of the way so we can put the roof on without squishing them. In my field notes I recorded the following comment from her:

*"I'm in that box at the moment, it's like me being in the hostel. It's shite but it's not forever. What I want is my hive – I want to be in there once I'm dry."*



Figure 9 Swarm catch 4

I went home and cried. Participant 9 is now in rehab at the time of writing. I really hope she makes it.

This was a eureka moment. During data collection I was only delivering beekeeping sessions on weekends and Buzzin staff were delivering the others on Wednesday and Friday afternoons. At this stage I didn't realise that the other groups were experiencing strong projection of meaning onto the beekeeping activity too. I knew enough for this to pique my interest in the philosophy of meaning and I began to explore phenomenological existentialism.

There's no honey coating on phenomenological existentialism and it presented a considerable academic challenge. In the discussion section of my thesis I was able to apply this to the meanings that participants projected onto the beekeeping activity. Merleau-Ponty (1945) wrote extensively about how humans apply metaphor and symbolism to enable them to more proactively engage with their experiences, rather than take the role of passive observers of social phenomena. For participants this enabled them to move on from grief, set goals to defeat homelessness, redefine old criminogenic identities and

overcome the things that previously held them back. But what does all this mean for me? The most challenging part is confronting the meanings that I project not only as a researcher but as somebody in long term recovery. As somebody who refuses to accept social inequality, this means that others can have access to the same opportunities that I have had. As somebody who has lost so many friends and acquaintances to the horrors of substance misuse, it feels like a tribute to them if I can develop more effective services for others. The old cliché is that if I can save just one person then I should rest easy at night. For me that isn't enough. One death is too many and it breaks my heart a little bit more every day. As a practitioner who has hugged people's mothers at their funeral and had to apologise that I couldn't help their son or their daughter, I am driven to dedicate my life to this. I equally find myself in absolute despair at human contempt for the planet and the price paid by animals and insects. Just as Howell et al, (2013) described how projection of meaning solidifies connection to nature, my projection of meaning solidifies my connection to this research. I had expected to feel gutted that there was no significant difference with the Comparator Group when compared over time – the reality is that the vast majority of participants got better no matter which group they were in. Despite where I stand philosophically as a researcher, that's just brilliant!

### **1.3.3 Ethical and Moral issues**

A key part of my research journey was reflecting on my own personal values and what I wanted the study to be used for before making generalisations or statements about any potential findings. I had to be very honest with myself about whether I had a genuine appetite to gain new knowledge or whether I wanted to provide proof that an intervention I designed works for purely egotistical purposes, or to give my charity a competitive advantage in a commissioning process. I felt like a newly emerging queen bee not knowing whether I was to be chosen or rejected and cast out of my own hive.

This troubled me for many months and I questioned whether I could realistically conduct viable research given that I am so emotionally connected to the subject of study. As chance would have it, I was approached for a CEO role with a different and much larger charity, specialising in homelessness, 18 months before data collection started. I took the job and became satisfied that this created enough distance between me as a researcher and the Buzzin project. I found it especially reassuring that I no longer had financial gain to make

or funding to secure for the future of the project; changing professional roles essentially solved this problem for me. The reality is that Buzzin will always be close to my heart and one of the things I am most professionally proud of, but I had to let go, build a different hive, and start another colony somewhere else.

Projects like Buzzin are subject to short term funding for three years at a time at the most, which raises further ethical considerations when interventions are withdrawn. Beekeeping is an expensive hobby and without community-based projects, equality of access to this activity is limited. It is deemed that research of this nature is within the public interest to ensure that equalities gaps are bridged. While conducting the feasibility study I ensured that all who took part as participants were able to continue to engage with The Buzzin Project after data collection was completed.

#### **1.3.4 Political Issues**

If there is one thing bees can teach humans, it is how to structure and manage a society, where everybody works together for mutual benefit. It saddens me that humans haven't quite figured this out yet. This is more obvious within the political arena than anywhere else and it is sadly found that political views on how to address substance misuse are largely unfounded and directly opposed to the global evidence base (Nutt, 2020). Within Wales there is an ongoing commitment to reduce drug related deaths and to remain open to doing things differently, one such example is the introduction of Enhanced Harm Reduction Centres, where people can use drugs safely. The benefits of this are far reaching and not only reduce street-based substance misuse, related litter and antisocial behaviour, but they also reduce deaths. Welsh Labour established a multi-agency network to explore this agenda, chaired by the South Wales Chief of Police. I was fortunate to provide evidence to the network in October 2020, promoting the use of Enhanced Harm Reduction Centres and incorporating an element of green care. While completing the modules ahead of this thesis, Wales tried to implement an EHRC in North Wales, the proposal was rejected by Theresa May. One of the challenges of working within a devolved nation is that areas such as health and housing are devolved by criminal justice isn't. Although Wales is currently run by a Labour government, issue relating to the criminal implications of using substances still fall under the jurisdiction of Westminster and a Conservative government. I find this unbearably frustrating. I welcome the day that Wales can develop truly independent



legislation and take radical action to address substance related deaths. My organisation has published a manifesto advising future governments on how to reduce substance related harm specifically for the homeless community in preparation for the next election and to influence future practice.

## 1.4 Directing sunbeams – changing my own practice

The experience of conducting this research has left a lasting impression on me and prompted me to question many of the things I previously took for granted, most notably that danger is not always a bad thing! I always had a reasonable level of confidence that beekeeping improves wellbeing but now I feel that I can explain why. As the research sample of people with substance misuse issues are often represented simultaneously in a variety of vulnerable groups, I feel there is an opportunity to apply the research findings to develop practice in my current professional field, which is homelessness. Ultimately my

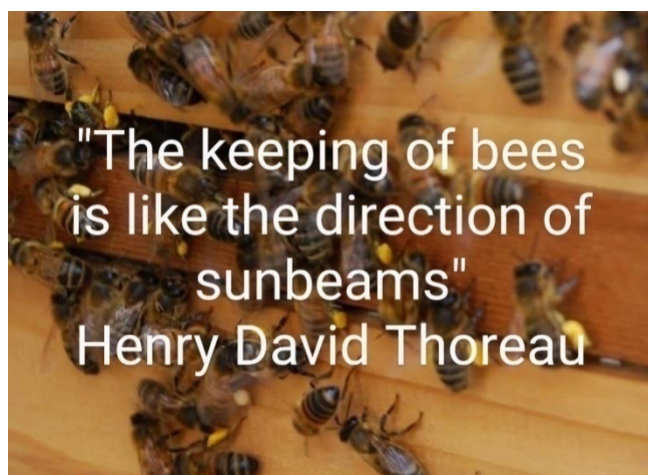
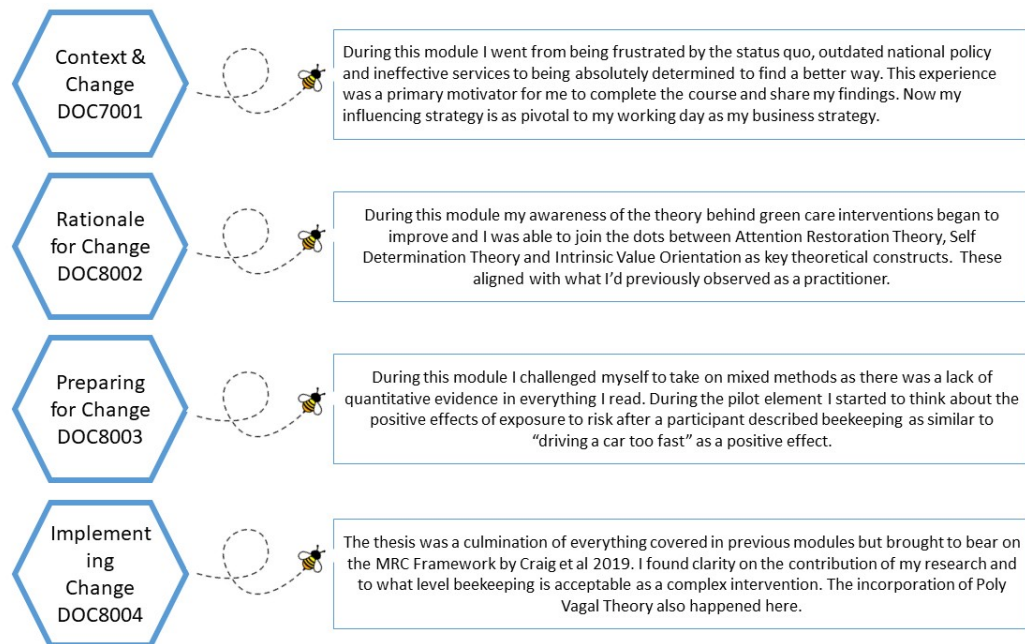


Figure 10 Thoreau sunbeams quote

charity helps many of the same people who are affected by substance misuse but with a different emphasis on housing. Even though my remit has changed I feel passionately that I can still use these findings to design better services. I have, however been forced to re-evaluate the delivery model I currently use to deliver 73 services across Wales.

### 1.4.1 Eureka Moments

My thinking progressed and developed in different ways throughout the Professional Doctorate Program. Figure 11 illustrates how.



*Figure 11 Eureka Moments throughout the Prof Doc*

In 20 years of supporting people at various stages of recovery in clinical, forensic, and community settings I have been taught to assess and manage risk robustly. Although I still hold this dear in terms of safeguarding vulnerable people, it strikes me that this is a process often imposed on a service user rather than undertaken in collaboration. Since undertaking this research, I have begun to consider the value of co-produced risk management. What became very apparent from the research was the biologically pre-determined propensity to take risks, to expose ourselves to danger, and to thrive off the feelings it induces (Cano et al, 2017; Churchyard & Buchanan, 2017). I can personally identify with this as someone who often takes things to the extreme. Early in my own recovery I found myself drawn to extreme sports, surfing, snowboarding, rock climbing, marathon running – anything that would give me a buzz. People need this and it's okay because, so long as they're careful, it's fun! While reading about green care I was interested to see the emergence of evidence about blue care, involving the benefits of water (Britton, 2018) and I will definitely do more reading on this. My conclusion is that the emphasis of the substance misuse sector needs to change from avoiding risks at all costs, to collaborating with somebody to help them develop the skills to analyse which risks are worth taking, and how to make sure things don't go too far. Coffee mornings for people in recovery and service-based interventions have their place, but if recovery is going to be really worth it, it has to be fun. At the very least it has to give more stimulation than misusing a substance does.



For my charity, future service designs are going to include controlled exposure to risk stimuli. In some services this will include beekeeping, in others it will be done differently following service user consultation. There will definitely be a stronger presence of green care opportunities to help the people I support to reconnect with nature and its wellbeing-enhancing power. One such example is a micro village currently being designed in Carmarthen. This is designed to facilitate the transition from hostel/prison environments to living in a longer-term community setting. This is a safe space to make mistakes without judgement and learn how to be a neighbour.



Figure 12 Micro Village site plan

In terms of the theoretical approach I take to my work, the findings of my feasibility study have challenged me to look in more depth at what I am trying to achieve on a neurological level. In my charity we operate within the ethos of the Psychologically Informed Environment (PIE), which is a person-centred way of working with people who have experienced homelessness. Essentially, we're determined to make all of our accommodation settings feel homely and to create safe spaces for healing (Johnson, 2012).

The PIE approach incorporates 5 elements:

- Relationships

- Staff support and training
- The physical environment and social space
- A psychological framework
- Evidence generating practice

The interplay between these elements has been strongly evidenced to create a safer environment for people who have experienced homelessness and face multiple challenges, including forensic histories and complex mental health diagnoses (Johnson, 2012). We have trained almost 400 staff to work within this approach and our service users are responding very well. Service users and staff have worked together across our entire estate to redecorate their homes, incorporate colour, introduce simple choices like bedding and curtain design, as well as the use of art. This has taken considerable investment as we supported almost 10,000 people last year. It means we have achieved outcomes such as reduced police and ambulance call outs to projects, a 90% increase in participation in project activities, and retaining people longer in their tenancies with less rent arrears. I'm very proud of what we've achieved but we're ready to take the next phase with our PIE approach. Undertaking this research has given me a deeper understanding of the neuroscience of feeling safe – in every service I've ever developed, this has been the fundamental aim. Only now do I feel that I can articulate it.

Polyvagal Theory (Porges, 2017) has completely fascinated me and now I can't stop reading about it. Discovering this through my extensive literature searches led to another air punching moment where I suddenly realised that my whole career has been about calming the fight or flight response and stimulating the vagus nerve! Before this I did not understand why or how the interventions, that I've been delivering for years, have a biological impact on the people I support. Given that the services I deliver in my current role are more about helping people to heal psychologically than they are about accessing housing, this has huge implications for where I take my charity next. I have already started developing the next batch of training for senior staff and a blog is in draft for our PIE Portal page on our intranet. One of my favourite things about bees is the Waggle Dance, which is one of the ways they communicate in the darkness of the hive. A bee will shake its rear end vigorously, walk around in a figure of eight pattern and repeat until everyone has got the message. The speed of the waggle communicates how far away the food source is and the

direction of the waggle tells the other bees how many degrees from the sun the direction of travel needs to be. Polyvagal theory has just waggle danced on me, revealing a new direction and guiding the next phase of my organisational strategy.

## **Conclusion and Chapter Summary**

The impact of my professional doctorate experience, especially undertaking a feasibility study into the therapeutic benefits of beekeeping for adults with substance misuse issues in Wales, has been profound. I have described how it started, from a dream that seemed too good to be true but that, with hard work, was made real through the Buzzin project. What started out as a novel idea to help people keep busy while working towards recovery, led to unexpected observations and started to have direct measurable impacts on the people taking part. When I attempted to make sense of this and turned to the literature, I found nothing, which made me want to investigate it myself. This happened against a backdrop of growing frustration with how the existing system was offering care for people with substance misuse issues. I found myself in absolute despair after witnessing successive systematic failures ultimately resulting in an avoidable death of a vulnerable person. I've known for a long time that the way we engage and intervene with vulnerable people needs to change.

For me, green care interventions such as beekeeping offer an opportunity to drive these changes in an evidence-based way. Within a small nation like Wales we enjoy an abundance of green space and wonderful accessible coastline. It's time to use these resources as well as to care for them. This has been a philosophical journey taking me from pragmatism to phenomenological existentialism. There has been some hard feedback along the way, and I've come to realise that perhaps I can't do everything after all. I need to pace myself better! As Kim Hubbard once said, "bees can't buzz any slower", but that doesn't mean that I can't. The depth of meaning derived from the findings and the research experience will stay with me for my lifetime.

The most important thing is that my learning from this experience can help me to help others. Through helping others I can help them to help the bees. The adaptations I intend to make to my practice includes development of green care interventions, the

incorporation of co-produced risk management, and the introduction of polyvagal theory to our Psychologically Informed Environments.

An additional outcome that I wasn't expecting is that the Buzzin project team have named a queen bee after me – the one that swarmed actually. I'm thrilled. I started this reflective piece by describing my love affair with bees and it has to be said that this project has been my summer romance.

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