Co-Designing Solutions to Improve Knowledge Mobilisation in Musculoskeletal Physiotherapy

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Table of contents

List of Tables

List of Boxes

List of Images

List of Figures

List of abbreviations used

MSK	Musculoskeletal
NIHR	National Institute for Health and Care Research
CLAHRC SY	Collaborations for Leadership in Applied Health Research and Care South Yorkshire
CLAHRC YH	Collaborations for Leadership in Applied Health Research and Care Yorkshire and Humber
TK2A	Translating Knowledge into Action
CSP	Chartered Society of Physiotherapy
NHS	National Health Service
EBCD	Experience Based Design
UCD	User Centred Design
PPIE	Patient and Public Involvement and Engagement
IKT	Integrated Knowledge Translation
PAR	Participatory Action Research
NICE	National Institute for Health and Care Excellence
AHP	Allied Health Professional
CATs	Critical Appraisal Topics
OA	Osteo-Arthritis
iPaHRis	The integrated Promoting Action on Research Implementation in Health Services
KTA	Knowledge To Action
TAHK	Translating Allied Health Knowledge
HCPC	Health and Care Professions Council

Abstract

Background

Musculoskeletal (MSK) disorders are extremely common and negatively impact on people's lives, accounting for over 60% of NHS physiotherapy consultations. Knowledge Mobilisation is challenging for MSK physiotherapists. Creative Co-Design, drawing on tools from the field of Design, could help develop tangible solutions to improve Knowledge Mobilisation in MSK physiotherapy practice.

Aim

To use Creative Co-Design to improve the way knowledge is mobilised in musculoskeletal physiotherapy practice.

Design and methods

A sequential three-phase study. Phase 1: Systematic review of the use of Co-Production, Co-Design and Co-Creation to mobilise knowledge in the management of health conditions. Phase 2: Non- participant observations of physiotherapists and semi-structured interviews with 14 physiotherapists and 13 people with MSK disorders. Phase 3: Creative Co-Design workshops and prototype development with 17 physiotherapists and 10 people of MSK disorders with the assistance of a Design Researcher.

Findings

A framework of key aspects and mechanisms of 'Co' approaches was developed from the systematic review of 24 papers.

Observations, interviews, and Creative Co-Design workshops, with physiotherapists and patients, to understand the factors that influence Knowledge Mobilisation in MSK physiotherapy generated understanding of the problems. They included: access to and accessibility of evidence and knowledge where physiotherapists utilise their peers and the internet and social media; a person-centred approach because evidence is a poor fit for

some patients; relationship building, including managing expectations and clear communication, is important.

Solutions were identified around making evidence accessible, managing expectations, and clear communication. Two prototype storyboards were developed of a digital concept which incorporated patient and physiotherapist resource packs: 'Physio in a Box', including pre appointment information; and 'Evidence in a Box' including evidence and information appraisal and sharing templates.

Conclusion

Creative Co-Design enabled the development of a suite of resources to improve Knowledge Mobilisation throughout physiotherapy appointments.

Chapter 1

Introduction

1.1 Outline of the chapter

The focus of this thesis is on using Creative Co-Design, a specific approach to Co-Design, to develop prototype solutions to improve Knowledge Mobilisation in musculoskeletal (MSK) physiotherapy. In this introduction chapter I:

- Present my back story which explains the rationale behind embarking on this PhD project.
- Introduce the topic area.
- Describe the aims and objectives of the research.
- Provide a summary of the research design.
- Explain the use of reflexivity.
- Outline the study timelines.
- Outline the thesis chapters.

1.2 Why I undertook this study

1.2.1 My background

I am a physiotherapist with 30 years' experience working in the UK National Health Service (NHS). I currently work one day a week in the acute MSK physiotherapy team at the NHS Trust in which my research was based. My journey towards this PhD started in 2012 when I undertook the UK National Institute for Health and Care Research (NIHR) funded Master's in Clinical research. During the Master's course I undertook a placement with the User Centred Healthcare Design theme of the NIHR Collaborations for Leadership in Applied Health Research and Care South Yorkshire (CLAHRC SY). It was during this placement that I was first introduced to working with Design Researchers. I gained experience working on two projects. The first was a Health Foundation funded project, 'SHINE', which explored using Design thinking and tools as part of the rehabilitation process for people with spinal cord injury (Wolstenholme *et al.*, 2014).   I worked closely with a Design Researcher and used my familiarity with the healthcare setting to complement their creative skills. I assisted them

with recruiting participants and in the creative Design-thinking skills sessions with spinal cord injured patient participants. The second project was called 'Better Services by Design'. This project explored the use of Design facilitation and Design-led tools to assist health and social care teams to carry out a service improvement project. This experience opened my eyes to a different way of working and thinking which I was keen to explore further. The placement led to my first academic role working in the NIHR Knowledge to Action theme of CLAHRC SY and also the publication of findings from the 'Better Service By Design' project (Wolstenholme, Grindell and Dearden, 2017).

Further academic secondments followed. One secondment was in the School of Health and Related Research at the University of Sheffield. I worked on an EU funded project 'INNOVAGE', in collaboration with Design Researchers from Sheffield Hallam University. I evaluated a Co-Designed intergenerational physical activity intervention and undertook focus groups and dyadic interviews with secondary school pupils and their teachers and a co-operative evaluation with a group of older women. This led to my first publication as lead author (Grindell *et al.*, 2018).

 I then spent three years working in a team of applied healthcare researchers which included a Design Researcher embedded within the team: the Translating Knowledge into Action (TK2A) theme of CLAHRC Yorkshire and Humber (YH). Over this time, I gained skills in planning Co-Design workshops, developing workshop activities, facilitating workshops and developing and testing physical prototypes alongside a Design Researcher using the Creative Co-design approach that I use in this thesis. I gained experience of working with many different stakeholders, including health care professionals and people who use healthcare, on a number of health-related projects including conditions such as cancer, mental health, stroke, back pain, and domestic violence and abuse. Examples of the many Co-Design projects I was involved in can the found in the NIHR CLAHRC YH Translating Knowledge into Action report (2019) and other publications related to the themes work (Easton *et al.*, 2019; Grindell *et al.*, 2020; Grindell *et al.*, 2022; Heyhoe *et al.*, 2022; Webber, Partridge and Grindell, 2022; Wolstenholme *et al.*, 2019).

During my time working in the TK2A team I also became familiar with working with Design Researchers, who were graphic designers and visual artists, to develop visual depictions of research findings and complex topics to make these more accessible. My creative journey

from physiotherapist into the world of Co-Design and Knowledge Mobilisation was presented as a poster at the Chartered Society of Physiotherapy UK conference 2018 (see Figure 1) and is featured in the Improvement and Innovation section of the Chartered Society of Physiotherapy (CSP) website (CSP, 2019).

Figure 1 My creative journey into clinical academia - Poster presentation at the Physiotherapy UK Conference 2018

1.2.2 Applying to do a PhD

My experience, up until commencing my PhD, was of working alongside Design Researchers embedded within a research team. I wanted to explore this concept further as I was aware that this was something that was not common within academia or complex intervention development at the time. It seemed to be more usual for researchers to do the research and then for Designers to be brought in towards the end of projects to make the final products. I had strong feelings about the benefits of working in an embedded way with Designers and wanted to reflect on this in my PhD. I also felt strongly that I would like there to be something tangible developed that those who participate in my study could potentially use

if they wished. That is a physical prototype rather than just a written report with a list of potential solutions.

As CLARHC YH was drawing to an end I decided to embark on Doctoral study. I wanted to use the knowledge and skills I had developed working with Designers, using Creative Co-Design, to facilitate Knowledge Mobilisation within the context of my professional clinical area of MSK physiotherapy. I had spent several years 'doing' Co-Design. I now wanted to take a step back and delve deeper into the theory and foundations of the approach reflecting on my experiences whilst gaining new ones in the primary research phase of my study.

I obtained a University of Sheffield PhD Scholarship. I also obtained competitive funding for a Chartered Society of Physiotherapy, Charitable Trust Physiotherapy Research Funds Fellowship. I was awarded the maximum £25,000 to fund a Design Researcher from Lab4Living at Sheffield Hallam University to work with me during the Co-Design phase of my thesis. It also covered reimbursement for physiotherapists and patients' time to participate in the study as well as workshop materials and prototype development. See appendices 1 and 2.

1.3 The topic area: Knowledge Mobilisation

The field of Knowledge Mobilisation has become popular in healthcare research over the past decade as the need to make public services evidence based and provide people with the best healthcare continues to be of high importance (Powell, Davies and Nutley, 2018). This is especially important now as many health conditions, such as cardiovascular disease, cancer, and MSK problems require long term management that places high burden on healthcare services (Brand and Timmons, 2021). The term 'Knowledge Mobilisation' is increasingly used by researchers in the broader healthcare literature to describe the active, iterative and collaborative process of creating, sharing and using knowledge between knowledge producers and consumers, for example, researchers, healthcare practitioners, and patients (Powell, Davies and Nutley, 2017; Melville-Richards *et al*., 2019). Ideally all forms of knowledge, such as experience, values and beliefs, are considered in this process, not just scientific factual knowledge (Ferlie *et al*., 2012; Ward, 2017). This is in contrast to the terms 'evidence' and 'Evidence Based Practice' which are still commonly used in

physiotherapy and medical practice. Here the emphasis is on the use of scientific knowledge in healthcare provision. Research and healthcare practice seem to inhabit very different worlds, with contrasting goals and use of different language, which can be problematic (Ferlie *et al.*, 2012). In the past decade there has been a gradual shift from hierarchical models of evidence and knowledge, that favour scientific medical facts, to other forms where the patient voice sits more at the forefront (Ferlie *et al.*, 2012, Greenhalgh, 2018). This has led to a change from a linear, rational approach to evidence implementation, often associated with Evidence Based Medicine or Practice, to more disordered, relational, context driven ones (Ferlie *et al.*, 2012; Greenhalgh, 2018; Powell, Davies and Nutley, 2018). Knowledge Mobilisation is the term used to describe this latter approach. It is not a straightforward concept and is often considered an umbrella term for other forms of knowledge sharing and use such as Knowledge Translation, Exchange and Dissemination (NIHR 2020a; Ward, 2017; Powell, Davies and Nutley, 2018). Knowledge Translation seems to be the preferred term in the physiotherapy literature (Bérubé *et al.*, 2018; Hitch *et al.*, 2019). The terms Knowledge Mobilisation and Knowledge Translation are frequently used interchangeably within the literature and will be defined in the next chapter of this thesis.

1.4 The topic area: Co-Design

Co-creative approaches to knowledge production have been advocated to bridge the knowledge-to-practice gap (Greenhalgh *et al.*, 2016; Powell, Davies and Nutley, 2018). There are many different collaborative and participatory methods in the health research and service improvement literature (Locock and Boaz, 2019), with a multitude of 'Co' approaches being used (Cowdell, Ahmed and Layfield, 2020). Co-Production, Co-Design and Co-Creation are some of the most common terms used in the healthcare literature. The fundamental principles of 'Co' approaches have been described, for example the UK's NIHR principles for Co-Production (NIHR, 2019). These principles include: 1. Sharing of power; 2. Including all perspectives and skills; 3. Respecting and valuing all knowledge; 4. Reciprocity; 5. Building and maintaining relationships (NIHR, 2019). However, there remains little consensus about the type of approaches the different terms describe or the distinction between them (Cowdell, Ahmed and Layfield, 2020; Williams *et al.*, 2020; B. Smith *et al.*, 2022; H. Smith *et al.*, 2022). More recently in the literature, since this PhD study commenced and the systematic review reported in Chapter 3 was undertaken, there have

been numerous papers published in an attempt to provide more clarity around the terms and use of 'Co' approaches (B. Smith *et al.*, 2022; H. Smith *et al.*, 2022; Masterson *et al.*, 2022; Robert *et al.*, 2022). Examples of common uses of these terms in the healthcare literature are: 1) Co-Production of a research project where researchers, practitioners and the public work together throughout the course of the project (NIHR, 2019); 2) Co-Creation of new knowledge by academics working alongside other stakeholders (Greenhalgh *et al.*, 2016); and 3) Co-Design when developing complex interventions (O'Cathain, Croot and Duncan *et al.*, 2019). In practice, the three terms are often used interchangeably and adopted and described inadequately and ambiguously (Cowdell, Ahmed and Layfield, 2020; Pearce *et al.*, 2020; H. Smith *et al.*, 2022). Many 'Co' approaches do not address the egalitarian and utilitarian values of what is considered 'genuine' Co-Production leading to a crowded landscape of terms and approaches beginning with the word 'Co' that Williams et al (2020) have described as 'Cobiquities' (Williams *et al.*, 2020).

One 'Co' approach is 'Creative' Co-Design and is the approach I chose to use in this PhD. It can be distinguished from other Co-Design approaches because it is a Design-led, structured approach to collaborative problem solving (Wolstenholme *et al*, 2019; Design Council 2023). The key elements of this approach include: using creative and visual activities drawn from Design such as Lego, journey mapping, storyboards and prototyping (Langley *et al.*, 2018; Wolstenholme *et al*, 2019); and having a Design Researcher embedded within the team who helps to develop workshop activities, facilitates the Co-Design process and develops prototypes. It has been suggested that the creative and visual activities and involvement of a Design Researcher, through a shared process of making and 'thinking while doing', can help create the conditions conducive to 'genuine' Co-Production (Langley *et al.*, 2018; Wolstenholme *et al.*, 2019; Grindell *et al.*, 2022). It has been suggested that the Design-led, creative approach can help overcome some of the barriers to more traditional approaches to Co-Production and Co-Design such as power and language imbalances (Grindell *et al.*, 2022; Langley *et al.*, 2018, 2022) and help gain access to tacit knowledge that is often difficult to verbalise (Langley *et al.*, 2018). Creative Co-Design therefore has the potential to be effective in bringing heterogeneous groups of people together to work collaboratively to share knowledge and develop novel, tangible solutions to healthcare problems (Langley *et*

al., 2018; Wolstenholme *et al.*, 2019; Grindell *et al.*, 2022). See Figure 2 for a creative visualisation of this.

Figure 2 Creative Co-Design in action (Grindell et al., 2022)
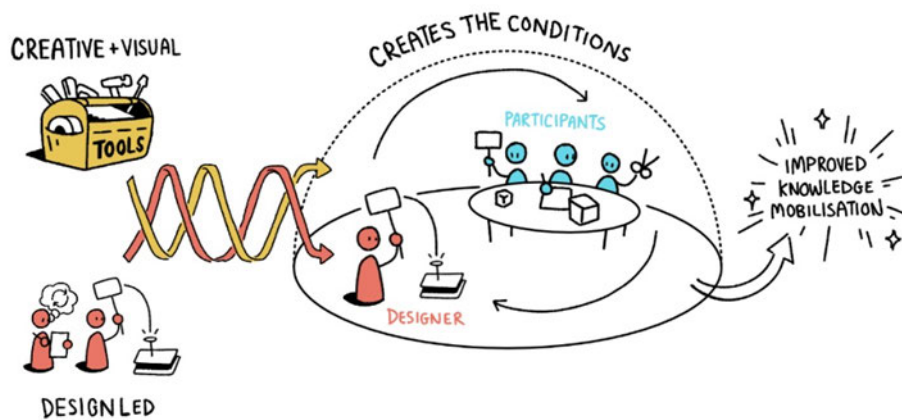
1.5 The topic area: Musculoskeletal physiotherapy

1.5.1 Introducing Physiotherapy, MSK disorders and the MSK physiotherapy Knowledge Mobilisation problem

Physiotherapy is a degree and science based profession that focuses on helping people to *'restore movement and function when someone is affected by injury, illness or disability'* (CSP*,* 2023a). There are 64,000 registered chartered physiotherapists in the UK, including support workers and students, working across a wide variety of types of care (NIHR, 2018; CSP, 2023b).

Musculoskeletal disorders affect the body's soft tissue (muscle and ligaments) and bone and include common problems such as arthritis and low back pain and some auto-immune diseases such as Lupus (Arthritis Research UK, 2018; NIHR, 2018; CSP, 2023a). MSK disorders are extremely common, and their prevalence is expected to rise as obesity, inactivity and population ageing increase. 17.8 million people in the UK (28.9% of the population) are known to have a MSK disorder that impacts on their daily life (Arthritis Research UK, 2018).

MSK disorders account for 65% of NHS physiotherapy consultations (NIHR 2018). Therefore, ensuring people with MSK conditions receive the best available physiotherapy care is important in order to improve patient outcomes and reduce healthcare costs (Arthritis Research UK, 2018; NIHR, 2018). Research into MSK health has increased at a significant pace over the past 30 years which has seen a transformation in the way MSK health is managed (Bérubé *et al.*, 2018; NIHR, 2018). However, this means it can be difficult for physiotherapists to keep abreast of the ever-expanding evidence base and use it in their treatment of MSK patients (Bérubé *et al.*, 2018).

I am a physiotherapist with over thirty years of experience working in the UK National Health Service and twenty five years in the musculoskeletal field. Therefore, the focus of my PhD study is musculoskeletal outpatient physiotherapy care.

1.5.2 The uncomfortable relationship between Evidence Based Practice and Knowledge Mobilisation in physiotherapy

I started my clinical academic journey because of the growing importance of Evidence Based Practice in my physiotherapy role. At the start of this journey, Knowledge Mobilisation was not a term I had heard of in my professional career. Although I now understand the broader concept of Knowledge Mobilisation, I am aware that most of my physiotherapy colleagues do not. They are more familiar with Evidence Based Practice with a strong focus on research evidence. I had to be cognisant of this and this is why research evidence, as to opposed to wider forms of knowledge, features strongly in my thesis. Despite this, I consider Knowledge Mobilisation to be innate in all physiotherapists' practice. As a physiotherapist, I know from experience that we constantly access, share and use different types of knowledge and evidence, both factual and experiential, to inform our decision making. However, as a term it is not widely used and will be unfamiliar to the majority of physiotherapists who are not involved in academia. For this reason, I used different terms and language throughout the primary research in this thesis. In particular, I used the terms 'knowledge', 'evidence' and 'information' interchangeably, depending on the audience, to ensure that my language was accessible and meaningful to everyone that worked together with me throughout the different phases.

1.6 The research question, aims and objectives

The research question that underpins this PhD research study is:

What solutions can be identified, using Creative Co-Design, to improve knowledge mobilisation in MSK physiotherapy?

1.6.1 Aim

To use Creative Co-Design to improve the way knowledge is mobilised in MSK physiotherapy practice.

1.6.2 Objectives

a) To undertake a systematic review to understand the use of Co-Production, Co-Design and Co-Creation ('Co' approaches) to mobilise knowledge in health condition management.

b) To understand how Knowledge Mobilisation, from a physiotherapist and patient perspective, influences MSK physiotherapy practice.

c) To use Creative Co-Design to develop prototype solutions to the issues identified to facilitate Knowledge Mobilisation in MSK physiotherapy practice.

1.7 Study design

A sequential three phase study was undertaken to fulfil the objectives:

Phase1: A systematic review exploring the use of Co-Production, Co-Design and Co-Creation to mobilise knowledge in the management of health conditions. This identified the key aspects of 'Co' approaches and produced a framework that informed the primary research.

Phase 2: A qualitative study using non-participant observation to provide an understanding of the context and environments in which Knowledge Mobilisation occurs. The observations were carried out alongside qualitative interviews with physiotherapists and patients to find out what factors influence Knowledge Mobilisation in MSK physiotherapy practice. The findings were used to inform the development of solutions.

Phase 3: The use of Creative Co-Design to develop prototype solutions to facilitate Knowledge Mobilisation. A series of Creative Co-Design workshops took place to explore problems and solutions. Prototypes were iteratively developed from the ideas generated by the Co-Design Participant Group.

1.8 Reflexivity

Reflexivity plays an important role in this thesis. I chose a reflexive form of thematic analysis to analyse the qualitative interviews. Reflective practice has always been an important part of my physiotherapy practice and something that I continue to use, often informally and implicitly when working clinically. I set out my epistemological stance in Chapter 3 where I describe that I do not believe researchers can be truly unbiased when undertaking research and therefore my experiences and beliefs, along with those of the participants, will always influence and form part of the findings of my research.

I am a white female in my early fifties who is a university educated health professional. I am likely to be considered middle class, which may impact on the way that I related with others involved in the primary research in this thesis. However, I originally come from a deprived South Yorkshire town. Both my parents come from working class backgrounds, and I am married to a builder. I was the first in my family to go to university. So, despite my white, middle class background I have life experiences that I hope help me to establish rapport with a wide range of people from different backgrounds.

Rapport and relationships are extremely important in Co-Design (Farr *et al*., 2021; Knowles *et al.*, 2021). Within the Co-Design field there is a lot of rhetoric with regards to how power dynamics are managed. Researchers are often portrayed as the ones holding power and being the primary decision makers whilst not always understanding or valuing the experiences of wider stakeholders (Williams *et al.,* 2020). Although I am a firm believer that we are all experts in our own fields and lives, I also recognise that as an academic and health care professional I am immediately put in a higher regard by society and in a privileged and often powerful position. I have tried to minimise the impact of this throughout my primary research.

Finally, I am aware that I come to this PhD holding a very positive view of Creative Co-Design and Knowledge Mobilisation. I have worked hard to critically reflect on potentially negative aspects of both of these throughout my thesis (see Chapters 7-10).

1.9 Timelines

I started this PhD in October 2019 with the intention of completing it full time over 3.5 years. I always intended to continue doing a small amount of clinical work during this time. However, in early 2020 the COVID-19 pandemic happened. By March 2020 the UK was in full 'lockdown' and everything took an unexpected turn. I reduced to part-time PhD study to help juggle my PhD work and home schooling. Then from October 2020 to April 2021 I increased my hours in the NHS to help cover outpatient clinics so my colleagues could help on the wards. My PhD therefore extended to 4 years.

I undertook Phase 1 (systematic review) 2020-2021; Phase 2 (observations and interviews) July to October 2021; Phase 2 preliminary data analysis October 2021- February 2022; Phase 2 in depth data analysis January 2023 – June 2023; and Phase 3 (Creative Co-Design) March 2022- January 2023.

1.10 Thesis chapters

This thesis is organised into the following chapters:

Chapter 2   Background to the study including Knowledge Mobilisation and Co-Design definitions.

Chapter 3   Phase 1 A systematic review of Co-Production, Co-Design and Co-Creation to mobilise knowledge in the management of healthcare conditions.

Chapter 4   Phase 2 and 3 Methodology and study design.

Chapter 5   Phase 2 Qualitative study methods.

Chapter 6   Phase 2 Qualitative study observation and interview findings.

Chapter 7   Phase 3 Creative Co-Design methods and process.

Chapter 8   Phase 3 Creative Co-Design workshops content and delivery.

Chapter 9   Phase 3 Creative Co-Design prototype development.

Chapter 10   Discussion and conclusions.

Chapter 2
Background

2.1 Outline of the chapter

In this chapter I provide the background to this thesis.

- I define Knowledge Mobilisation and Creative Co-Design both in relation to the current healthcare literature and then more specifically for the purposes of this thesis.
- I briefly introduce 'Design' and its role in this study.
- I present the problem of Knowledge Mobilisation within the MSK physiotherapy context.
- I discuss previous research in the area of Knowledge Mobilisation and MSK physiotherapy and specific Knowledge Mobilisation tools and products that have already been developed.
- I introduce the field of developing complex interventions and the place of Creative Co-Design within it.
- I highlight gaps in the literature and the justification for this research.

2.2 Defining Knowledge Mobilisation and related terms

I introduced the concept of Knowledge Mobilisation in healthcare in Chapter 1. I highlighted how it is sometimes used as an umbrella term for knowledge sharing and use, and how the term Knowledge Translation is more commonly used in some clinical disciplines such as physiotherapy. In this next section I unpick the numerous related terms and their definitions to provide more clarity about the meaning of Knowledge Mobilisation and present what I mean when I use the term Knowledge Mobilisation in this thesis.

2.2.1 Knowledge

Definition of knowledge

Knowledge comes in different forms and, as Polanyi (1962) described it, can be explicit (codified/factual) or tacit (more difficult to articulate) (Ferlie *et al.*, 2012). In this thesis, the

concept of explicit and tacit knowledge is expanded to include, as Ward (2017) described as *'Aristotle's ancient distinction between episteme, techne and phronesis'*:

1) *'Scientific/Factual knowledge i.e., research findings, quality and performance data, population data and statistics and evaluation data'.*
2) *'Technical knowledge i.e., practical skills, experiences and expertise'.*
3) *'Practical wisdom i.e., professional judgements, values and beliefs'* (Ward, 2017 p.484).

The definition above recognises the importance of 'local knowledge'. That is, 'knowledge from practice' (technical and practical), not just 'knowledge for practice' (scientific/factual) (Melville-Richards *et al.*, 2019). This 'knowledge from practice' includes knowledge from professional knowledge producers such as researchers, from service providers such as health care professionals, from service users such as patients, as well as decision makers and programme and product developers (Ward, 2017; Melville-Richards *et al.*, 2019).

Knowledge is not just information

It is important to recognise that knowledge is different from information, even though they are often considered one and the same. Information such as data and statistics may be knowledge to those who produce them but not necessarily to those in receipt of them. This is important in the context of being able to use information and knowledge in practice. Information, such as data and statistics, needs to be interpreted in order for them to become knowledge to the recipient and so that knowledge can be applied in practice. Nonaka (1994) distinguishes between information and knowledge by emphasising how knowledge involves human action:

> "*Information is a flow of messages, while knowledge is created by that very flow of information, anchored in the beliefs and commitment of its holder. This understanding emphasizes that knowledge is essentially related to human action*." (Nonaka and Lewin, 1994, p.15).

As information needs to be turned into knowledge by those in receipt of it, and because this study is concerned with how physiotherapists engage with and use scientific and factual knowledge (research evidence) in practice alongside their technical and practical wisdom,

and that of their patients also, it is important to consider and define ways clinicians acquire and make sense of knowledge to use in practice.

Turning information into knowledge

One of the ways that information is turned into knowledge is 'clinical mindlines' (Gabbay and Le May, 2004). It is important to consider clinical mindlines here in this PhD thesis because, as has been already indicated in the previous chapter, there is a tension between Evidence Based Healthcare and Knowledge Mobilisation which Gabbay and Le May's work explored (Gabbay and Le May, 2004). They undertook an ethnographic study of primary care teams to try and understand "*the mismatch between the rational linear, scientific approach to evidence based health care and the pragmatic, workable approach demanded by the messy world of practice.*" (Gabbay and Le May, 2011, p.5).

Gabbay and Le May's (2004) work is relevant for MSK physiotherapy practice. The MSK physiotherapy literature (to be discussed in section 2.5) tends to focus on the scientific approach to Evidence Based Practice or Healthcare. However, from my experience MSK physiotherapists do take a more pragmatic approach in their practice. Physiotherapists gather and weigh up information from different sources and skilfully choose, or clinically reason, which knowledge to apply and how, in a specific patient context. This is so the information relayed can be assimilated as knowledge by patients. Gabbay and Le May have called this internal gathering and weighing 'mindlines' (Gabbay and Le May, 2004; 2011, 2016). They found that 'communities of practice' were an important source of information and information sharing (Gabbay and Le May 2023., Le May, 2008; Kislov, Walshe and Harvey, 2012; Swaithes *et al.*, 2023,). In this doctoral research, a community of practice would be a group of MSK physiotherapists.

2.2.2 Knowledge Mobilisation

Knowledge Mobilisation is the term used to describe ways of enabling the active, collaborative, and interactional use of knowledge in clinical practice and in this thesis specifically MSK physiotherapy practice. The term 'to mobilise' is defined in the dictionary as: to assemble, organise or adapt for action (Collins Dictionary 2020). This implies movement and processes that are not necessarily linear, may be multi-directional, and most

importantly indicate active use. Knowledge Mobilisation, for the purpose of this PhD, is defined as:

> *The fluid, multi-directional process of moving knowledge to where it can be most useful* (Ward, 2017)*. It encompasses a range of active approaches that encourage the creation, sharing and use of knowledge that is not exclusively research-informed* (Powell, Davies and Nutley, 2017)*. It is an iterative, collective endeavour between knowledge producers and knowledge users* (Melville-Richards *et al.*, 2019) *that attends to context and can occur on various levels including personal, team, and organisational* (Langley *et al.*, 2018).

2.2.3 Alternative terms to Knowledge Mobilisation

In the academic literature, and in particular healthcare literature, there are a number of other related terms used in this field. These include knowledge translation, utilisation, exchange, transfer and implementation. The UK's NIHR acknowledge that Knowledge Mobilisation can include some of these other activities within it, such as dissemination, transfer and translation of knowledge (NIHR, 2020a) It can be confusing because these terms are often used to mean the same thing. I will now go on to define some of these other commonly used terms to help demonstrate why Knowledge Mobilisation is the term of choice in this thesis.

Knowledge Translation

The term knowledge translation has been more frequently used than Knowledge Mobilisation in the healthcare literature and especially in relation to Allied Health Professions (AHP's) (Scott *et al.*, 2012; Jones *et al.*, 2015; Bérubé *et al.*, 2018; Hitch *et al.*, 2019). The term 'to translate' is defined in the dictionary as '*to explain in terms that are more easily understood*' (Collins dictionary, 2020). This implies a passive, one-way, transactional process of turning something - in this case knowledge or evidence - into something else that is easier to digest by the recipient. However, in the literature, knowledge translation is often not described in this simplistic way. The Canadian Institutes of Health Research define it as:

> "*a dynamic and iterative process that includes the synthesis, dissemination, exchange and ethically sound application of knowledge to improve health, provide more effective health services and products and strengthen the healthcare system.*"
> (Straus, Tetroe and Graham, 2009, p.165)

This definition has similarities to Knowledge Mobilisation as described earlier. Therefore, it could be argued that Knowledge Mobilisation and knowledge translation mean the same thing, and often in the literature this is the case. Both can be considered to be non-linear, active approaches to accessing, understanding and applying knowledge in practice. However, translation is often used to describe a simple, rational, transactional process to aid the use of explicit knowledge, for example guideline use, in practice. Given that decision making in health is rarely rational nor context free (Greenhalgh and Wieringa, 2011), I favour the term Knowledge Mobilisation in this thesis because it implies a messier, multi-layered, context specific, collaborative process.

Knowledge Utilisation

Knowledge utilisation is another term used to describe the use of knowledge in practice. It has been described as the process by which specific research-based knowledge is implemented in practice. It can be considered: 1. Conceptual, in that it influences the way a person thinks but not necessarily acts; 2. Instrumental, where the knowledge has to be turned into a usable form or material, for example a research guideline or protocol; or 3. Symbolic, as a political tool to influence policies and decisions (Estabrooks, Wallin and Milner, 2003; Diehr and Gueldenberg, 2017). The term indicates an active, unidirectional, transactional use of explicit knowledge only.

Knowledge Exchange and Transfer

Knowledge Exchange is yet another term used frequently in the literature. It can be thought of as part of the knowledge-to-practice field, i.e., the lack of exchange of knowledge, and a component of the Knowledge Mobilisation or translation process (Ward *et al.*, 2012). Simplistically it can be considered to come after knowledge generation but before translation, in its literal sense, and implementation. It can be considered a two way, interactional process between knowledge producers and users (Rushmer *et al.*, 2019) but where knowledge is a product to be passed between each other, i.e. a transactional action.

Knowledge transfer in contrast has been described as:

"*a one-way process: researchers produce new knowledge, which gets disseminated to end users, and then incorporated into policy and practice*" (Holmes *et al.*, 2016, p.3).

Again, this implies a transactional action where knowledge users are the passive recipients of the produced knowledge. It does not have the active, interactional, collaborative component that I consider important to mobilise knowledge.

Diffusion and Dissemination

In contrast to Knowledge Mobilisation, 'diffusion and dissemination' can be considered more unidirectional, transactional approaches to knowledge spread. Diffusion can be described as the unintentional spread of knowledge from knowledge producer to knowledge user, whereas dissemination is intentional (Greenhalgh *et al*, 2004; Nilsen, 2015). In both these terms the knowledge user is usually a passive recipient in the process which is not the case in Knowledge Mobilisation.

Implementation

Lastly, but perhaps most importantly is 'implementation' which has been defined by Greenhalgh et al (2004) as:

> *''active and planned efforts to mainstream an innovation within an organization''*
> *(*Greenhalgh *et al*., 2004, p. 582*)*

It could be argued that Knowledge Mobilisation and implementation are the same thing. Implementation however relies on there being a definitive product, intervention or 'innovation' to implement. Implementation could therefore be considered as the final stage of the Knowledge Mobilisation process after all the different types of knowledge have been shared and collaboratively transformed into a practical (implementation) intervention ready for use (Bauer *et al.*, 2015).

2.2.4 Knowledge Mobilisation versus Evidence Based Medicine

'Evidence Based Medicine' or 'Evidence Based Healthcare' are commonly used terms to describe the evidence into practice movement and they are used often in physiotherapy practice. These terms tend to focus on a positivist view of the use of explicit, scientific research knowledge that is immediately ready to be used easily in practice. This is despite

Sacket et al's 1996 definition including the use of technical knowledge and practical wisdom (Greenhalgh, 2018). Sackett et al (1996) state that Evidence Based Medicine requires:

> ''a bottom up approach that integrates the best external evidence with individual clinical expertise and patients' choice'' (Sackett et al., 1996, p. 72)

This original definition appears to fit within the broader Knowledge Mobilisation stance. However, in healthcare research and practice this is often not the reality. A top-down approach is often taken as per the hierarchy of evidence (Greenhalgh, 2018). As it has become increasingly evident that the use of evidence in practice is not a straightforward, linear, rational process the field of Knowledge Mobilisation (or translation) has emerged (Greenhalgh, 2018).

The Knowledge Mobilisation Continuum

 Figure 3 attempts to depict the messy reality of Knowledge Mobilisation and the related terms discussed and defined in this section. It visualises Knowledge Mobilisation as a continuum, from knowledge generation through to implementation, and situates the related terms in relation to whether they are more active or passive and transactional or interactional processes.

Figure 3 The Knowledge Mobilisation continuum and associated terms
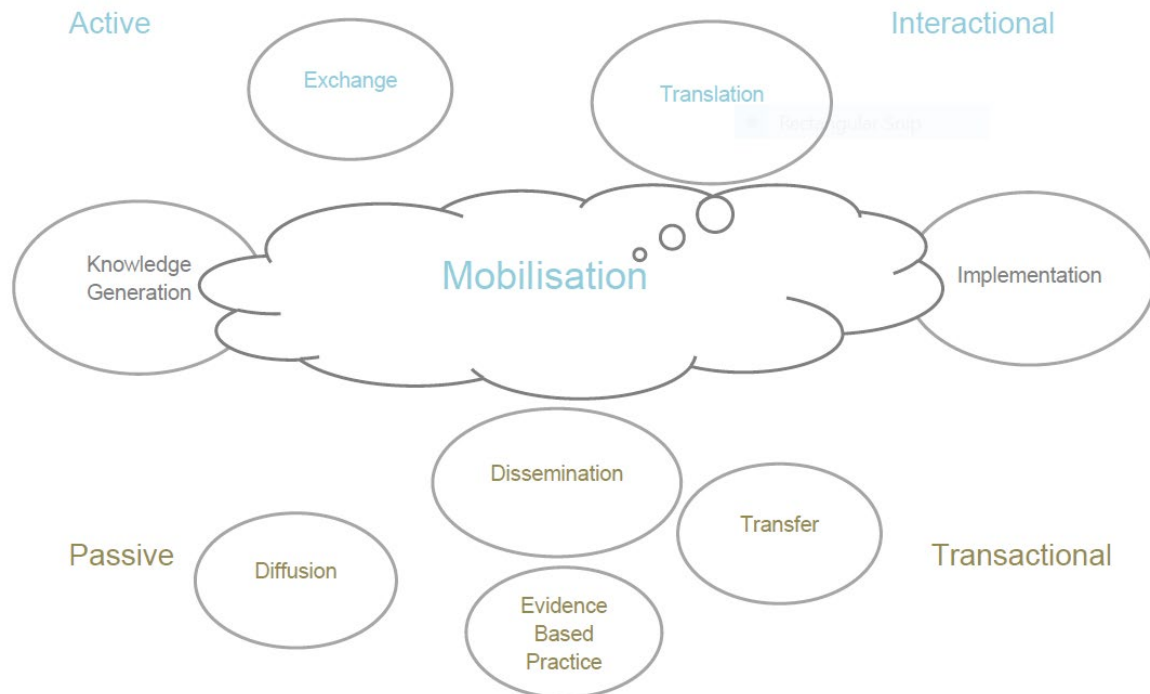
2.2.5 The use of the terms evidence, knowledge and information throughout this PhD

I have explained in Chapter 1 how the language I use in this thesis changes during the different phases of my primary research. I switch between the terms evidence, knowledge and information frequently depending on who is involved in order to make sure the purpose of the phase or activities are clear to those undertaking them.

So, although I am studying the whole scope of Knowledge Mobilisation, rather than Evidence Based Practice per se in this thesis, I used language associated with Evidence Based Practice in my primary research. This was because the term Evidence Based Practice is more commonly used in physiotherapy practice rather than Knowledge Mobilisation. I did however address the whole territory of Knowledge Mobilisation in the primary research Phases 2 and 3 even though I had to use Evidence Based Practice language.

2.3 Creative Co-Design and related terms and approaches

2.3.1 Collaborative and participatory approaches to research

The drive for more collaborative and participatory approaches to healthcare research and service improvement has arisen due to a shift in thinking over recent years. It is now thought that involving those who research findings impact upon, in the research process, taking into account their local knowledge and context, will lead to more relevant, implementable and impactful research, and enable the Knowledge Mobilisation process (Greenhalgh *et al.*, 2016; Locock and Boaz, 2019). This alternative way of thinking has grown from Gibbons et als (1994 & 2000) work related to 'mode 1' and 'mode 2' knowledge production (Gibbons *et al*, 1994; Gibbons, 2000). Mode 1 research or knowledge production is considered to be where problems are identified and solved by academics within a given speciality (Gibbons, 2000). Scientists are regarded as the '*holders of privileged expert knowledge'* that the public are to be '*enlightened or educated'* by in a one-way process of communication (Gibbons, 1994). This type of research and knowledge production is typically produced through rigorous and robust methods in order to produce reliable but context free results (Gibbons, 2000). That is research that has been generated by academics in universities, their findings published in journals, in the hope that clinicians will read them and change practice accordingly (Greenhalgh *et al.*, 2016). This pipeline approach to generating evidence to be used in practice is being challenged because the use of evidence in healthcare is now known not to be a straightforward linear, rational process (Powell, Davies and Nutley, 2017). In contrast mode 2 research or knowledge production is a more open, fluid, interactive and applied process, where '*science meets the public'* (Gibbons, 2000). It embraces heterogeneity of knowledge and skills and flattens hierarchies (Gibbons, 2000). Mode 2 knowledge production reflects the complexity and uncertainty of society and in doing so produces context specific knowledge and solutions (Gibbons. 2000) This feels more akin to Knowledge Mobilisation and the realities of healthcare practice.

It is well reported that health services are complex systems that are made up of interconnected components that all influence each other. This means a change in one area is likely to affect another, often in unpredictable ways (Rushmer *et al.*, 2019). Mode 1 research is therefore not always appropriate because findings from this type of research are

not always applicable to real world situations and the complex systems in which clinicians work. It is also known that changing people's behaviour and practice is difficult (NICE, 2014; NHSE and PHE, 2016). Therefore, it can take years for widespread change and implementation of new findings to occur (Greenhalgh *et al.*, 2016; Greenhalgh, 2018).

As already highlighted in Chapter 1, the move to involve people (mainly patients and the public) in research has generated a complicated landscape of terms that involve and engage patients, the public, and clinicians in varying degrees and in varying stages of the research process (Locock and Boaz, 2019). Involving patients and clinicians in research or service improvement is challenging and sometimes considered to be tokenistic (Locock and Boaz 2019). Social hierarchies exist which often means not all knowledge is valued and considered equally in the research process (Farr 2018). Collaborative and participatory approaches have become popular to try and address these imbalances within healthcare research. This has given rise to an increase in the use of 'Co' approaches within the healthcare research arena. The confusing plethora of terms and techniques used makes it difficult to assess the quality of these approaches and sometimes it seems the approaches being used are not even 'Co' at all (Williams *et al.*, 2020; B. Smith *et al.*, 2022). This has prompted calls for more clarity in what defines 'Co' approaches and how they are reported in the literature (Clarke *et al.*, 2017; Slattery, Saeri and Bragge, 2020; Langley *et al.*, 2022). It is now acknowledged that trying to provide clear, unanimously agreed definitions may be counterproductive and even divisive (B. Smith *et al.*, 2022; H. Smith *et al.*, 2022; Langley *et al.*, 2022). However, in order to provide clarity it is important for this PhD thesis that I define the 'Co' approach - Creative Co-Design - that I will use in this study, in terms of what it means to me and why I have chosen to use it over other 'Co' approaches commonly used in healthcare research.

The next section of the thesis will therefore define and distinguish between some of these collaborative and participatory terms used so it is clear which of these approaches is utilised and why in this thesis. I will start by describing Co-Production, and common associated terms, as Co-Production is the term that seems to have the most traction in the healthcare literature. I will then go on to define some of the other participatory and collaborative terms and approaches that are frequently used in the healthcare literature including Co-Design

and Co-Creation. I will finish this section by defining the Creative Co-Design approach I will use in this thesis.

2.3.2 Co-Production and associated terms

Co-Production as a concept has been gaining popularity in healthcare research and service improvement and is the term most frequently seen in the literature. Co-Production is also often used interchangeably with Co-Design. Co-Production itself has its roots in the public service domain rather than the health research domain. This meant, from a public services perspective, that the people who did not work in a service or organisation i.e., the public, users or consumers of goods and services, were given a say about how these were developed (Ostrom, 1996). In this context it was considered part of the implementation phase of public service or goods development (Voorberg, Bekkers and Tummers, 2014).

Public services can include healthcare provided by the NHS. However, the term 'Co-Production' is used differently in this context. In the health and social care literature, Co-Production has been described as happening at different stages of the research process, not just at the output or implementation end of a project. For the purposes of this thesis, it is defined in more general terms as:

> *the moral and pragmatic* (Wolstenholme, Kidd and Swift, 2019) *bringing together of diverse forms of expertise* (Durose *et al.*, 2017) *in the form of people who generate, give and receive service, products or knowledge, to work together in an equal and reciprocal partnership* (Boyle *et al.*, 2013; NIHR, 2019; SCIE, 2015) *to achieve shared goals by making a tangible object or product(s) such as actionable tools and objects together, in context, that contribute to the likelihood of uptake and use* (Langley *et al.*, 2018)*.*

I have already described in the introduction how creativity and Design are important aspects to me and the Co- approach I have chosen to use in this study. Co-Production, as defined above and in the healthcare literature, rarely involves creativity or a Designer in the development and facilitation of Co-Production activities even though creativity is considered an important aspect of Co-Production and Co-Creation (Greenhalgh *et al.*, 2016; Langley *et al.*, 2018, 2022; Robert *et al.*, 2022). I therefore did not choose to use Co-Production in this thesis.

Co-production versus Patient and Public Involvement and Engagement

In the UK, the Co-Production of healthcare research from defining the research question, collecting data, through to dissemination of findings is encouraged (NIHR, 2019). This has evolved from the Patient and Public Involvement and Engagement (PPIE) in research agenda. The PPIE in research movement in the UK has focused mainly on involvement of service users, as in the past patients had rarely been involved in decisions about research. PPIE has been criticised for being tokenistic and using 'top down' approaches, such as consultation, where power hierarchies still exist and true partnerships are not developed (Madden *et al.*, 2020; Nguyen *et al.*, 2020). Therefore, in order to improve and evolve the public involvement agenda the adoption of Co-Production principles has been encouraged (NIHR, 2019; Madden *et al.*, 2020). I use PPIE in the form of an Advisory Group rather than Co-producing the entire research in this PhD.

Integrated Knowledge Translation

A similar approach to the UK's NIHR Co-Production of research model is Canada's Integrated Knowledge Translation (IKT). IKT was developed over a decade ago by the Canadian Institute of Health Research. Kothari et al.'s (2017) definition of IKT (or research Co-Production) is:

> "*a model of collaborative research, where researchers work with knowledge users who identify a problem and have the authority to implement the research recommendations*" (Kothari *et al.*, 2017, *para. 1*).

It involves researchers and knowledge users (clinicians, patients and families) and other stakeholders (such as managers and policy makers) as equal partners throughout the research process including research question identification, governance and conduct of research (Graham *et al.*, 2018; Graham *et al.*, 2019).

The involvement of policy makers and managers in this approach is considered important due to the influence they can have on implementation (Nguyen *et al.*, 2020). However, I do not use this term for the same reasons as Co-Production.

Participatory Action Research

Participatory Action Research (PAR), or Community Based Participatory Research also shares the features of equality, power sharing and placing value on local experiential knowledge that are common to Co-Production and Co-Design (Jull *et al.*, 2017). However, as an approach it draws upon more traditional investigative research methods rather than the generative 'making' methods used in Design Research, so I chose not to use it in this study. PAR has been defined as:

> "*focusing on social change that promotes democracy and challenges inequality; is context-specific, often targeted on the needs of a particular group; is an iterative cycle of research, action and reflection; and often seeks to 'liberate' participants to have a greater awareness of their situation in order to take action. PAR uses a range of different methods, both qualitative and quantitative.*" (Institute of Development studies, 2020).

2.3.3 Co-Design and associated terms

Co-Design is the term used in this thesis. In general terms, Co-Design can be defined as 'to plan the form, structure, details and features of something (i.e., a tangible object) jointly or in partnership' (Collins dictionary, 2020). In the academic literature there are differences in how it is described and this tends to be dependent on the area of research in which it is discussed.

The Origins of Co-Design

As its name implies, Co-Design's origins lie in the world of Design, specifically Participatory Design which originates from Scandinavia (Spinuzzi, 2005). Participatory Design can be defined as:

> "*a process of investigating, understanding, reflecting upon, establishing, developing and supporting mutual learning between multiple participants in collective 'reflection-in-action'.* (Schon, 1983 quoted in Simonsen and Robertson, 2013, p.2)

> *'' The participants typically undertake the two principal roles of users and designers where the designers strive to learn the realities of the users' situation while the users strive to articulate their desired aims and learn appropriate technological means to obtain them."* (Simonsen and Robertson 2013, p.2)

'Genuine' participation is paramount. This means moving from "*users merely as informants to be legitimate acknowledged participants in the design process.*" (Simonsen and Robertson, 2013, p.5). That is, not just answering questions in an interview about their point of view or knowledge of a particular issue but getting involved together in the 'making' or drawing of something that represents their perspective (Simonsen and Robertson, 2013). Participatory Design, as opposed to participatory research, generally has three stages that include exploration and discovery processes, and then prototyping which involves Design Researchers and users working together in varying degrees (Spinuzzi, 2005). As Participatory Design has moved away from 'user as subject' to 'user as partner' it has become more commonly termed 'Co-Design' which is described by Sanders and Stappers (2008) as:

> "*a creative endeavour of designers and people not trained in design working together in the design developmental process*" (Sanders and Stappers, 2008, p.6)

and where:

> "*the person who will eventually be served through the design process is given the position of expert of their experience and play a large role in knowledge development, idea generation and concept development*" (Sanders and Stappers, 2008, p.12)

The role the Designer plays in the Co-Design process in this context is considered important, providing participants with tools for ideation and expression (Sanders and Stappers, 2008). These tools can include creative activities such as journey and emotional mapping, story boards and personas (Langley *et al.*, 2018; Wolstenholme *et al.*, 2019). However, in the healthcare research and service improvement setting, undertaking Co-Design involving Designers is yet to become common practice and is the reason why I chose not to use the term Co-Design alone in this thesis.

In contrast to this Design perspective, in the public services domain, where Co-Production has its historical roots, Co-Design has been described as occurring at a specific stage of the service or product development process rather than the whole process itself. Voorberg et al (2014) describe Co-Design to be the involvement of citizens in the Design of the content of a service and the processes required to successfully deliver it (Voorberg, Bekkers and Tummers, 2014). That is, in Voorberg et al's (2014) definition of Co-Design, citizens are not involved in the earlier decisions about what will be designed.

2.3.4 Different types of Co-Design

I have already explained how Co-Design originates from Participatory Design which is rooted in Design practice, and how Designers or Design based tools do not always feature when Co-Design is used in healthcare research. There are however other specific types of Co-Design or Design-based collaborative approaches being used in the healthcare research and service improvement arena. Next, I describe two of these approaches: Experience Based Co-Design and User Centred (or Human Centred) Design

Experience Based Co-Design

Experience-Based Co-Design (EBCD) has become popular as a Participatory Action Research approach to healthcare service improvement (Robert & Macdonald, 2017). EBCD was developed from an Experience-Based Design perspective and also focuses on Co-Designing with, rather than for, users (Bate and Robert, 2006). It has a readily available tool kit with step-by-step instructions to enable researchers, service users, and health care practitioners to plan and carry out their own EBCD project. In brief, EBCD entails gathering patient experiences through in-depth interviewing, observations, group work and discussions, and then creating a short film based on the patient experience data. These 'trigger' films are then shown to staff and patients who work together in small groups to identify and propose solutions that will improve the service or care pathway. (The Point of Care Foundation, 2023).

User Centred Design

User Centred Design (UCD) is another approach commonly seen in the healthcare literature. It originated mainly from the USA and tends to be researcher rather than Design led (Sanders, 2006; Sanders and Stappers, 2008; Sanders and Stappers, 2012). UCD can be more inclined to focus on 'user as subject' compared to 'user as partner' in Participatory or Co-Design (Sanders and Stappers, 2008). It values users' experiential knowledge and considers it at all stages of the Design process. This helps identify what works well and what does not work well early in the process to ensure outputs are context-specific, usable and accessible. Sanders and Stappers (2012) suggest it uses more traditional research, rather than Design Research, including methods such as surveys, interviews and observations (Sanders and Stappers, 2012). That is, it focuses on what people 'say' and 'do' rather than the generative

'making' approaches more commonly used in Design Research (Sanders and Stappers, 2012).

It could be argued that, unlike Participatory and Co-Design, User Centred Design does not foster 'genuine' participation and users are seen more as informants giving their views on their needs and experiences rather than getting engaged in the Design activities themselves (Simonsen and Robertson, 2013). In the healthcare literature however, as with Co-Design approaches, this is not always the case, nor does everyone hold the same view, and some would consider that UCD incorporates a mixture of traditional research investigative methods and generative tools (Interaction Design Foundation,2016).

Co-Creation

Finally, Co-Creation is another term commonly used interchangeably with Co-Design in health research. Co-Creation is defined in the dictionary as 'to jointly cause something to come into being, to evolve from one's own thoughts or imagination, as a work of art or invention' (Collins dictionary 2020). From a public service perspective, Co-Creation can be considered to take place at the initiation of ideas and design phase of a service or product (Voorberg, Bekkers and Tummers, 2014), distinguishing it from Co-Production but overlapping with some elements of Co-Design.

From an academic perspective it is considered as a 'mode 2' method of knowledge generation (described earlier in 2.3.1). Greenhalgh and colleagues describe it as a creative enterprise, where academics and stakeholders work together taking a systems approach, i.e., considering all aspects of the health system and how changes in one part of the system will have a knock on effect on other components of the system, to improve human experience (Greenhalgh *et al.*, 2016). The difference between Co-Creation and Co-Design could be considered to be that Co-Design focuses on not only the generation of new ideas but also in turning those ideas into a tangible, practical product, intervention or actionable tool ready to be used. I wanted to develop tangible prototype solutions not just ideas in this study therefore Co-Creation was not used.

2.3.5 Creative Co-Design

In this PhD study the Design aspect of Co-Design is important. This is because of my specific Co-Design experience working alongside a Design Researcher outlined in Chapter 1. So, in this thesis I call the Co-Design that I use Creative Co-Design, as per the approach I used in my previous role (Wolstenholme *et al*., 2019; Grindell *et al.*, 2022), but also to clearly differentiate it from other approaches to Co-Design used in the healthcare literature that do not usually involve a Designer or Design Researcher or draw upon Design tools and techniques. I define Creative Co-Design using a mixture of Design and healthcare literature as:

> *a process where the people who will eventually be served through the design process* (Sanders and Stappers, 2008) *are brought together as equal partners, where their experience and expertise is equally valued* (NCOSS, 2017; Langley *et al.*, 2018). *They are led, ideally by a design researcher, and empowered together through a solutions-focused and creative process* (Sanders and Stappers, 2008; NCOSS, 2017; Langley *et al.*, 2018) *that captures and shares experiences, knowledge (explicit and tacit), habits and behaviours and generate ideas that are prioritised and agreed on together to inform the design and development of a contextually specific tangible prototype, such as actionable tools and objects* (Langley *et al.*, 2018).

I chose it over the other Co-Design approaches described in this section because it uses a set of Design tools and generative 'making' activities to engage participants rather than traditional extractive methods, such as surveys or interviews, that are often used, for example, in User Centred Design. Also, in Creative Co-Design the type of generative activities used during the different phases of the process vary depending on the topic to be explored. This is to ensure the right problem is defined in the first place in order to develop the right solution(s). This is different to EBCD where there is a specified toolkit and process to follow.

Finally in Creative Co-Design, the solutions are delivered as prototypes that can be tested in the clinical environment (Design Council, 2020). The involvement of Designers throughout the whole, iterative process means real time synthesis and visualisations of participants' thoughts and ideas can occur and they can then develop tangible prototypes that represent the collective ideas of the group (Langley *et al.,* 2018).

The Creative Co-Design approach used in this PhD can therefore be thought of as 'Designerly' or 'Design led', as opposed to EBCD which has been described as 'Design like', that, is led by non-designers but based on Design tools and thinking (Robert & Macdonald, 2017; Robert *et al.*, 2022).

2.3.6 Disentangling the 'Cobiquities'

Co-Design, Co-Production, and Co-Creation overlap. In public service research, they are sometimes visualised along a continuum (Voorberg, Bekkers and Tummers, 2014). This would start with Co-Creation as the initial ideation phase, Co-Design as the middle ideation to prototype development phase, and Co-Production as the final product development and implementation phase, similar to Co-Producing an entire research project. See figure 4. However, in healthcare research, the three terms are often used interchangeably and undistinguished (Williams *et al.*, 2020; B. Smith *et al.*, 2022; Masterson *et al.*, 2022). In this thesis I am not Co-Designing the whole PhD study. I use the term Creative Co-Design because I am interested in both ideation and prototype solution development as a creative endeavour involving a Design Researcher in the process.

Figure 4 The public Services Co-Production Continuum
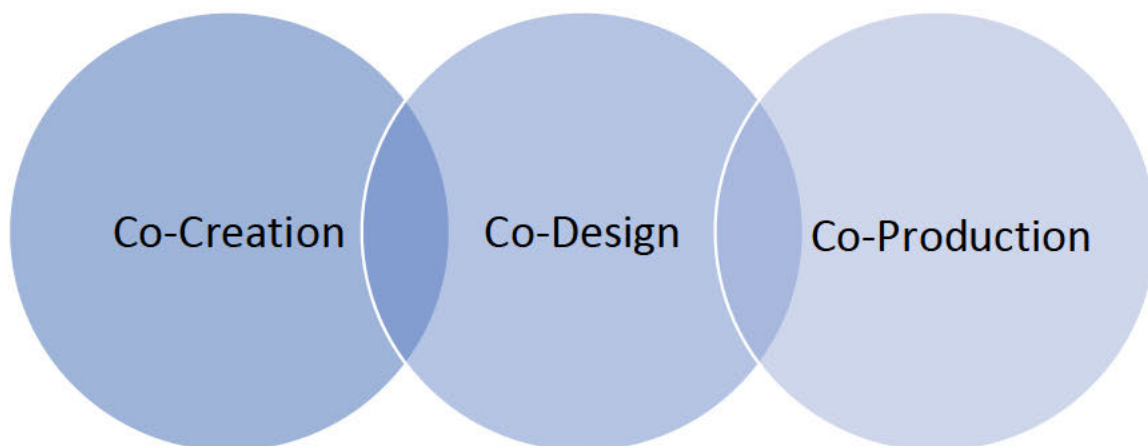
2.4 Design and Design in health

The use of a Design Researcher and methods drawn from Design play an important role in Creative Co-Design. This next section describes Design practice and Design in health.

<u>What is Design</u>

Greenhalgh et al (2016) have described Design as *'part art and part science'* which requires *'imagination, exploration, field testing, and reflection on emerging data to move from idea to prototype to the refined output (product, process, or service)'* (Greenhalgh *et al.*, 2016, p.406). Langley et al (2018) describe Design as, '*both a practice and a process*'. That is*, 'as a practice it is something everybody can do',* but it is also *'a professional practice where those with training and extensive application gain considerable knowledge, skills and experience'* (Langley *et al.*, 2018, p.3)*.* From a Design process perspective, it is an *'approach to problem solving that is human centred and collaborative'* (Langley *et al.*, 2018, p.3; Drew, Robinson and Winhall, 2020; Design Council, 2020)*.* Langley et al (2018) state that although Design is often user centred, it does not always involve end users in the process. It is therefore different to participatory or Co-Design (Langley *et al* 2018). One of the key characteristics of Design is that it makes ideas tangible through *'creative acts of making'* (Sanders and Stappers 2014, p.6) and prototyping is often seen as a key component of Design practice (Langley *et al.,* 2018; Drew, Robinson and Winhall, 2020; Design Council, 2020). Prototyping has many functions which include communicating and testing ideas to quickly learn what will and won't work in practice and represent the first or early form of these ideas or products (Stickdorn *et al*., 2018, Sanders and Stappers, 2012; Langley *et al.*, 2022). It was therefore important to me that I had someone who was trained in Design and had the skills required to make ideas tangible involved in my PhD study.

<u>Design in health</u>

It has been recognised that Design and Design thinking are needed in health and there has been an increasing trend for the use of Design in healthcare over the past decade and more (Micsinszki *et al.*, 2022). People are living longer with often complex and multiple long term conditions. Therefore, new ways of delivering healthcare are needed (WHO, 2002; Pearson-Stuttard, Ezzati and Gregg, 2019; Watt *et al*., 2023). Design, which is a solution focused approach to problem solving (Design Council, 2020), is thought to be well suited to tackle

the complex, ill defined, or 'wicked' problems that healthcare poses (Chamberlain *et al* 2015; Drew, Robinson and Winhall, 2020). This is because Design practice tends to embrace messiness, intuition and uncertainty (Design Council, 2020). Designers have been described as possessing an un-tangible set of skills often termed the 'designer mindset' (Design Council, 2020). This mindset means that they are often more comfortable taking risks, dealing with ambiguity and change and have confidence in their own creative abilities (Design Council, 2020). This is often in contrast with other professions such as academics and healthcare professionals.

Design thinking and methods are often considered to be a toolbox of approaches and activities that anyone can use (Johansson-Sköldberg, Woodilla and Çetinkaya, 2013; Robert *et al.*, 2022). However, it can be argued that without professional training in Design people will not possess the knowledge, skills and competence to know when and which Design tools to use (Johansson-Sköldberg, Woodilla and Çetinkaya, 2013; Robert *et al.*, 2022).

Role of a Designer in this PhD

Therefore, the plan in this PhD study was to have a Design Researcher embedded in phase 3 – The Creative Co-Design workshops and prototype development. They would be working with me to help plan, develop and facilitate Creative Co-Design workshops and activities and develop initial prototype solutions. However due to circumstances beyond my control a Design Researcher was only 'embedded' in the early stages and not in final idea prioritisation and prototype development. A Graphic Designer, who had not been involved in the earlier Co-Design stages, produced the initial prototypes. The challenges and benefits of these two different ways of working with Designers will be reflected upon in the discussion chapter of the thesis.

2.5 Musculoskeletal physiotherapy and Knowledge Mobilisation

I have discussed Knowledge Mobilisation in healthcare in general. In the next part of this chapter, I will focus on Knowledge Mobilisation in the context of MSK physiotherapy. I undertook a scoping search to locate relevant literature. I searched three databases: EMBASE and MEDLINE via OvidSP and CINHAL via EBSCO using the terms Knowledge Mobilisation and/or Translation, Evidence Based Practice and Musculoskeletal

Physiotherapy between the years 1990 to 2020. I chose to go back as far as 1990 as it was during this decade that Sackett et al's (1996) seminal paper on Evidence Based Medicine was published in the British Medical Journal (Sackett *et al.*, 1996) and the Evidence Based Practice movement really started to gain traction in the physiotherapy world. I included knowledge translation, as well as mobilisation in my search as I was aware that knowledge translation seemed to be the more prevalent term in the physiotherapy and Allied Health Professional literature (AHP) (Bérubé *et al.*, 2018; Hitch *et al.*, 2019). I then updated this search in 2023. I focused on systematic reviews initially but also extended this to primary research that was not included in these.

2.5.1 Evidence Based Practice vs. Knowledge Mobilisation in MSK physiotherapy

Research into MSK health is increasing at significant pace and although the literature suggests physiotherapists are generally positively embracing this (Scurlock-Evans, Upton and Upton, 2014; Zadro, O'keeffe and Maher, 2019), it can be difficult for physiotherapists to keep abreast of this ever expanding evidence base (Bérubé *et al.*, 2018). The amount of MSK research, coupled with the fact that physiotherapy interventions can be considered complex and therefore not always suitable to be evaluated by the 'gold standard' randomised controlled trial, means that research evidence is often lacking for some conditions and interventions (Hitch *et al.*, 2019; Zadro, O'keeffe and Maher, 2019). Even when rigorously evaluated Evidence Based Interventions do exist it is recognised that implementing and sustaining them into routine clinical practice is challenging (Walker *et al*. 2020 & 2022).

I have already defined Knowledge Mobilisation earlier in this chapter and how it is a non-linear, collaborative process in contrast to the top down, more linear approach of Evidence Based Practice (Boaz *et al.*, 2019). The CSP MSK physiotherapy service standards state that, '*Evidence Based Practice is the integration of best research evidence, individual clinical expertise and patient choice'* (CSP, 2021, p.52). Despite this, they do not include experience, that of MSK physiotherapists or their patients, in their definition of best practice. They state that: *'Best research evidence includes NICE clinical guidelines, SIGN clinical guidance, systematic reviews and studies using methods such as randomised controlled trials, observational studies, cost benefit analyses and qualitative investigations'* (CSP, 2021, p.17)*.* This is reflected in the physiotherapy literature which also appears to focus on the use of

formal evidence such as guidelines and takes a more positivist Evidence Based Medicine approach rather than a broader Knowledge Mobilisation stance.

This has stemmed from the traditional medical model of patient care where patients are passive recipients to be 'fixed' by medical interventions such as medication and surgery rather than being active participants in the management of their own health (Lewis *et al*., 2020). As the healthcare landscape is changing, with a growing number of people suffering with chronic long term conditions, often exacerbated by lifestyle factors such as diet, inactivity, smoking and alcohol consumption (ONS, 2022), the traditional medical model of care is being challenged (Lewis and O'Sullivan, 2018; Lewis *et al*., 2020). This calls for a move in the way physiotherapists consider evidence and the implementation of it to encompass a Knowledge Mobilisation approach that considers and values wider bodies of knowledge and people and their relationships within the process (Boaz *et al.,* 2019).

Whether clinicians do or do not follow evidence and guidelines in their practice has long been an area of interest within healthcare research. It is recognised that power actors or opinion leaders, such as consultants or senior colleagues, play a big part in whether evidence is used or not (Martin and Wiliams, 2019). There are also deep-seated issues surrounding attitudes, legitimacy and biases about certain sources of evidence which create an environment where people feel it is unacceptable to use other and perhaps more innovative forms of evidence to inform their practice (Gabbay and Le May, 2016; Martin and and Williams, 2019).In addition, the move to non-pharmacological and non-surgical interventions for managing MSK disorders, such as exercise which is often prescribed by physiotherapists, poses additional challenges to implementing Evidence Based Practice (Bérubé *et al.*, 2018; Zadro, O'keeffe and Maher, 2019; Lewis and O'Sullivan, 2018; Lewis *et al.*, 2020). This is because these types of interventions are often less explicitly described in the literature and guidelines (Bérubé *et al.*, 2018) and also because they do not always meet the expectations patients hold about physiotherapy (Lewis and O'Sullivan, 2018).

More recently it has been advocated that MSK physiotherapists should be utilising their *'mindlines not tramlines'* (Copeland, 2020, p.97). That is, not taking a simplistic and linear view of the Evidence-to-Practice problem and acknowledging that physiotherapists draw upon the many sources of evidence, knowledge and interactions that influence their

practice (Gabbay and Le May, 2004 2011, 2016, 2023) when making quick automatic decisions (Beenen *et al.*, 2018). This means a move away from the positivist certain and absolute nature of scientific fact to a more constructed and variable one (Beenen *et al.*, 2018). This includes a broader outlook on what informs best clinical practice such as, embracing more qualitative rather than just quantitative statistical evidence, focusing on individualised not standardised approaches to patient care, and becoming comfortable and accepting of clinical uncertainty (Anjum, Copeland and Rocca, 2020).

I am focusing on Knowledge Mobilisation in this PhD because it feels more relevant and useful to the current shift in MSK physiotherapy practice. However, this does not mean there is not useful learning to be gained from the large amount of work undertaken that focuses on Evidence Based Practice and MSK physiotherapy.

2.5.2 Facilitators and barriers to EBP in physiotherapy

Systematic reviews

A number of systematic reviews have explored the barriers and enablers to implementing Evidence Based Practice specific to physiotherapy (Paci *et al*., 2021, Mota da Silva *et al*., 2015, Scurlock -Evans, Upton and Upton, 2014, Zadro. O'Keefe, Maher, 2019). Two reviews (Scurlock-Evans, Upton and Upton, 2014, Zadro, O'Keefe, Maher, 2019) focused specifically on whether MSK physiotherapists in Australia follow evidence-based guidelines. Overall, the findings from several of these reviews indicated that the main barriers to Evidence-Based Practice for physiotherapists included: lack of time, lack of skills to interpret research, lack of generalisability of research findings, and lack of support and interest (Scurlock- Evans *et al*., 2014, Mota da Silva *et al*., 2015, Paci *et al.,* 2021). A further scoping review identified the use of professional networks rather than individual skills and highlighted shared decision-making as part of Evidence-Based Practice (Condon *et al.*, 2016). Most of these reviews were based on survey or audit data with very few including primary qualitative research.

Primary research

There have been a small number of recent studies using surveys and questionnaires that have investigated MSK physiotherapists use of Evidence Based Practice and guidelines for common conditions that they see, such as back, neck and subacromial pain (Bernhardsson and Larsson, 2019; Powell *et al.*, 2022). These studies have shown that the MSK physiotherapy Evidence Based Practice landscape is making positive steps. Both studies

showed that most physiotherapists were already managing their patients based on current evidence (Bernhardsson and Larsson, 2019; Powell *et al.*, 2022).

In contrast, most of the qualitative research related to physiotherapy and Evidence Based Practice in general was undertaken more than 10 years ago and did not focus on MSK physiotherapy (Barnard and Wiles, 2001; Hannes *et al.*, 2009; Dannapfel, Peolsson and Nilsen, 2013). Barnard and Wiles' (2001) study found that junior physiotherapists were more confident to critically appraise the literature (Barnard and Wiles, 2001). Hannes et al's (2009) study set in Belgium, highlighted physiotherapists' lack of autonomy to make decisions, inaccessibility and inapplicability of evidence, and patients' expectations as well as physiotherapists' motivation to be limiting factors to evidence use (Hannes *et al.*, 2009). Dannapfel et al's (2013) study found research use in physiotherapy practice to be influenced at different levels, both individual and organisational (Dannapfel, Peolsson and Nilsen, 2013). They found it to be both '*an interactive and interpretive social process*' demonstrating a Knowledge Mobilisation perspective to Evidence-Based Practice (Dannapfel, Peolsson and Nilsen, 2013).

A more recent qualitative study, published after the start of this PhD research, explored the specific issue of lack of time as a barrier to Evidence Based Practice (Stander, Grimmer and Brink, 2021). They found that the construct of time related to a number of different issues in terms of physiotherapists' readiness to use the best evidence in their practice. These issues included staffing levels and high patient load (Stander, Grimmer and Brink, 2021). It is worth noting that of these qualitative studies only one (Barnard and Wiles, 2001) was undertaken in the UK NHS. Access to physiotherapy and the level of autonomy of the profession may vary by healthcare system so international literature may not be directly transferable.

Another recent body of work, that was undertaken in the UK and published after this PhD started, has considered the issues related to implementing and sustaining a specific group based Evidence Based Intervention – ESCAPE-pain (Walker *et al.*, 2020, 2021, 2022). This work, which focuses on physiotherapists, managers and commissioners' perspectives, identified a number of factors that helped and hindered implementation into MSK physiotherapy practice. Facilitators included the importance of clinical champions to

spearhead the implementation process. That is, senior clinicians who support the operational staff as well as act as a bridge between these staff and higher management (Walker *et al.* 2022). How easily an intervention fits with current practice and the support of management also influenced implementation (Walker *et al*., 2022). In contrast managers focus on the importance of activity targets over patient outcomes was perceived to be a barrier to implementation and the Knowledge Mobilisation process (Walker *et al*. 2021).

Interestingly, a survey exploring evidence use within nursing and AHP's, including physiotherapists, was undertaken in the NHS Trust participating in this PhD. Although the response rate was low, the survey found barriers similar to those found in international studies including lack of time; difficulty accessing research findings; poor understanding of the evidence; and perceived lack of authorisation to implement change (Carroll, 2021).

2.5.3 Interventions to promote Knowledge Mobilisation in physiotherapy

Systematic reviews

'Knowledge translation' is the preferred term in the Allied Health Professional (AHP) literature. Several systematic reviews have investigated specific knowledge translation strategies within therapy rehabilitation, physiotherapy (Menon *et al.*, 2009; Jones et al., 2015; Stander, Grimmer and Brink, 2018) and more recently in MSK physiotherapy in primary care (Bérubé *et al.*, 2018). Menon et al's (2009) review found that several interactive multi component interventions were most successful in achieving improved knowledge and changes in physiotherapists' behaviours (Menon *et al.*, 2009). Examples of interventions included: interactive educational sessions, printed materials, opinion leaders and interactive discussions regarding critical appraisal of research and guidelines. In Jones et al's (2015) review, eighteen articles reported a mixture of multi-component and single component Knowledge Translation strategies amongst AHPs. They found education-related components to be the main knowledge translation intervention (Jones *et al*., 2015). However non-significant findings were reported for single knowledge translation interventions. such as local opinion leaders and audit and feedback. They concluded that translating knowledge into a clinical context is not a simple process but an interactional one where patients' and therapists' values should be considered (Jones *et al*., 2015). Stander et

al's (2018) review also identified that multi-faceted knowledge translation training programmes and those strategies that addressed local contextual issues were most effective (Stander *et al.*, 2018).

Finally, Berube et al (2018) carried out a systematic review that specifically focused on knowledge translation interventions within MSK physiotherapy. They identified professional knowledge translation interventions such as distribution of educational materials, educational meetings, local consensus processes, educational outreach visits, local opinion leaders, audit and feedback and reminders as well as patient-mediated interventions, marketing, and mass media campaigns (Berube *et al.*, 2018). Organisational interventions included revision of professional roles, clinical multidisciplinary teams, skill mix changes, communication, and case discussion between distant professions. (Bérubé *et al.*, 2018). Face-to-face continuing education courses of longer duration, including case studies and practical tools, reported positive outcomes compared to online courses or passive dissemination of information (Bérubé *et al.*, 2018). Overall, the findings suggested an increase in guideline awareness and knowledge only, with little to suggest any changes to practice or patient outcomes regardless of the type of intervention used (Bérubé *et al.*, 2018).

Primary research

My searches did not produce any research literature on Knowledge Mobilisation in MSK physiotherapy beyond what is reported in the systematic reviews above. However, one paper I was aware of, through a network of clinical academic knowledge mobilisers, was very relevant to my work. This recent ethnographic study explored knowledge sharing in long term condition self-management, although the focus was on people with renal, bowel or liver disorders not long term MSK conditions (Brand and Timmons,2021). In this qualitative study several interesting observations were found. First, although knowledge sharing was seen as important from both a health care professional and patient perspective, it seemed only the patients felt obliged to utilise the knowledge they were receiving, not vice versa (Brand *and* Timmons, 2021). Second, patients were more likely to share difficult knowledge and be more honest with the nursing staff than the medical doctors.

2.5.4 Interventions available for facilitating Knowledge Mobilisation in MSK physiotherapy

A number of interventions have been developed for the purposes of facilitating Knowledge Mobilisation in healthcare. Below are examples of some of these interventions including those specific to MSK physiotherapy.

In healthcare

A website has been developed, using a participatory Co-Design approach, by a GP in Oxford as part of a PhD study. The website, called GP EVIDENCE, provides '*summaries of the evidence on the benefits and harms of treatments for long term conditions'* specifically for GP's (GP Evidence*, 2023). It can be used as a quick reference guide by GP's during consultations and be used to aid the shared decision making process with patients. Critical Appraisal Topics (CAT's) were developed over 20 years ago by a group of AHP researchers at Keele University (Foster *et al.*, 2001; Keele University, 2023a). The purpose of CAT's is to assist primary care clinicians to provide the best evidence base treatments (Foster *et al.*, 2001; Keele University, 2023a). It is a process where clinical interest groups meet, develop clinically important questions, liaise with a librarian or information specialist who carries out a review and synthesis of the literature, and a clinical bottom line is developed and agreed upon to then inform clinical practice (Foster *et al.*, 2001; Keele University, 2023a). A more recently developed AHP Knowledge Mobilisation strategy is 'AHP2minutestalks' (Breckenridge *et al*., 2020). 'AHP2minutetalks' is a twitter group where AHPs including physiotherapists, can post video summaries of the latest research papers they have read. It was developed as part of a project involving AHP's and creative practitioners to develop knowledge products to improve dissemination of research for AHPs in Scotland (Breckenridge *et al*., 2020).

However, CATs and 'AHP2minutetalks' only deal with physiotherapists and AHPs acquisition of evidence and knowledge and not sharing or use of it with patients. 'GP Evidence' deals with knowledge acquisition and sharing, but its focus is on management of common conditions that present to a GP. Elements of this site may be useful for wider MSK physiotherapy practice and MSK physiotherapists in advanced roles, such as First Contact Practitioners in primary care, but its focus is not on MSK disorders nor is its target audience physiotherapists.

Keele's CATs (Foster *et al.*, 2001; Keele University, 2023a) have recently been used to identify the best evidence for using hydrotherapy as a physiotherapy intervention for MSK conditions. A focus group discussion with hydrotherapy clinical experts, including physiotherapists but not patients, was carried out to explore the barriers and facilitators to this knowledge being mobilised in practice. (Stevenson *et al.*, 2023). No Knowledge Mobilisation interventions were developed, perhaps indicating how the CATS process only addresses part of the whole Knowledge Mobilisation process.

Keele AHP researchers have also explored the 'model consultation' for Osteo-Arthritis (OA) in a primary care setting (Dziedzic *et al.*, 2018) and the more recent PEP-OA trial (Keele University, 2023b) included the development of an OA guide and animation with clinicians and patients. These resources are now available on their newly developed Keele.Health web-based information repository for patients and health care professionals to freely use (Keele University, 2023c). So far, despite there being evidence that this 'model consultation' including the Co-designed guide improved the uptake of the NICE guidance, there has been little evidence that it improves patients' outcomes (Dziedzic *et al.*, 2018). In addition, the Keele.Health information repository website was only launched after I had completed the primary research, Phases 2 and 3 of my PhD study.

Another Evidence Based Intervention developed specifically for OA is the ESCAPE -pain group rehabilitation programme (ESCAPE-pain.org, 2022). Although the intervention was not Co-designed with patients (Hurley *et al*., 2007), it has been the focus of Walker et al's recent body of MSK physiotherapy implementation work (Walker *et al.*, 2020, 2021, 2022). ESCAPE – pain has four core components which must be adhered to in order to ensure it is implemented with fidelity to achieve reproducible benefits (Walker *et al*.,2022). The four core components are: 1. Groups of up to 12 people attend two 90 minute sessions a week for six weeks; 2. The same cohort of people attend each six week program; 3. Each session is a mixture of education and exercise; 4. It is delivered by a trained facilitator who has attended the 1 day ESCAPE-pain training (ESCAPE-pain.org, 2022; Walker *et al.* 2021, 2022). In Walker et al's work the need to adhere to these components was found to be a potential barrier to implementation (Walker *et al*., 2021). This is because changes to the core components may inevitably need to be made to ensure the intervention is suitable for

practice in different contexts. However, it is suggested that any changes to the core components could lead to compromised fidelity and reduced quality of care (Walker *et al.,* 2021). This highlights a potential problem associated with implementing specific Evidence Based Interventions. That is, not considering or allowing for adaptations to be made to the intervention so it fits the different contexts within which it is to be implemented into.

From an international perspective a clinical translation framework has been developed by a team of physiotherapy researchers in Australia (Mitchell *et al*., 2018). Although specific to MSK physiotherapy the framework concentrates solely on providing guidance for physiotherapists clinical reasoning process and therefore only addresses part of the whole Knowledge Mobilisation process. In addition, a group of Canadian researchers used the Knowledge to Action cycle to develop and test the effectiveness of a tool kit for translating MSK exercise adherence principles into their clinical practice (Babatunde, MacDermid and MacIntyre, 2017). No patients, only physiotherapists were involved in its development.

Finally, prior to this PhD I had been involved in two MSK physiotherapy focused Co-Design projects, using the Creative Co-Design approach I use in this study. The first focused on implementing the NICE guidelines for obesity management in routine MSK physiotherapy practice. The second focused on the NICE low back pain guidance. Both projects developed tangible solutions with MSK physiotherapists and patients, so the principles of the guidelines could be implemented more easily into practice (Wolstenholme *et al*., 2019; Webber, Partridge and Grindell, 2022).

2.6 The importance of relationships in Knowledge Mobilisation, Co-Design and MSK physiotherapy

Relationships and relationship building are an important component of both Knowledge Mobilisation and Creative Co-Design (Powell, Davies and Nutley, 2017; Langley *et al.*, 2018; Farr *et al*., 2021; Knowles *et al.*, 2021, Cainey, Boaz and Oliver 2023). In the MSK physiotherapy literature the therapeutic relationship, sometimes called the therapeutic alliance or rapport, has been highlighted as having an impact on MSK physiotherapy patient care (Babatunde, MacDermid and MacIntyre, 2017, Miciak et al, 2018 and 2019, Cosgrove and Hebron, 2021) and is an important aspect of person-centred care (Morera-Balaguer *et*

al, 2021). It is important to highlight this relational aspect of the physiotherapy consultation here because there is a gap in knowledge about the interaction between the physiotherapy therapeutic relationship and Knowledge Mobilisation in the current literature**.**

2.7 The Research Gap

Most of the physiotherapy literature available that I have discussed so far focuses on Knowledge Mobilisation and evidence use predominantly from a physiotherapist's perspective. That is, it predominantly centres on the barriers and facilitators to Evidence Based Practice and the common strategies available to make sure physiotherapists are equipped with the latest evidence base. There is limited literature exploring Knowledge Mobilisation interventions beyond the physiotherapists' acquisition of knowledge to the sharing of it with patients so they can act upon and use it.

I have already explained that MSK physiotherapy has moved away from the medical model of care and relies much more on interventions that focus on self-management such as exercise that the patient must then carry out themselves. This means the patient needs to become an active participant rather than a passive recipient of their physiotherapy care. The interaction between the physiotherapist and patient, where knowledge is shared and decisions are made which then need to be acted upon, is therefore of central importance to ensure knowledge is fully mobilised. Literature focusing on this aspect of the Knowledge Mobilisation process, between the physiotherapist and the patient, so that the right knowledge and evidence is acted upon, is lacking.

In this PhD study I therefore take a broader view looking at the whole Knowledge Mobilisation process within MSK physiotherapy, from acquisition of knowledge by the physiotherapists right through to use of knowledge by patients. This is because Knowledge Mobilisation by definition should be a collaborative, interactional, two-way process and therefore focusing on the physiotherapists part alone is not attending to the whole Knowledge Mobilisation process. Figure 5 depicts this in the context of a single MSK physiotherapy appointment.

Figure 5 The Knowledge Mobilisation process and the MSK physiotherapy appointment

Access knowledge   Share knowledge   Use knowledge

Before the appointment → **During** → **After** the appointment
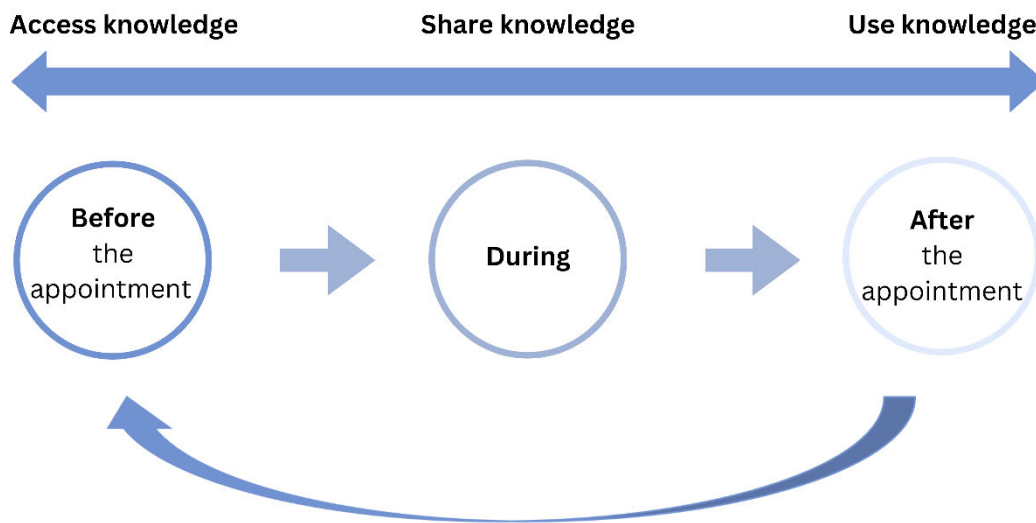
Although some of the Knowledge Mobilisation interventions that have been presented in section 2.5.4 cover the breadth of the Knowledge Mobilisation process, for example the TK2A service improvement projects, the Keele PEP-OA study and Walker et al's implementation work (Wolstenholme *et al.*, 2019; Webber, Partridge and Grindell, 2022; Keele University,2023c; Walker *et al.* 2020, 2021, 2022), they tend to focus on a single condition or specific Evidence Based Intervention. Most physiotherapists have a general caseload, that is, they see patients with a wide range of MSK disorders not just, for example, low back pain. They therefore have to keep abreast of a wide range of knowledge and evidence for many MSK disorders which is challenging. It was therefore important to me to keep the scope of this PhD wide and not focus on one MSK disorder or specific intervention because this is not what happens in reality for most MSK physiotherapists.

In summary, there is clearly a gap in the current evidence base for a non-condition specific intervention that addresses the full Knowledge Mobilisation pathway. Complex interventions are likely to be needed to address such a complex issue.

2.8 The place of Creative Co-Design when developing complex interventions

The UK Medical Research Council guidance on developing and evaluating complex interventions advocates a four phase approach which includes development, feasibility and piloting, evaluation and implementation (Skivington *et al.*, 2021).

The recent work by O'Cathain et al (2019) recognises the importance of spending time on the development phase to prevent research waste and develop solutions that are implementable in the real world (O'Cathain, Croot, Duncan, *et al.*, 2019). This work identified a taxonomy of approaches to intervention development (O'Cathain, Croot, Sworn, *et al.*, 2019) and guidance for intervention development (O'Cathain, Croot, Duncan, *et al.*, 2019). The guidance does not advocate any approach but does identify a framework of issues to consider when developing an intervention which includes: Plan the development process; Involve stakeholders; Bring a team together; Review published research evidence; Draw on existing theories; Articulate a programme theory; Undertake primary data collection; Understand the context; Consider implementation; Design and refine the intervention (O'Cathain, Croot, Duncan, *et al.*, 2019).

In O'Cathain et al's (2019) systematic review they identified a partnership approach as one of eight categories in a taxonomy of approaches for complex intervention development; Co-Design sits within this partnership approach category (O'Cathain, Croot, Sworn, *et al.*, 2019). Partnership approaches, such as Co-Design, are recommended by some researchers because of their perceived strengths which include working together with all stakeholders who give and receive the intervention, the attention they pay to context, and the involvement of those with expertise in Designing interventions, for example Design Researchers, in the Design process (Langley *et al.*, 2018; O'Cathain, Croot, Duncan, *et al.*, 2019; O'Cathain, Croot, Sworn, *et al.*, 2019; Rousseau *et al.*, 2019). More creative approaches to the Design of complex interventions have also been advocated (Langley *et al.*, 2018; O'Cathain, Croot, Duncan, *et al.*, 2019; Rousseau *et al.*, 2019).

As yet there is no evidence to suggest that Co-Design is superior to the other complex intervention development methods in the taxonomy (O'Cathain, Croot, Sworn, *et al.*, 2019). More research is required that focuses on describing the Design and development process in detail and comparisons between different approaches, as this is often lacking in research

publications (O'Cathain, Croot, Sworn, *et al.*, 2019). This PhD study will address this gap by describing the Creative Co-Design approach used to develop a Knowledge Mobilisation prototype solution in the context of MSK physiotherapy.

2.9 Chapter summary

In this chapter I have introduced the many terms being used in the area that this PhD study is focusing on. I have highlighted why I have chosen the term Knowledge Mobilisation over the two more commonly used terms in the physiotherapy literature: Knowledge Translation and Evidence-based Practice, and Creative Co-Design over other 'Co' approaches to Knowledge Mobilisation and intervention development in the wider healthcare literature.

The research evidence shows there is a need to develop an intervention that addresses the whole Knowledge Mobilisation process in MSK physiotherapy. Creative Co-Design might be a good way to achieve this.

Chapter 3
Phase 1 - The use of Co-Production, Co-Design and Co-Creation to mobilise knowledge in the management of health conditions: A systematic review

3.1 Chapter overview

In Phase 1 of this PhD I undertook a systematic review of the existing literature to understand how Co-Production, Co-Design and Co-Creation, termed 'Co' approaches throughout this chapter, have been used to mobilise knowledge in health condition management. I conducted the review between 2020-2021, during the height of the COVID-19 pandemic, in the first and second year of this PhD. In this chapter I cover:

- The aim and rationale for undertaking the systematic review.
- The systematic review methods.
- The findings of the review.
- Discussion.
- Implications for Knowledge Mobilisation research and this PhD.
- Chapter summary.

The majority of the chapter was published as a journal article in BMC Health Services Research (Grindell *et al* 2022) and is available at:

https://bmchealthservres.biomedcentral.com/articles/10.1186/s12913-022-08079-y

3.2 Aim of the review

To my knowledge, when I started this PhD, there had yet to be a systematic review that had specifically explored the use of 'Co' approaches in Knowledge Mobilisation in the management of health conditions. In this systematic review I aimed to explore why researchers use 'Co' approaches, how researchers think 'Co' approaches can achieve health improvement, the activities they use, and whether 'Co' approaches achieve Knowledge Mobilisation in the management of health conditions (actual or perceived).

3.3 Rationale for the review

I undertook the review to understand how 'Co' approaches are being used to mobilise knowledge in health condition management in the hope that this would provide insights that could potentially influence the way I approached Creative Co-Design in the context of Knowledge Mobilisation within MSK physiotherapy in this PhD study.

Due to the lack of AHP and physiotherapy literature in this field I recognised the need to consider literature beyond AHP and physiotherapy practice. I chose to focus the review on three 'Co' approaches (Co-Production, Co-Design and Co-Creation) to mobilise knowledge in health condition management because:

1. There were many Knowledge Mobilisation terms and 'Co' approaches being used in the literature. To try and make some sense of this already confusing area, and to narrow the scope to make it more manageable, I decided to focus on the three 'co' terms that appeared to be most commonly used in the healthcare literature: Co-Production, Co-Design and Co-Creation.

2. To keep the review as relevant to physiotherapy as possible, I chose to focus on health condition management. This was because keeping it broad to encompass healthcare was likely to produce an overwhelming amount of narrative data that would be difficult to synthesise. Whereas focusing on health condition management was likely to include conditions that might be managed by MSK physiotherapy.

Several reviews have explored the use of specific Co-Production, Co-Design or Co-Creation processes but none address the focus of my review. A recent review undertook content analysis of the Co-Creation of knowledge for health interventions aiming to reduce the term's ambiguity and provide a clear definition (Pearce *et al* 2020). The authors developed a new evidence-based definition of knowledge Co-Creation but included a number of other 'Co' terms within this, still leaving the reader to address a confusing landscape of 'Cobiquities'. A rapid review of research Co-Design in health settings had a specific focus on the planning stages of a research project only (Slattery, Saeri and Bragge, 2020). Another review sought to understand the outcomes associated with developing and implementing Co-Produced interventions in acute healthcare settings (Clarke *et al* 2017). The latter reported findings related to understanding the processes of Co-Designing a service. They

found different forms of Co-Production were reported, often uncritically, with a lack of consistent use of terminology to support this diverse range of participatory approaches (Slattery, Saeri and Bragge, 2020, Clarke *et al* 2017). The ambiguity related to the 'Co' terms used in these reviews further reinforced my decision to focus on three 'Co' terms only.

3.4. Methods

This is a mixed studies systematic review, that is, a comprehensive review and synthesis of a wide range of literature of diverse designs (Pluye and Hong, 2014). Mixed studies reviews are useful for understanding complex phenomena such as 'Co' approaches for Knowledge Mobilisation. Seven standard systematic review steps for mixed studies reviews have been followed (Pluye and Hong 2014): 1. Writing a review question. 2. Defining eligibility criteria. 3. Applying an extensive search strategy in multiple information sources. 4. Identifying potentially relevant studies (by two independent researchers screening titles and abstracts). 5. Selecting relevant studies (based on full text). 6. Appraising the quality of included studies using an appropriate tool. 7. Synthesising included studies.

Conduct and reporting of the review followed the Preferred Reporting Items for Systematic reviews and Meta Analysis checklist and flowchart to ensure transparency and complete reporting of the findings (Page *et al* 2021). The review was registered with PROSPERO (registration number CRD42020187463 September 2020).

3.4.1   Review questions

1. What is the rationale for using 'Co' approaches to mobilise knowledge in the management of health conditions?
2. How do 'Co' approaches achieve Knowledge Mobilisation (actual or perceived) in the management of health conditions?
3. What type of activities are used within 'Co' approaches to mobilise knowledge in the management of health conditions?
4. To what extent do 'Co' approaches achieve Knowledge Mobilisation (actual or perceived) to help manage health conditions?

3.4.2 Defining eligibility criteria

I defined specific inclusion and exclusion criteria using the PICOS framework, Population, Intervention, Context, Outcome and Study type (Higgins *et al* 2019). See table 1. One of three common terms, that is Co-Production, Co-Design and Co-Creation, had to be explicitly used in a paper for inclusion in this review.

Table 1 Inclusion and exclusion criteria for systematic review

Inclusion criteria	Exclusion criteria
Population Children, adults, patients, carers, healthcare staff and researchers.	**Population** Non-human participants.
Intervention Explicit use of co-design, co-production or co-creation to mobilise knowledge, where knowledge mobilisation includes the generation, sharing, transformation and use of knowledge or evidence in practice.	**Intervention** Studies where the knowledge mobilisation strategy is not explicitly termed Co-Design, Co-Production or Co-Creation. Patient and public involvement in research, and collaboration and participatory approaches unless specifically described as Co-Design, Co-Production, or Co-Creation.
Context All studies investigating a health condition including acute care, sub-acute care, community health and non-health settings delivering condition specific health-related activities.	**Context** Studies not focused on management of a specific health condition.
Study type Primary research, either quantitative, qualitative or mixed methods (including study protocols), case studies, commentary and discussion and opinion papers and grey literature. Studies published in English.	**Study type** Studies not published in English.

3.4.4 Search terms

I developed a comprehensive search strategy in conjunction with an information specialist. I used a wide variety of key search terms, based on terms in the review question. They included free text and subject headings (such as MeSH) where appropriate. I used truncation for certain keywords for completeness. I then utilised Boolean logic operators AND / OR to combine terms (Booth *et al* 2012). For example:

1. Co-production OR co-prod* OR coproduction OR coproduc* OR co production OR co produc*OR codesign OR co-design OR co design OR co-creat* OR cocreat* OR co creat*
2. AND
3. Knowledge mobil* OR Knowledge transl*OR knowledge utili*OR knowledge exchange OR knowledge uptake OR Knowledge to action OR Knowledge to practice OR Evidence based practice.

I purposely limited search terms to try and provide some focus on what is a very crowded and complex landscape. As stated earlier in chapters 1 and 2 multiple terms are often used in the literature for Co-Productive activities and so in the review I focused on use of the three common 'Co' terms – Co-Production, Co-Design and Co-Creation - rather than, for example, Patient and Public Involvement and Engagement. The same can be said for Knowledge Mobilisation. I therefore focused on the use of Knowledge Mobilisation terms frequently seen in the healthcare literature and which encompassed a more interactional, two way, flow of knowledge. I specifically did not use the term 'implementation', even though it could be considered the final stage of Knowledge Mobilisation, so as not to cause confusion between these two different but similar terms and their meanings. Also, because implementation can mean many things, not just in the context of Knowledge Mobilisation, and I felt using the term had the potential to produce many irrelevant papers. See appendix 3a for detailed search terms used.

3.4.3 Applying an extensive search strategy in multiple information sources

<u>Systematic search of academic literature</u>

I conducted searches of four electronic databases: Web of Science (all databases) 1970 -
April 2021, EMBASE via OvidSP 1988 – April 2021, MEDLINE via OvidSP 1946 – April 2021,
CINHAL via EBSCO 1981 - April 2021. I decided to search beyond the last 10 years even
though the use of 'Co' approaches in the UK healthcare research only became more popular
during this period. This is because Co-Production originated in the public services in the USA
much earlier than this and I did not want to miss any earlier relevant work. I carried out
initial full database searches up to 26th May 2020. I used search alerts from this point on all
four databases up until the end of April 2021. I also searched the University of York's Centre
for Reviews and Dissemination database, the Cochrane Library (CENTRAL) and Trip medical
database. I browsed bibliographic searches of selected articles reference lists for any
additional relevant studies (Booth, Papaioanna and Sutton, 2016).

<u>Structured search of the grey literature</u>

I also conducted grey literature (unpublished) searches to identify any literature from non-
traditional sources and to minimise publication bias (Booth, Papaioanna and Sutton, 2016). I
searched grey literature sources such as Open Grey and Google as well as websites of
professional networks in the field, for example the Canadian Integrated Knowledge
Translation Network. A google search may produce many pages of potentially relevant
literature. In this case I screened the first eight pages of the google search, at which point
the amount of relevant literature significantly diminished. I also searched publications
situated on the university profile pages of academic experts in Co-Production and or
Knowledge Mobilisation. I identified these through the UK Knowledge Mobilisation Alliance,
a collaboration of Knowledge Mobilisation experts in health and social care
(https://kmalliance.co.uk/team/) and through recommendations of academic peers. For a
list of researcher's profile pages see appendix 3b. I also carried out citation searching from
the reference lists of included studies.

3.4.5 Identifying relevant studies

I imported and organised all database search results in Endnote X8 and exported to an Excel spreadsheet. I removed duplicate references. This selection process allowed for transparency and reproducibility (Booth, Papaioanna and Sutton, 2016). I screened documents by title and then by abstract using the pre-determined eligibility criteria. I obtained any articles that appeared to fulfil the inclusion criteria in full (Moher, *et al*., 2009; Aromataris and Munn, 2017; Higgins *et al*., 2019). I screened all citations by title and abstract and a second reviewer independently screened 50. A high level of agreement was achieved between myself and the second reviewer on initial screening (90%). The remaining 10% were uncertainties mainly on my part. These uncertainties were resolved through discussion with the second reviewer who was a more experienced researcher. I made the final decisions about inclusion of articles because it was my PhD. Due to the high level of initial agreement and lessons learnt through the discussions, I decided that the process was robust enough to review the remaining titles and abstracts alone. I then assessed the full text of all potentially eligible studies and the second reviewer reviewed 20% of the full text articles. The second reviewer provided a second opinion for papers that I was unclear about. I discussed any uncertainties and disagreements with reviewer 2 and then made the final decision about which studies to include.

3.4.6 Data extraction and management

I developed a standardised data extraction form and tested it on a small number of selected studies and then refined it (Aromataris and Munn, 2017; Higgins *et al*., 2019). The type of data extracted included: study characteristics such as type of study, setting, participant characteristics, rationale given by researcher for using a 'Co' approach, proposed mechanisms of 'Co' approach, type of activities used and outcomes of 'Co' approach (measured or perceived impact on Knowledge Mobilisation). I extracted the data from all the included studies and reviewer 2 double extracted 20% of papers to ensure consistency of extraction. Again, we discussed inconsistencies, and I made final decisions about what to extract from the remaining 80% of papers.

3.4.7 Appraising the quality of included studies

I included a mixture of study types in this review including qualitative studies, Co-Design case studies and study protocols. Five of the 24 papers were mixed methods with qualitative research dominance, that is, they collected survey data alongside the main qualitative findings. It is important to assess the quality of studies in a systematic review to ascertain the validity of both the methods and results (Booth, Papaioanna and Sutton, 2016); also, for qualitative research in particular, to ensure conclusions are reliable (Thomas and Harden, 2008). There are various appraisal tools to choose from. I chose the Joanna Briggs Institute quality assessment checklists because they cover a variety of study designs (Aromataris and Munn, 2017). Due to the nature of the included studies, I used the Joanna Briggs Institute qualitative quality assessment checklist for all studies as a 'best fit'. This was because there are no specific checklists for study protocols and case studies. I did not exclude studies based on quality as long as they addressed the focus of the review. This was to ensure no rich and meaningful insights from the data were lost (Swaithes *et al.*, 2020). I appraised all selected studies and the second reviewer double appraised 20% of the selected studies. Any disagreements were resolved through discussion. Again, I made the final decisions and applied learning to the remaining 80% of papers.

3.4.8 Synthesising included studies

Results from systematic reviews can be synthesised in a number of ways such as meta-analysis of statistical findings in quantitative studies and qualitative meta synthesis (Sutton *et al.*, 2019). It was not appropriate to do a meta-analysis in this review because of the types of studies that were included. Instead, I chose to use a type of qualitative research synthesis, thematic synthesis, based on the principles of Thomas and Harden (2008) (Thomas and Harden, 2008). This is because in this review there were likely to be large amounts of textual data to synthesise rather than statistical quantitative data. Thematic synthesis has three stages: line by line coding of text, development of descriptive themes, and generation of analytical themes (Thomas and Harden, 2008). Analytical themes were not relevant for research questions 1 and 3 so descriptive themes were presented. I used NVivo QSR (2020) to store and organise the extracted data. I extracted a small amount of quantitative data in this review in the form of descriptive statistics. I used a convergent

integrated approach to bring together the qualitative and quantitative results (Aromataris and Munn, 2017; Hong *et al.*, 2017). This means that the quantitative data was 'qualitized' and turned into textual descriptions and then combined with the qualitative data (Aromataris and Munn, 2017; Hong *et al.*, 2017). This allowed for a narrative interpretation of the quantitative results (Aromataris and Munn, 2017).

3.5 Results

3.5.1 Characteristics of studies

I identified 1138 studies from the searches. After deduplication I screened 767 by title and abstract. I found this to be a challenging task due to the broad and varied use of the terms Co-Production, Co-Design, Co-Creation and Knowledge Mobilisation in the literature. I reviewed the full text of the remaining 351 articles to assess their eligibility, resulting in 24 included in the review. This is set out in the PRISMA diagram (See Figure 6).

Study characteristics are shown in table 2.

Country

The included studies were conducted internationally, in

- The UK (n= 9) (Reeve *et al.,* 2016; Heaton, Day and Britten, 2016; Knowles *et al*., 2018; Lewando-Hundt *et al*., 2019; Wolstenholme *et al*., 2019; Cowdell *et al.,* 2020; Grindell *et al*., 2020; Law *et al*., 2020Wolstenholme, Poll and Tod., 2020),
- Australia (n=7) (Dent *et al.,* 2016; Livings *et al*., 2020; Milton *et al*., 2021; Ospina – Pinillos *et al*., 2019; Ospina-Pinillos *et al*., 2020; Ospina- Pinillos *et al*., 2018; Yeganeh *et al*., 2021).
- Canada (n=5) (Miller et al 2016 ; Fonseka *et al* 2019; McCutcheon *et al* 2019; Boland *et al* 202; Thompson et al 2020),
- Sweden (n=2) (Revenas *et al* 2018; Wannaheden and Revenas 2020)
- and Italy and the UK (n=1) (Dal Mas *et al* 2020).

Study type

The majority of the studies were qualitative case studies (Heaton, Day and Britten*,* 2016; Lewando-Hundt *et al* 2019; Reeve *et al* 2016; Dent *et al* 2016; Cowdell *et al* 2020; Grindell *et*

al 2020; Wolstenholme, Poll and Tod, 2020; Milton *et al* 2021; Ospina – Pinillos *et al* 2018, 2019, 2020; Dal Mas *et al.*, 2020). Five studies collected and presented survey data alongside the narrative data (Knowles *et al* 2018; Yeganeh *et al* 2021; Fonseka *et al* 2019; Revenas *et al* 2018; Wanneheden and Revenas 2020). Three papers were qualitative study protocols (Law *et al* 2020; Livings *et al* 2020; Thompson *et al* 2020). One was a patient-led (co-designed) qualitative study (Miller, *et al.*, 2016), and there were three case study collections (*Wolstenholme, et al.,* 2019; McCutcheon, *et al* 2019; Boland *et al.*, 2020).

Size

The numbers of participants varied across studies from a minimum of 7 to a maximum of 156.

Terms used

All three terms Co-Production (Heaton, Day and Britten, 2016; Reeve *et al* 2016, Lewando-Hundt *et al* 2019; Wolstenholme *et al* 2019; Grindell *et al* 2020; Wolstenholme, Poll and Tod, 2020; Dal Mas, *et al.*, 2020), Co-Design (Knowles *et al* 2018; Revenas, *et al.*, 2018; McCutcheon, *et al.*, 2019; Fonseka, *et al.,* 2019; Wolstenholme, *et al.*, 2019; Ospina-Pinillos, *et al.*, 2018, 2019, 2020; Livings*, et al.,* 2020; Grindell *et al* 2020; Law *et al* 2020; Wannheden and Revenas 2020; Milton *et al.,* 2021) and Co-Creation (Dent, *et al* 2016; Boland, *et al* 2020; Thompson, *et al.*, 2020) were used to define the approach taken.

3.5.2 Quality of studies

Eighteen of the 24 papers were assessed as moderate to high quality (see appendix 3c). Three papers - two non-peer reviewed casebooks and two study protocols - were assessed as low quality. Another three papers were deemed low-moderate quality and consisted of another casebook, a study protocol and a qualitative case study. The latter was assessed as low quality due to unclear reporting. It is possible that the casebooks and study protocols scored poorly due to the lack of appropriate quality assessment tools specific to these types of publications.

Figure 6 PRISMA 2020 flow diagram
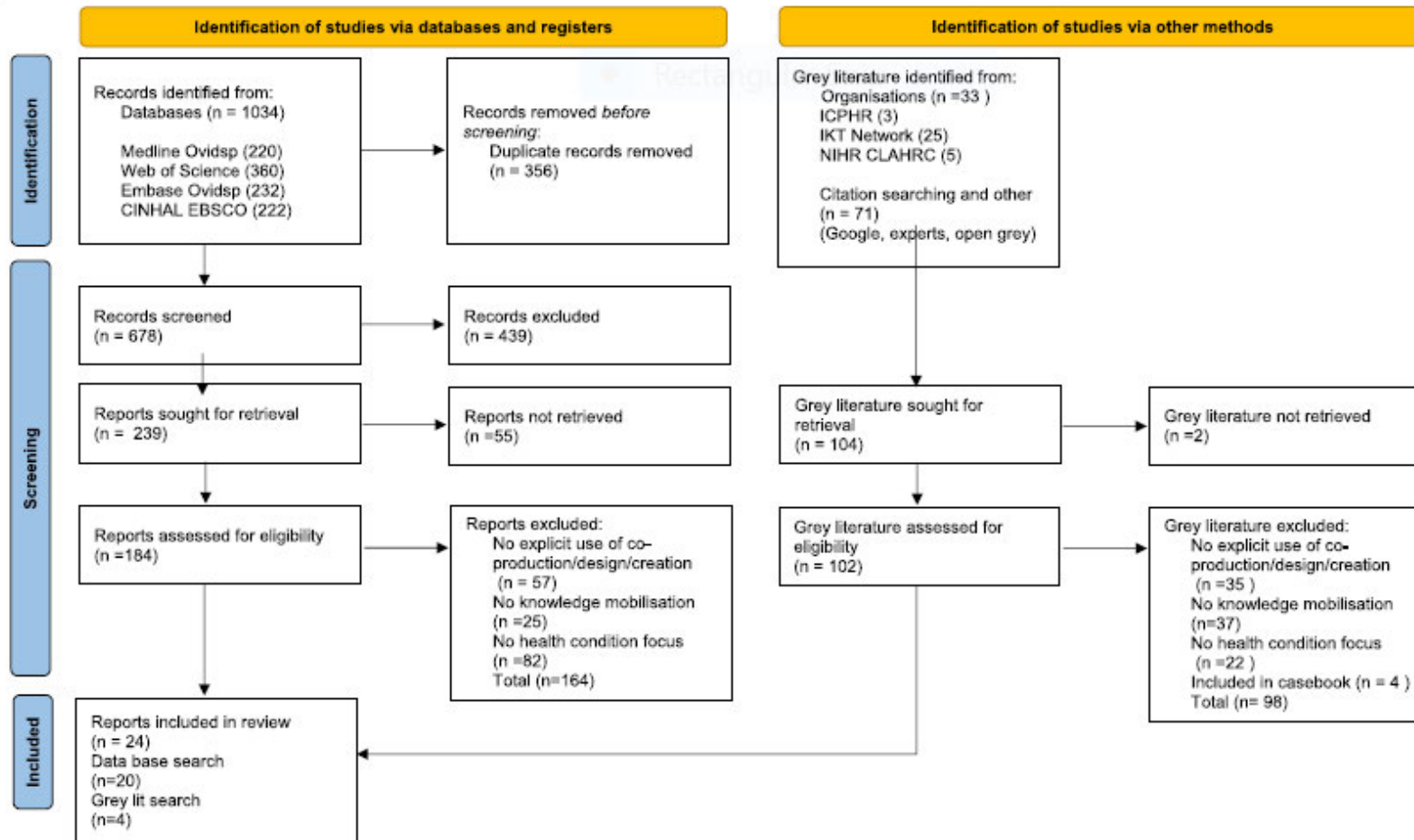
Table 2 Characteristics of the studies included in the review

Author, year, country	Health condition	Aim of study	Methodology	Participant numbers	Co-approach	Definition of co-approach used by authors
Cowdell *et al* (2020) UK	Eczema	To devise strategies to amend lay and practitioner eczema mindlines to improve consultation experiences and self-management practices in primary care. To identify 1. What knowledge needs to be mobilised. 2. Who needs this knowledge. 3. How should this knowledge be shared.	Qualitative case study	Total n= 22 Lay people n=10 Health practitioners n=12	Co-Creation	Using 8 principles of Co-Create co-production matrix: Holistic, resourced, transparent, inclusive, iterative, positive, equal, Sustainable
Dal Mas *et al* (2020) Italy/UK	Breast cancer	How can knowledge translation be triggered by design to support and enhance the physical and psychological recovery of patients after breast cancer surgery	Qualitative case study	Total n=28 Researchers n= 4 Psychiatrists/physiotherapists n=9 Nurses n=3 Breast surgeon n=1 Sport and fitness professional n=1 Patients n=2 National association of breast surgery operated women n=2	Co-production	Patient engagement. Active and effective participation of patients in their healthcare.

				Librarians n=3 Admin staff n=3		
Dent *et al* (2016) Australia	Long term musculoskeletal problems	Describe lessons learned from implementation of a population health intervention study in a rural setting using a Co-KT framework as a guideline for intervention	Qualitative case study	Not reported	Co-creation (cocreating a knowledge translation framework – Co-KT)	'Co-creating of KT' (Co-KT) framework, which combines academic evidence-based knowledge with the context-specific knowledge from stakeholders.
Fonseka *et al* (2019) Canada	Mental Health	A knowledge translation project to adapt the CANMAT clinician guidelines into an accessible, plain language version.	Qualitative case study	Total n=7 Workshop People with lived experience of mental health problems n=7	Co-design	Incorporating expertise of individuals with lived experience
Grindell *et al* (2020) UK	Malignant pleural effusion	To describe the co-design methods used to mobilse knowledge and co-create a decision support tool for people with malignant pleural effusion.	Qualitative case study	Total n=41 Workshop 1 Site 1 Total n= 9, Consultant physician n=3 Patients n=5 Carers n=2 Nurse specialist n=1 Site 2 Total n =11, Consultant physician n=1 Physician Registrar n=1	Creative co-production/design	A four phased, human-centred process of divergent and convergent thinking. Recognising all forms of knowledge. Considering all ideas before the best, most practical solutions

				Patients n=5 Carers n=3 Nurse specialist n=1 Research nurse n=1 Site 3 Total n=11, Physician registrar n=1 Patients n=5 Carers n=5 Senior research nurse n=1 Student nurse n=1 Workshop 2 Total n = 10 Consultant physicians n=2 Physician registrar n= 3 Nurses n=3 Patients n=2		are tested through an iterative prototyping process ready for implementation
Heaton, Day and Britten (2016) UK	Acute stroke management	What does the theory of co-production add to our understanding of the processes of knowledge creation and translation in PenCLAHRC.	Qualitative case study	Total n=9 NHS trust staff and local stroke network n=5 Researchers n=4	Co-production	Co-production of knowledge and closer collaboration
IKT casebook vol 1 (2019) Case studies: Townley *et al*, Sibbald *et al*, Gainforth *et al,*Kastner *et al*.	4 case studies includes chronic pain assessment, spinal cord injury and multi chronic disease	Using an Integrated Knowledge Translation approach to co-create a pain assessment toolkit, and physical activity interventions and to	Case studies	Not disclosed	Co-production, co-creation and co-design	Not explicitly defined beyond an Integrated Knowledge Translation approach

Editors McCutcheon *et al* Canada		co-design a multi disease management tool.				
IKT casebook vol 3 (2020) Case study: Ramage et al Editors Boland *et al*	Stroke	The co-design and piloting of an evidence-based intervention aimed at increasing physical activity to reduce secondary stroke risk.	Case study	Total n= 45 Knowledge user partners Total n=13 Person with lived experience of stroke n= 1 Physiotherapists n=2 Exercise scientist n=1 Researchers n=5 PhD supervisors n= 4 (with research expertise in physiotherapy [n=3] and nutrition and dietetics [n=1]). Knowledge-user informants Total n= 32 Health-care workers (n=16) such as doctors, nurses, physiotherapists, managers Stroke survivors (n=10) Carers (n=5) Behaviour change researcher (n=1)	Co-design	Not explicitly described but involving knowledge user partners and knowledge user informants at each stage of project.
Knowles *et al* (2018) UK	People with multi-morbidity	To explore whether co- production methodologies could enhance intervention development and provide a mechanism	Qualitative (co-design and survey)	Total n=34 Workshop 1 Total n=11 People or carers with multi morbidities n=11	Co-design (participatory design)	Methodologies which explicitly involve patients in design and development.

		to translate available evidence into patient- centred intervention proposals for multimorbidity and safety		Workshop 2 Total n=5 GP n=1 Pharmacists n=3 Pharmacy dispenser n=1 Workshop 3 Total n=11 Public contributors n=9 Pharmacist n=1 Pharmacy dispenser n=1 Survey n=7 Patients n=4 Health care professionals n=3		
Law *et al* (2020) UK	Long term conditions	To identify and produce a taxonomy of physical activity interventions that aim to reduce functional decline in people with long-term conditions managed in primary care (Stage 4 Intervention co-design, actionable recommendations and knowledge mobilisation)	Study protocol – realist synthesis with embedded co-production and co-design	Participant numbers not described	Co-design/production	Draw on the lived experiences of service users and professionals providing services to them. Ensuring all views from stakeholders are included and embedded within the process.

Lewando Hundt et al (2019) UK	End of life care	Evaluation of research based theatre performance post discussions to capture the nature and dynamics of the co-production of knowledge.	Qualitative case studies	Total n=25-75 On average 50% 0f audience (n=50-150) attended post show activities. included service users, carers, students, researchers, and health, and social care service providers and the wider public	Co-production (of knowledge)	This term recognizes that the process involves multiple types of knowledge and experience from a plurality of stakeholders and actors
Livings et al (2020) Australia	Osteo-Arthritis	To establish whether a co-designed, community- based, physiotherapy- led multidisciplinary model of care for managing knee OA can be developed and implemented in the community physiotherapy setting.	Study protocol a quasi-experimental, pre– post design with an embedded qualitative component- phase 2 = co-design.	Aim to recruit 52	Co-design	Consultation with researchers, patients, clinical staff, members of the public and other stakeholders
Miller et al (2016) Canada	Osteo -Arthritis (OA)	What does quality care mean to patients with OA and what is most helpful in managing their arthritis.	Qualitative	People with OA n=25	Co-design	Co-design of research project- participants setting research questions, collecting data etc.
Milton et al (2021)	Mental health /eating disorders	To collaboratively customise and	Qualitative case study	Total n=45	Co-design/participatory design	The active participation of all

Australia		configure the InnoWell Platform to enhance access to and service quality of Butterfly's National Helpline.		People with experience of eating disorders Workshop 1 n =9 Workshop 2 n=7 Workshop 3 n=11 Workshop 4 n= 5 Workshop 5 n=5 Workshop 6 n=8		stakeholders to ensure that the end product meets the needs of its intended user base, improves usability, and increases engagement of all individuals
Ospina- Pinillos *et al* (2018) Australia	Mental health	To codesign and build a Mental Health eClinic (MHeC) to improve timely access to, and better quality, mental health care for young people across Australia.	Qualitative case study	Total n=44 Stage 1 n=28 Young people (YP) with mental health problems n= 18 Health care professionals (HCP) n= 10 Stage 2 n=9 YP n=6 HCP n=4 Stage 3 n= 6 YP n=4 HCP n=2	Co-design (participatory design)	Involves iterative design cycles in which end users and researchers contribute to knowledge production and the development of the end product
Ospina- Pinillos *et al* (2019) Australia	Mental health	To co-design and culturally adapt the MHeC for Spanish-speaking young people based in Australia;	Qualitative case study	Total n=32 Workshops n=17 YP n=10 HCP n=7 User testing n=15 YP n=7 HCP n=5 Supportive others n=3	Co-design (participatory design)	involve stakeholders and end users in the design and development to increase user engagement and system usability.

Ospina- Pinillos *et al* (2020) Australia	Mental health	To culturally adapt the MHeC for young people in Colombia	Qualitative case study	Total n=28

Workshop n= 18
YP n=7
HCP n=11

User testing
YP n=5
HCP n=3
Supportive others n=2 | Co-design (participatory design) | The process involves engaging end users and other stakeholders at all stages (from conception to completion) of the design, development, and testing of these technologies |
| Reeve *et al* (2016) UK | Mental health and wellbeing | The aim was to translate a model of care into practice-based evidence describing delivery and impact. (started as a formative evaluation but finished as a co-production model) | Qualitative case study | Numbers not specified.
Initial evaluation:
GP practices =7
Redesign of intervention:
GP practice n=1 | Co-production | To generate practice based knowledge to contextualise a complex intervention ready for implementation |
| Revenas *et al* (2018) Sweden | Parkinsons Disease | The aim of this study was to describe the co-design an eHealth service for co-care (knowledge exchange) for Parkinson disease. | Qualitative | Total n= 25
4 workshops:
People with Parkinsons Disease n=7
HCP n= 9
Facilitators n=7 | Co-design | Co-creation has been broadly defined as any act of collective creativity, while co-design signifies the span of a design process |

Thompson *et al* (2020) Canada	Functional constipation in children	To use patient engagement methods to establish a research collaboration with parents to co-create a digital knowledge translation tool for parents caring for a child with functional constipation	Qualitative study protocol	Specific numbers not disclosed	Co-creation	Not explicitly described but to be achieved through a parent collaborator group
Wannheden and Revenas (2020) Sweden	Parkinsons disease	This study explores People with Parkinson's (PwP) and HCPs' expectations and desired eHealth functionalities to achieve co-care (knowledge exchange to improve healthcare outcomes).	Qualitative (Co-design workshops and questionnaire)	Total n = 53 4 workshops n= 16 PwP n=7 HCP's n=9 Prototype questionnaire n= 37 PwP n=31 informal care givers n=6	Co-design/participatory design	Participatory design shares similarities with action research and offers a method for combining health service and technology development in close collaboration with the intended users of the future service
Wolstenholme, Poll, Tod (2020) UK	Hepatitis C	To devise interventions to improve access to the nurse-led hepatitis C clinic through sharing knowledge from	Qualitative case study	Total n= 22 Over 2 workshops: service users who were current or former patients of the hospital HCV clinic n=12 Stakeholders representing seven different agencies n=10	Co-production	Meaningful engagement of all stakeholders in the design of new services or knowledge. Ensuring the

		those who both receive and deliver services.				research is relevant to the end users and informed by them.
Wolstenholm, et al (2019) UK	Various health conditions including low back pain, chronic obstructive pulmonary disease, stroke	Highlights of how knowledge is translated, in its many forms, into action. With a particular focus on the contribution of creative practices and design to deliver successful change	Collection of case studies	Varies across projects. From n=10 – n=75	Co-design	That allows the contribution of all the stakeholders of a project or service to share and synthesise new knowledge
Yeganeh et al (2021) Australia	Early menopause (EM)/ premature ovarian insufficiency (POI)	To describe and summarise the overall process of co-design and report on the development and evaluation of the digital resource as well as dissemination and implementation.	Qualitative case study	Total 156 Interviews Women with EM n=30 Surveys n=126 Women with POI n=110 HCP n=16	Co-design	With all stakeholders including active patient inclusion, to ensure developed resources are relevant and improve patient understanding and knowledge

3.5.3 Overview of Themes

I identified four themes related to the research questions. 1. Key aspects of 'Co' approaches for Knowledge Mobilisation. 2. Mechanisms of action. 3. Activities used. 4. Outcomes of 'Co' approaches for Knowledge Mobilisation. The themes and their sub-themes, along with the relationships between them, are illustrated in figure 7 which can be viewed as a framework or logic model to help guide researchers using 'Co' approaches to mobilise knowledge and consider the key aspects and mechanisms of action of their chosen approach.

Figure 7 Overview of systematic review themes: key aspects, mechanisms of action, activities used and outcomes of 'Co'approaches for Knowledge Mobilisation in health conditions
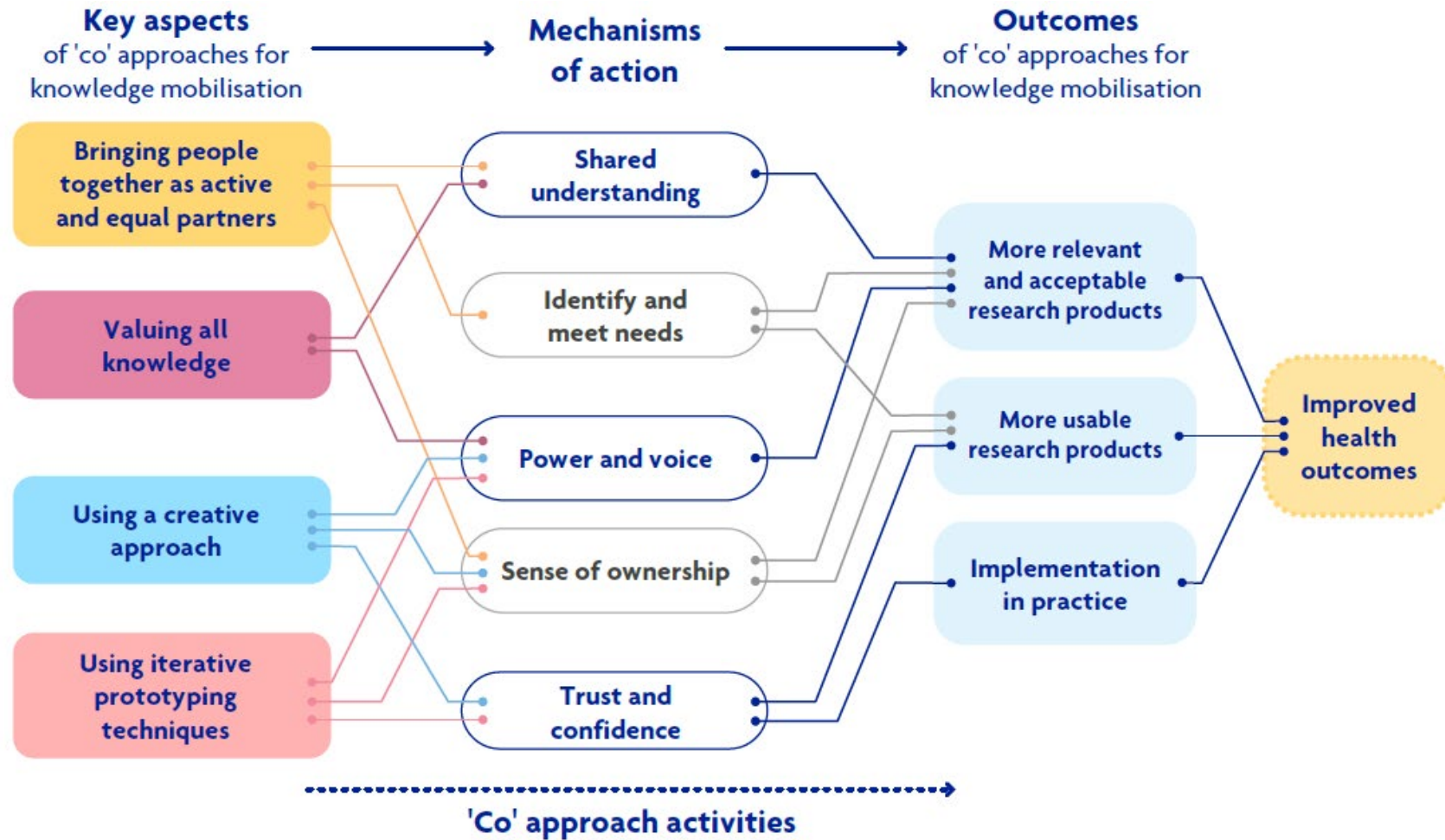
3.5.4 Key aspects of 'Co' approaches for knowledge mobilisation

The aspects of 'Co' approaches that authors proposed as important to mobilise knowledge to improve the management of health conditions included: bringing people together as active and equal partners, valuing all knowledge, using a creative approach, and iterative prototyping techniques.

Bringing diverse people together as active and equal partners

Forming collaborations between different stakeholders was considered critical (Heaton, Day and Britten, 2016; Lewando-Hundt *et al.,* 2019; Dent *et al.,* 2016; Milton *et al.,* 2021; Yeganeh *et al*., 2021; Thompson *et al*., 2020). These authors believed that partnership working led to the sharing of goals (Wolstenholme *et al.*, 2020), responsibilities and decision making throughout the process (Cowdell *et al*., 2020; Knowles *et al*., 2018; Law *et al*., 2020; Kothari *et al*., 2019; Thompson *et al*., 2020; Revenas *et al.,* 2018). Involving the right people in the 'Co' approach was considered to be central to knowledge mobilisation. Involving a wide range of stakeholders could offer more understanding than simply focusing on one or two types of stakeholders*:*

> '*involving all stakeholders can provide richer insights than involving patients or professionals alone'* (Knowles *et al*., 2018).

Focusing not simply on diversity, but on making efforts to include the views and experiences of everyone involved or impacted by health condition management regardless of their social or educational status, meaning power imbalances could be addressed:

> '*meaningful egalitarian partnerships are formed between participants*'
> (Grindell *et al*., 2020).

The way in which stakeholders were engaged was highlighted as important by a number of high quality studies. Actively engaging stakeholders, where they have a clear role and contribute to the process or service was preferable to more passive modes of engagement, where they may be commenting on decisions or actions that have already been made (Grindell *et al.,* 2020; Law *et al*., 2020; Wolstenholme *et al*., 2020; Dent *et al.,* 2016; Milton *et al*., 2021). That is, where they are:

>   *'active agents not merely passive subjects or recipients of services'*

>   (Heaton, Day and Britten, 2016).

Valuing all knowledge

Authors acknowledged the existence of disparate types of knowledge in terms of research evidence, experience and opinions. They highlighted the need to include, recognise and understand all knowledge (Ospina-Pinillos *et al.*, 2018; Lewando Hundt *et al.*, 2019; McCutcheon *et al*., 2019; Cowdell, Ahmed and Layfield; 2020; Law *et al*., 2020; Wannheden and Revenäs, 2020) and place equal importance (Heaton, Day and Britten, 2016) on evidence-based research knowledge, clinical knowledge and experiential knowledge (Grindell *et al.,* 2020; Dent *et al*., 2016; Ospina-Pinillos *et al.*, 2019, 2020; Cowdell, Ahmed and Layfield, 2020; Dal Mas *et al.*, 2020). Some authors suggested that 'Co' approaches offered an opportunity to generate, share and gain locally generated knowledge and experience from different sources (Grindell *et al.,* 2020; Dent *et al*., 2016; Knowles *et al.*, 2018; Revenäs *et al.*, 2018).

>   *'Our approach is potentially efficient in making use of all available knowledge*
>   *(scientific and 'practical'); and potentially effective in being grounded in the reality*
>   *and complexity of applied practice'* (Reeve *et al.*, 2016).

Using a creative approach

Collaborative ways of working, inherent in 'Co' approaches, were deemed to be significantly different to the usual way of doing applied health research (Heaton, Day and Britten, 2016; Ospina-Pinillos *et al.*, 2019):

>   *'the researchers and clinicians in some of the projects found that their experience of*
>   *working in collaboration on the projects was different to how they had carried out*
>   *research before ('game changers') and opened up new possibilities and capacity'*
>   (Heaton Day and Britten, 2016)*.*

Design and creative practice were recognised as a means to successfully bring the knowledge, skills, expectations and beliefs of heterogeneous groups of people together by a number of studies of mixed quality (Grindell *et al*., 2020; Lewando-Hundt *et al.*, 2019;

Wolstenholme *et al.,* 2019; Dal Mas *et al.*, 2020) encouraging those involved to think and behave in different ways (Heaton, Day and Britten, 2016; Knowles *et al.*, 2018) and enhancing idea generation (Ospina-Pinillos *et al.*, 2018; Ospina-Pinillos *et al.*, 2019). Although some authors felt that they achieved similar results using less creative approaches (Heaton *et al.*, 2016; Reeve *et al.*, 2016; Wannheden and Revenäs, 2020; Yeganeh *et al.*, 2021; Dent *et al.*, 2016; McCutcheon *et al.*, 2019; Boland *et al.*, 2020).

Maintaining engagement of stakeholders was recognised as difficult. One study found that despite regular project meetings and media awareness campaigns they did not maintain engagement of key stakeholders through to implementation (Dent et al., 2016). In contrast, other studies (Ospina- Piniilos *et al.*, 2018; McCutcheon *et al.*, 2019; Milton *et al.*, 2021) that favoured creative activities, felt that their Design and Participatory methods helped to engage diverse groups of people with varying goals, feelings and abilities. They perceived that their 'Co' approach helped retain engagement even within those groups who do not traditionally get involved in research (Ospina-Pinillos *et al.*, 2019; Wolstenholme *et al.*, 2019; Dal Mas *et al.*, 2020; Wolstenholme, Poll and Tod, 2020):

> *'The research and development cycle that we employed in this study is an optimal methodology to engage, retain, and work more efficiently with hard-to-reach populations'* (Ospina-Pinillos *et al.*, 2019).

Innovative, iterative and prototyping techniques

Many of the study authors proposed to use a flexible, iterative process to achieve successful Knowledge Mobilisation (Miller et al., 2016; Reeve *et al.*, 2016; Knowles *et al.*, 2018; McCutcheon *et al.,* 2019; Cowdell, Ahmed and Layfield, 2020; Grindell *et al.*, 2020; Wolstenholme, Poll and Tod, 2020). For example, the iterative PaCER process in one study allowed learning from participants in each phase to inform the next (Miller *et al.*, 2016). Another study team felt that flexibility was essential to adapt knowledge to context in a complex dynamic system such as healthcare (Reeve *et al.*, 2016).

Iterative prototyping, often used in Design practice, was adopted in a number of studies (Grindell *et al.,* 2020; Knowles *et al.*, 2018; Ospina-Pinillos *et al.*, 2018; Ospina-Pinillos *et al.*, 2019; Wolstenholme *et al.*, 2019; Ospina-Pinillos *et al.*, 2020; Law *et al.,* 2020; Wolstenholme, Poll and Tod, 2020). Prototyping was considered useful for turning

knowledge into practical, tangible objects (Grindell *et al.*, 2020; Wolstenholme *et al.*, 2019; Wolstenholme, Poll and Tod, 2020). For example, one study used quick, easy and cheap, low fidelity prototypes to generate iterative cycles of feedback and development (Grindell *et al.*, 2020). In other studies, visual design artefacts such as videos, drawings and sketches were used (Grindell *et al.*, 2020; Ospina-Pinillos *et al.*, 2018, 2019, 2020; Wolstenholme *et al.*, 2019). Authors felt that ideas could be quickly communicated in this way in simple, understandable forms that made knowledge more accessible (Grindell *et al.*, 2020; Knowles *et al.*, 2018; Wolstenholme *et al.*, 2019; Dal Mas *et al.*, 2020).

Expert facilitation of these varied prototyping activities was considered to be crucial to their success. The use of independent facilitators was found to be successful (Fonseka *et al.*, 2019; Wolstenholme *et al.*, 2019; Wolstenholme, Poll and Tod, 2020). They appeared to reduce anxieties regarding participation and encourage open and honest contributions (Fonseka *et al.*, 2019; Wolstenholme *et al.*, 2019):

> *'Having a design facilitator enabled visualisation of thoughts and ideas as they arose. This allowed real time synthesis of occurring knowledge, for example through drawings, which was presented in a form that was easy to understand and which accurately represented participant's views'* (Grindell *et al.*, 2020)*.*

Alternatively, training could be given to enable researchers to facilitate these activities successfully (Knowles *et al.*, 2018).

3.5.5 Mechanisms of action

'Co' approaches were considered to achieve Knowledge Mobilisation through a number of mechanisms of action directly related to the key aspects described earlier. Study authors considered that bringing people together as active partners, valuing all forms of knowledge, using a creative approach, and using iterative prototyping techniques, could facilitate a shared understanding of the problem, identify important needs and how to meet them, thereby balancing power differentials (Knowles *et al.*, 2018; Wolstenholme *et al.,* 2019), offering a sense of ownership, and engendering trust and confidence in solutions (Knowles *et al.*, 2018).

Authors reported engaging multiple stakeholders in the process could identify wider perspectives and contexts and contribute to a shared understanding of the problems and potential solutions (Grindell *et al.*, 2020; Miller *et al.*, 2016; Reeve *et al.*, 2016; Knowles *et al.*, 2018; Fonseka *et al.*, 2019; Lewando Hundt *et al.*, 2019; Cowdell, Ahmed and Layfield, 2020; Ospina-Pinillos *et al.*, 2020; Milton *et al.*, 2021). Using design artefacts such as mood boards, personas and story boards to communicate participants' thoughts and feelings could facilitate the generation of knowledge and develop a mutual understanding of what was important to stakeholders (Grindell *et al.,* 2020; Knowles *et al.*, 2018; *Wolstenholme et al.*, 2019; Dal Mas *et al.*, 2020). The use of personas (Grindell *et al.*, 2020; Knowles *et al.*, 2018; Wolstenholme *et al.*, 2019; Wolstenholme, Poll and Tod, 2020) and scenarios (Knowles *et al.*, 2018; Wolstenholme *et al.*, 2019), which I present later in this section, were thought to help distance participants from their own positions and prevent a 'them and us' dynamic developing (Knowles *et al.*, 2018).

> *'The persona seemed to be particularly powerful for the professional group and prompted a focus on considering the "whole person" experience that the attendees said they may not have considered otherwise'* (Knowles *et al.*, 2018)*.*

This meant that outputs were a consensus between participants, considering all perspectives, rather than the product of situated assumptions, such as what health care professionals think patients want or need (Knowles *et al.*, 2018).

Identify and meet needs

Authors described that by bringing diverse groups of people together, pooling their 'creative assets' (Heaton, Day and Britten, 2016), and considering and valuing their different types of knowledge, expertise and perspectives, they could produce outputs that were tailored to everyone's needs (Heaton, Day and Britten, 2016; Miller *et al.,* 2016; Ospina-Pinillos *et al.*, 2018; Lewando Hundt *et al.*, 2019; Dal Mas *et al.*, 2020; Thompson *et al.*, 2020; Milton *et al.*, 2021; Yeganeh *et al.*, 2021). They felt that by including people with lived experience of a health condition in the process they were able to contribute their unique perspectives and ideas (Heaton, Day and Britten, 2016; Revenäs *et al.*, 2018; Lewando Hundt *et al.*, 2019; Wolstenholme, Poll and Tod, 2020) and the research addressed the areas that patients felt were most important (Dent *et al.*, 2016; Fonseka *et al.*, 2019). This challenged the

traditional medical model which assumes the clinician knows best (Fonseka *et al.*, 2019; Cowdell, Ahmed and Layfield, 2020).

> *'because clinical guidelines are often developed using the medical model where clinicians are considered to possess knowledge and expertise over what is best for the patient'* (Fonseka *et al.*, 2019)*.*

By valuing diverse evidence and knowledge, authors perceived that complex systems and services, such as those in healthcare, could be better understood as no one individual could understand them completely (Reeve *et al.*, 2016; Wolstenholme, Poll and Tod, 2020). In this way 'Co' approach outputs could attend and align to context (Grindell *et al*., 2020; Heaton, Day and Britten*.*, 2016; Wolstenholme *et al*., 2019; Milton *et al.,* 2021) including wider organisational factors (Heaton, Day and Britten, 2016). Authors felt that using creative and iterative prototyping techniques allowed them to challenge and refine ideas into practical concepts that were fit for purpose and more likely to meet stakeholder needs (Grindell *et al*., 2020; Knowles *et al.*, 2018).

Balancing power and voice

Authors felt that balancing power and voice of those involved aided knowledge mobilisation. They felt this was achieved in various ways. Two studies, one high and the other low quality, suggested that giving clinicians, patients and the public a more active role in the whole research process meant that they felt valued and had a more equal role (Heaton, Day and Britten, 2016; Boland *et al.*, 2020). In other studies, involving people with lived experience meant their voices were listened to and valued (Miller *et al*., 2016; Boland *et al.*, 2020). One study used research-based theatre to achieve this (Lewando Hundt *et al.*, 2019):

> *'Theatre makers on the panel were able to explain the process of developing research-based theatre and by doing so revealed how the voices of research participants were respected and heard'* (Lewando Hundt *et al.,* 2019)*.*

A number of studies found that their 'Co' approaches challenged traditional relationships between patients and doctors (Grindell *et al*., 2020, Ospina-Pinillos *et al.,* 2018; Dal Mas *et al.,* 2020; Wolstenholme, Poll and Tod, 2020) or blurred practice and academic boundaries

(Grindell *et al*., 2020, Reeve *et al.*, 2016; Wolstenholme *et al*., 2019; Wolstenholme, Poll and Tod, 2020):

> *'The discussion was not led by power players such as scientists or surgeons that could have used their status to lead the discussion'* (Dal Mas *et al.*, 2020)*.*

Several studies (Grindell *et al*., 2020, Ospina-Pinillos *et al.*, 2019; Wolstenholme *et al*., 2019; Ospina-Pinillos *et al.*, 2020; Dal Mas *et al.*, 2020; Wolstenholme, Poll and Tod, 2020) found that the use of creative activities had a positive influence on group dynamics. For example, one study felt that their design-led activities enabled participants to:

> *'share and express themselves in an inclusive environment using a common language.'* (Grindell *et al*., 2020)

Another author felt that power hierarchies could be flattened and more voices heard by making ideas tangible (Wolstenholme *et al*., 2019). Creative 'making' activities were found to be helpful in engaging people *'who might otherwise have struggled to participate'* (Wolstenholme *et al*., 2019) and contribute to the process, such as people with verbal communication problems or lower literacy levels (Wolstenholme *et al*., 2019; Wolstenholme, Poll and Tod, 2020). Skilled facilitation was recognised as important in order to manage the power asymmetries found in heterogeneous groups of people (Revenäs *et al.*, 2018).

Sense of ownership

Authors anticipated that knowledge could be shared and generated by bringing people together to form collaborative partnerships, creating a sense of ownership and common purpose (Grindell *et al*., 2020., McCutcheon *et al.,* 2019) that would help reduce the research-to-practice gap (Dent *et al*., 2016). Ownership was reinforced by considering context, implementation and by valuing all stakeholder knowledge (Grindell *et al*., 2020., Heaton, Day and Britten., 2016; Wolstenholme *et al*., 2019):

> *'These include developing strong cross-sector partnerships with stakeholders to co-create and share emerging knowledge, integrating and utilizing all stakeholders' relevant expertise and experience and promoting a sense of ownership and common purpose'* (McCutcheon *et al.,* 2019)*.*

Trust and confidence in the final outputs

Authors identified that stakeholders would have more trust and confidence in the final outputs because their needs were identified, a shared understanding was gained, power and voice was attended to, and a sense of ownership was achieved (Miller *et al.*, 2016; Grindell *et al.*, 2020). A number of authors deemed their outputs to be more credible, relevant, practical, realistic, and trustworthy, because of their 'Co' approach (Grindell *et al.*, 2020., Heaton, Day and Brtten, 2016; Miller *et al.*, 2016; Reeve *et al.*, 2016; Revenäs *et al.*, 2018; Fonseka *et al.*, 2019; Ospina-Pinillos *et al.*, 2019; Wolstenholme *et al.*, 2019; Ospina-Pinillos *et al.*, 2020; Yeganeh *et al.*, 2021).

> *'This experience only confirmed their view that it was important to include representatives of all the relevant professionals in the process of building a model, to make it sufficiently realistic and trustworthy, and to increase the chances of the results being accepted by them and acted upon'* (Heaton, Day and Britten, 2016).

3.5.6 Activities used in 'Co' approaches

Authors used a range of activities, regardless of the term used for their 'Co' approach, in order to produce the mechanisms of action described earlier. It is useful to document these because often researchers rely on research methods when other activities can help to achieve these mechanisms (see Table 3). For example, several studies included creative activities drawn from design, such as drawing and sketching, personas, journey maps and prototyping (Grindell *et al.*, 2020., Knowles *et al.*, 2018; Revenäs *et al.*, 2018; Ospina-Pinillos *et al.*, 2018; Wolstenholme,*et al.*, 2019; Ospina-Pinillos *et al.*, 2019; Ospina-Pinillos *et al.*, 2020; Dal Mas *et al.*, 2020; Wolstenholme, Poll and Tod, 2020; Law *et al.*, 2020; Wannheden and Revenäs, 2020; Milton *et al.*, 2021). These are described in more detail in Table 3. Some did use research methods, for example interview and focus group data, to inform their 'Co' approach process (Revenäs *et al.*, 2018; McCutcheon *et al.*, 2019; Yeganeh *et al.*, 2021). Others were Co-Production or Co-Design of a whole research project (Heaton, Day and Britten, 2016; Miller *et al.*, 2016; McCutcheon *et al.*, 2019; Boland *et al.*, 2020). Prioritisation and consensus techniques were common, including the research methods nominal group and Delphi techniques (Revenäs *et al.*, 2018; Fonseka *et al.*, 2019; Wolstenholme *et al.*, 2019; Cowdell, Ahmed and Layfield, 2020; Law *et al.*, 2020; Livings *et al.*, 2020; Thompson *et*

al., 2020; Wannheden and Revenäs, 2020). One study used a writing committee (Fonseka *et al.*, 2019) and others used meetings and discussion groups to involve stakeholders in the development and decision making process (Dent *et al.,* 2016; Lewando Hundt *et al.*, 2019; McCutcheon *et al.*, 2019; Cowdell, Ahmed and Layfield, 2020; Livings *et al.*, 2020; Wannheden and Revenäs, 2020). Group workshops were a common way to carry out 'Co' approach activities.

It can be seen in Table 3 that some of the activities used could be considered to be less 'Co' than others. Despite their intentions to be Co-productive in their approach none of the authors that used more traditional research methods provided any explanation as to whether they adapted their methods to fulfil the principles of 'Co' approaches.

Table 3 Type of activity used within 'Co' approaches

Method	Activity used by authors in this review	Definition/description from general literature or from the papers in the review
Research methods	**(Semi-structured) interviews** (Miller *et al.,* 2016; Dal Mas *et al.,* 2020; Milton *et al.,* 2021; Yeganeh *et al.,* 2021)	'Where the researcher has a list of questions or specific topics to be asked using an interview guide. Questions do not have to be followed as per the guide and new questions can be asked as the researcher picks up on things the interviewee says.' (Bryman, 2008)
	Focus groups (Miller *et al.,* 2016; Revenäs *et al.*, 2018; McCutcheon *et al.*, 2019; Wannheden and Revenäs, 2020)	'A form of group interview with a number of participants and a moderator. Questions follow a fairly tightly defined topic with a focus on interaction between the group.' (Bryman, 2008)
	Observations (McCutcheon *et al.*, 2019)	'Immersion in a group for a period of time observing behaviour, listening to what is said and asking questions.' (Bryman, 2008)
	Surveys/feedback forms (Lewando Hundt *et al.*, 2019; McCutcheon *et al.* 2019; Yeganeh *et al.*, 2021)	'Respondents read and answer a series of questions themselves.' (Bryman, 2008)
	Qualitative enquiry (Thompson *et al.,* 2020)	"a broad approach" to examine social circumstances. It is 'based on an assumption which posits that people utilize "what they see, hear, and feel" to make sense of social experiences'. The meanings and interpretations of the participants are the essence of qualitative inquiry.' (Liamputtong., 2019)
	Guideline/literature appraisal (Yeganeh *et al.*, 2021)	*'a synthetic review and summary of what is known and unknown regarding the topic of a scholarly body of work, including the current work's place within the existing knowledge.' (Maggio et al., 2016)*
Prioritisation and consensus methods	**Prioritisation/ranking** (Fonseka *et al.*, 2019; Wolstenholme *et al.*, 2019; Cowdell, Ahmed and Layfield, 2020; Law *et al*., 2020)	'At the point of defining which of several ideas we should take forward. The act of assessing for impact and feasibility can be done in a participatory and visual way.' (Wolstenholme *et al*., 2019)

	Consensus (Livings *et al*., 2020 ; Yeganeh *et al.*, 2021)	'Consensus methods provide a means of harnessing the insights of appropriate experts to enable decisions to be made.' (Jones and Hunter, 1995). They are 'a way to gather general agreement on topics that do not yet have empirical evidence to support future decisions or actions'. They 'can also be used as a way to forecast future events or create decision protocols.' (Waggoner et al, 2016)
	Nominal Group technique (Revenäs *et al.*, 2018; Wannheden and Revenäs, 2020)	'The purpose is to generate ideas, which are discussed and ranked by the group. The group is 'nominal' to the extent that it is highly controlled and discussion is allowed only during the later stages of the group process.' (Gallagher *et al.*, 1993)
	Delphi technique (Thompson *et al.*, 2020)	'a group of 'expert' participants are sent a postal questionnaire about the area of interest. Responses are then sent to a panel who collate and assess the participants views, which are then fed-back to the participants, usually in the form of a more structured questionnaire. The participants return their second responses to the panel and the process is repeated for as many rounds as necessary to achieve either a consensus on the subject under study or allow a full understanding of opposing perspectives to be achieved.' (Gallagher *et al.*, 1993)
Research co-production/co-design	**Engaging all stakeholders throughout research project** (Heaton, Day and Britten, 2016; Miller *et al*., 2016; McCutcheon *et al.,* 2019, Boland *et al*.,2020)	'co-producing a research project is an approach in which researchers, practitioners and the public work together, sharing power and responsibility from the start to the end of the project, including the generation of knowledge.' (NIHR, 2019) Integrated Knowledge translation is a specific form of research co-production. It is described as 'a model of collaborative research, where researchers work with knowledge users who identify a problem and have the authority to implement the research recommendations.' (Kothari *et al.*, 2017)
Creative methods	**Making activities** (Wolstenholme *et al*., 2019; Law *et al.,* 2020)	'used as vehicles for collectively (e.g. designers and co-designers together) exploring, expressing and testing hypotheses about future ways of living.' (Sanders and Stappers, 2012)
	Warm up activities (Fonseka *et al.*, 2019; Wolstenholme *et al*, 2019; Grindell *et al*., 2020; Wolstenholme, Poll and Tod, 2020)	'Not just ice breakers warm up activities focus on supporting individuals to recognise their own unique ability to contribute to creative process regardless of background or role in project'. (Wolstenholme *et al*, 2019)

		LEGO® SERIOUS PLAY® (Law *et al*., 2020)	'Based on research which shows that hands-on, minds-on learning produces a deeper, more meaningful understanding of the world and its possibilities, the LEGO® SERIOUS PLAY® methodology deepens the reflection process and supports an effective dialogue – for everyone in the organization.' (www.lego.com). The techniques 'stimulate ideas and creativity, work with metaphor, symbolism and association and are highly democratic and non-hierarchical.' (Wengel *et al* 2021)
		Sketching and drawing (Miller *et al.,* 2016; Ospina-Pinillos *et al.*, 2018, 2019, 2020; Dal Mas *et al.*, 2020; Law *et al.*, 2020)	'Sketching is a rapidly executed freehand drawing that is not usually intended as a finished work. It may serve a number of purposes: it might record something that the artist sees or develop an idea for later use or it might be used as a quick way of graphically demonstrating an image, idea or principle' (Wikipedia*,* 2022*)*. Drawing as a participatory research method 'relies on researcher-participant collaboration to make meaning of the drawing.' (Mitchell *et al.*, 2011)
		Personas (Knowles *et al.*, 2018; Wolstenholme *et al*., 2019; Wolstenholme, Poll and Tod, 2020; Milton *et al.*, 2021)	Fictional characters representing a particular group and their interests and needs. (Stickdorn and Schneider, 2012; Sanders and Stappers, 2012). They can be used 'to visually represent peoples experiences through characters that allow critical distance from participants' own experience.' (Wolstenholme *et al*., 2019)
		Maps/user journeys (Wolstenholme *et al.,* 2019; Grindell *et al.*, 2020; Wolstenholme, Poll and Tod, 2020; Milton *et al.*, 2021)	'A vivid and structural visualisation of a service users experience. Touchpoints, where users interact with the service, are often used to construct a 'journey'/engaging story based on their experience.' (Stickdorn and Schneider, 2012). 'It may show pitfalls and opportunities and support choices of route and targets.' (Sanders and Stappers, 2012)
		Posters (Wolstenholme *et al*., 2019; Wolstenholme, Poll and Tod, 2020)	Can be used to 'summarise progress to date or remind participants of the goal of the workshop/project.' (Wolstenholme *et al*., 2019)

	Storyboards (Wolstenholme *et al*., 2019)	'A series of drawings or pictures that visualise a particular sequence of events. May include a common situation where a service is used or the hypothetical implementation of a new service prototype' (Stickdorn and Scneider, 2012). They often' resemble a comic strip with captions.' (Sanders and Stappers, 2012).
	Scenarios (Knowles *et al.*, 2018; Revenäs *et al.*, 2018)	'A story, typically of how people perform a part of their lives or an interaction with a product or service.' (Sanders and Stappers, 2012)
	Role play (Livings *et al*., 2020)	'The physical acting out of scenarios and prototypes in a situation that resembles a theatre rehearsal.' (Stickdorn and Schneider, 2012)
	Research based theatre (post-performance panel discussions) (Lewando Hundt *et al.*, 2019)	'A multi-disciplinary platform that enables the impact of original research to extend its reach beyond academic publications and presentations.' (Lewando-Hundt *et al.*, 2019). It' deepens understanding and allows for learning through cognitive and emotional engagement and debate of complex and contested issues during post-show discussion.' (Lewando-Hundt *et al.*, 2011
	Ideation (Knowles *et al.*, 2018; Ospina-Pinillos *et al.*, 2018, 2019, 2020; Revenäs *et al.*, 2018; Wolstenholme, Poll and Tod, 2020)	'The process of generating ideas.' (Sanders and Stappers, 2012) 'Ideation techniques are used to structure and inspire group brainstorming sessions. Usually simple exercises which can be used to stimulate group discussion whilst providing structure within which to work.' (Stickdorn and Schneider, 2012)
	Blue sky thinking (Knowles *et al.*, 2018; Ospina-Pinillos *et al.*, 2018, 2019, 2020; Revenäs *et al.*, 2018; Wolstenholme, Poll and Tod, 2020)	'Creative ideas that are not limited by current thinking or beliefs.' (*Collins dictionary*)

	Prototyping (Knowles *et al.*, 2018; Ospina-Pinillos *et al.*, 2018, 2019, 2020; Revenäs *et al.*, 2018; Wolstenholme *et al.*, 2019; McCutcheon *et al.,* 2019, 2020; Grindell *et al.,* 2020; Wannheden and Revenäs, 2020; Wolstenholme, Poll and Tod, 2020; Law *et al.*, 2020; Milton *et al.*, 2021)	'Artifacts created to explore a (design) question or to express a conceptual design, used to evaluate ideas with users' (Sanders and Stappers, 2012). They are 'physical manifestations of ideas or concepts that range from rough (giving the overall idea only) to finished (resembling the actual end result). They give form to an idea and explore technical and social feasibility.' (Sanders and Stappers, 2014).
	Trigger films (Knowles *et al.*, 2018)	A method used in Experience Based Co-Design that involves making 'a video film of 'touchpoints' (where interaction with a service occurs) from patient experience interviews that exemplify good or bad experiences of a service.' (Locock *et al.*, 2019).
	Future Workshops (Knowles *et al.*, 2018) (Personas, scenarios- described in creative methods)	Future workshop is a method that aims to have stakeholders design their desired future, avoiding constraints imposed by experts or organizations. (Jungk and Mullert, 1987).
	'Talking points' (Yeganeh *et al.*, 2021)	'Talking points are part of the HealthTalk/DIPEx patient experience approach which are well-established methods of qualitative research.' (DIPEx international, 2022) Talking points are described as a presentation of themes through video, audio or text format. (Yeganeh *et al.*, 2021)
Other	**A writing committee** (Fonseka *et al.*, 2019)	Training to support writing and resources to help writing and amending a guideline. (Fonseka *et al.*, 2019)
	Improvement-in practice-in context (Reeve *et al.*, 2016)	'Through the generation of practice-based evidence, with researchers and clinicians working together to co-construct and evaluate a new account of practice.' (Reeve *et al.*, 2016)
	Note cards/post cards (Revenäs *et al.*, 2018; Cowdell, Ahmed and Layfield, 2020; Wannheden and Revenäs, 2020; Wolstenholme, Poll and Tod, 2020)	

	Meetings (Dent *et al.*, 2016; McCutcheon *et al.*, 2019)	
	Teleconferences (McCutcheon *et al.*, 2019)	
	Presentations (Livings *et al.*, 2020; Yeganeh *et al.*, 2021)	

3.5.7 Achieving outcomes

Few of the included studies measured outcomes. Authors tended to describe the outcomes they believed they were more likely to achieve using 'Co' approaches. These included more relevant research products, more usable knowledge, outputs more likely to be implemented in practice, and improved health.

More accessible, relevant and acceptable knowledge mobilisation products

Two teams perceived that their 'Co' approach helped overcome the problem of research and research findings seeming inaccessible and irrelevant to non-academic audiences by avoiding professional jargon and taking into account local contexts and needs (Grindell _al et_., 2020, (Wolstenholme, Poll and Tod, 2020). Other authors felt their use of visualisations and Design artefacts improved the accessibility of knowledge by simplifying complex concepts (Grindell _et al._, 2020; Knowles _et al._, 2018; Ospina-Pinillos _al._, 2019; Dal Mas _et al._, 2020; Wolstenholme, Poll and Tod, 2020). Several other studies felt making research and its findings more accessible and relevant was an important outcome and one of the main drivers for using a 'Co' approach (Fonseka _et al._, 2019; Thompson _et al._, 2020; Wolstenholme, Poll and Tod, 2020).

> _'The participation of end users in the design process ensured that the prototype was accessible to individuals of varying literacy levels with a range of cultural differences'_ (Ospina-Pinillos, _et al._, 2019)_.

Authors indicated that by using collaborative approaches they could produce more engaging, functional, practical and acceptable products (Grindell _et al._,2020., Ospina-Pinillos _et al._, 2018; Ospina-Pinillos _et al._, 2019; Ospina-Pinillos _et al._, 2020; Livings _et al._, 2020; Yeganeh _et al._, 2021). Findings from user testing of prototype functionalities for an e-mental health management system supported this view (Ospina-Pinillos _et al._, 2018; Ospina-Pinillos _et al._, 2019; Ospina-Pinillos _et al._, 2020). Authors felt that their participatory 'Co'approach could: '_help ensure the end product meets everyone's needs; improve usability; and increase engagement of users'_ (Ospina-Pinillos _et al._, 2018)_.

<u>*More usable knowledge products*</u>

A number of authors felt that their 'Co' approach produced outputs with potential to be useful and useable in practice (Grindell *et al.*, 2020; Fonseka *et al.*, 2019; Ospina-Pinillos *et al.*, 2020; Heaton *et al.*, 2016; Reeve *et al.*, 2016; Knowles *et al.*, 2018; Fonseka *et al.*, 2019; Wolstenholme *et al.*, 2019; Yeganeh *et al.*, 2021). Several felt that their outputs were more likely to be accepted and therefore more likely to be acted upon and used, leading to successful changes in practice (Grindell *et al.*, 2020; Heaton, Day and Britten, 2016; Reeve *et al.*, 2016; Revenäs *et al.*, 2018; McCutcheon *et al.*, 2019; Wolstenholme *et al.*, 2019; Boland *et al.*, 2020; Thompson *et al.*, 2020). Authors felt that outputs would be fit for purpose in the real world because their 'Co' approach ensured cultural and contextual factors were captured and used to inform their generation (Grindell *et al.*, 2020., Reeve *et al.*, 2016; Revenäs *et al.*, 2018; Wolstenholme *et al.,* 2019).

> *'Including people with lived experience in guideline development can aid improved understanding of treatment options, greater involvement in health care decision making, and increased satisfaction in primary and secondary health care. This model can be used to ultimately produce a product that has real-world utility for patients and their families'* (Fonseka *et al.*, 2019)*.*

Considering cultural and contextual factors *'could result in better products that are more functional in real-life settings'* (Ospina-Pinillos *et al.*, 2020)

Few studies carried out formal evaluation of their outputs, however data collected in four studies indicated that the process could produce useful and easy to use outputs (McCutcheon *et al.*, 2019; Dal Mas *et al.*, 2020; Wolstenholme, Poll and Tod, 2020; Yeganeh *et al.*, 2021).

<u>*Implementation in practice*</u>

Authors proposed that because their research was more relevant, acceptable and usable it was more likely to be implemented in practice. A number of studies provided insights into how their outputs had been implemented and impacted on clinical practice both locally and nationally (Heaton, *Day and Britten*, 2016; Reeve *et al.*, 2016; Wolstenholme, Poll and Tod, 2020; Dent *et al,* 2016; McCutcheon *et al* 2019; Miller *et al*, 2016). For example, one study

found that their 'Co' approach intervention led to clinicians identifying and assessing more patients with chronic pain (McCutcheon *et al.*, 2019)

> *"because of our adoption of the Toolbox, our implementing clinicians have assessed chronic pain in over 70% of their pediatric patients who may not have otherwise discussed their chronic pain''* (McCutcheon *et al.*, 2019).

Two casebooks used the Integrated Knowledge Translation approach to ensure research outputs were more implementable (McCutcheon *et al.,* 2019; Boland *et al.*, 2020). Other studies found that prototypes incorporating culturally and contextually specific information had the potential to aid implementation (Grindell *et al.*, 2020; Ospina-Pinillos *et al.*, 2018; 2020; Ospina-Pinillos *et al.*, 2019; Wolstenholme *et al.*, 2019).

It was acknowledged that implementation and sustained engagement with outputs was challenging. In order to achieve sustainability and long term impact after research teams departed, there was a belief that local champions were required to continue to drive implementation forward (Dent *et al.*, 2016). Additionally, most of the studies in this review produced outputs that required further refinement before being ready to be implemented (Revenäs *et al.*, 2018).

Improved health

None of the included studies in this systematic review undertook an in-depth post-implementation evaluation; nor did they measure or report on specific health outcomes. Many of the authors aspired to, and in some cases reported, the goal of improving healthcare outcomes and quality of care (Grindell *et al.*, 2020., Knowles *et al.*, 2018; Fonseka *et al.*, 2019; Wolstenholme *et al.*, 2019; Dal Mas *et al.*, 2020; Livings *et al.*, 2020, Miller *et al.,* 2016). However, these claims were not based on robust evaluation data and evaluation methods were not clearly reported. A number of authors felt that improving the relevance (Ospina-Pinillos *et al.*, 2018, 2020; Fonseka *et al.*, 2019; Miller *et al.,* 2016), acceptability (Livings *et al.*, 2020; Ospina-Pinillos *et al.,* 2020) and usability (Ospina-Pinillos *et al.*, 2018, 2020) of outputs would improve outcomes or quality of care. Livings *et al* (2020) felt that a Co-designed conservative model of care for people with OA would be more acceptable and less likely to fail.

> *'the development of a codesigned conservative model of care involving patients, clinical staff, members of the public and other stakeholders is more likely to be accepted by both providers and users, resulting in a higher rate of stakeholder satisfaction, continuous improvement and a reduced failure risk'* (Livings et al., 2020).

A few studies demonstrated actual changes in practice as a result of introducing the Co-Designed outputs. Outcomes included improved consistency in clinician assessment and identification of patient problems that were previously missed (McCutcheon *et al.*, 2019), changes to clinical pathways (Heaton, Day and Britten, 2016), fewer hospital visits and admissions (McCutcheon *et al.*, 2019), and a reduction in the number of patients who failed to attend appointments (Wolstenholme, Poll and Tod, 2020). Additional positive outcomes, such as patient satisfaction, were either shown or perceived to be possible (Reeve *et al.*, 2016; Fonseka *et al.*, 2019).

3.6 Discussion

3.6.1 Summary of findings

From the 24 included studies authors' main reasons for choosing a 'Co' approach were: 1. Bringing people together. 2. Valuing all knowledge. 3. To produce more relevant research products. 4. To improve health outcomes. These were achieved by, for example, identifying and meeting all stakeholders' needs and enabling trust and confidence in the outputs. However, there was little evidence that these approaches improved health because of the lack of robust evaluation of any of the interventions produced. Despite this, the findings provide useful insights into how 'Co' approaches might mobilise knowledge in health condition management.

3.6.2 Consideration of related research

The findings are aligned with the five principles for Co-Production described by a leading research funder in the UK (NIHR, 2019). The NIHR (2019) propose the principles of: 1. Sharing power. 2. Including all perspectives and skills. 3. Respecting and valuing all knowledge. 4. Reciprocity and 5. Building and maintaining relationships (NIHR,2019). This review builds on these principles by highlighting activities researchers use to achieve them, further key aspects and mechanisms of action, and articulating the relationships between

them. For example, sharing of power may be facilitated if the 'Co' approach brings people together as active partners and uses creative activities. Building and maintaining relationships may be promoted by using iterative prototyping techniques. The findings from this review suggest that the process of developing adaptable, visible, and tangible outputs helps participants see that their knowledge and ideas have been heard and valued. Participants may have more trust in the process and reciprocity achieved by producing relevant and acceptable outputs that meet everyone's needs.

Langley *et al.'s* (2018) 'collective making' Knowledge Mobilisation model specifically considers the influences of creative practices (Langley *et al.*, 2018). The authors propose that their 'collective making' 'Co' approach influences the participants involved, the knowledge being mobilised, and the implementation of interventions in a number of ways (Langley *et al.*, 2018) similar to the findings in this review. For example, influencing participants by balancing power and voice and enabling articulation of complex concepts; influencing knowledge by accessing, sharing, and valuing different types of knowledge; influencing implementation by creating a sense of ownership and trust in the co-created outputs. My review complements this model and highlights that some researchers believe similar benefits can be gained without the use of creative activities. However, there was no strong evidence from any of the included studies as to whether their approach, creative or not, was better at producing these benefits.

My review demonstrates that there is no 'one size fits all' approach to using 'Co' approaches in health condition management research. All three 'Co' approaches, that is Co-Production, Co-Design and Co-Creation, were used in the studies in this review utilising a variety of activities, from research methods such as interviews and focus groups to workshops using creative activities drawn from design which authors perceived were successful in mobilising knowledge. My review therefore highlights the need for researchers to concentrate on how they carry out their chosen 'Co' approach activities, of which there are many to choose from, based on the principles set out in the framework I developed rather than the name they give their 'Co' approach.

3.6.3 Strengths and limitations of the evidence base

This is the first systematic review of 'Co' approaches for Knowledge Mobilisation for the management of health conditions. The review included a large number of studies. It also resulted in the development of a framework or logic model documenting mechanisms of action and outcomes. However, there were three factors, related to the evidence base, that may have limited the strength of the findings in this review. First, three of the included studies were protocols and therefore had no findings. Second, six of the included papers were assessed to be of low to moderate quality. There are two possible reasons for this assessment. The first being the lack of an appropriate checklist for case study research. The second being the fact that case study research, although an appropriate and relevant way of carrying out this type of collaborative work, is often considered lower down in the traditional hierarchy of the evidence base. Finally, participant numbers were low in some of the included studies. However, I suggest that 'Co' approach research does not necessarily require high numbers of participants. The context specific data this type of research produces is its' strength rather than its' lack of generalisability being a weakness.

3.6.4 Strengths and limitations of the review process

There were five limitations of this review process. First, there was a lack of studies that had formally evaluated the outputs of their 'Co' approach. This may have been because I did not search explicitly for these types of studies. A review focused explicitly on the effectiveness of interventions for knowledge mobilisation might have identified more relevant literature than my review. Second, the inclusion and exclusion criteria selected may have excluded some studies. For example, some collaborative and participatory research that could be deemed to sit under the Co-production umbrella, such as studies using an IKT approach, were not included because they did not explicitly describe their approach as Co-Production, Co-Design or Co-Creation. The focus of my systematic review was on three commonly used terms and Knowledge Mobilisation only. On reflection, I feel that this exclusion criterion was necessary in order to make some sense of this diverse and complex field and I would not change the inclusion criteria. Third, the elasticity of the term 'Knowledge Mobilisation' in the healthcare literature meant that studies that focused on 'knowledge exchange' and' evidence into practice' were considered for inclusion. I had to interpret exactly what

authors meant by Knowledge Mobilisation which may have led to reviewer bias in the inclusion and exclusion process. As I conducted the majority of the screening process, the use of a second reviewer was essential in reducing the extent of any bias. Fourth, the lack of use of MeSH terms may have reduced the number of search results meaning some potentially relevant papers may have been missed. Finally, I was the author or co-author of some of the included papers. This was uncomfortable and required a considerable amount of reflection on my part when considering the inclusion of papers. My bias was minimised to some degree by working closely with a second reviewer and discussions with my supervisors.

3.6.5 Implications

<u>Implications for Knowledge Mobilisation and research</u>

This systematic review was performed to inform the primary research of this PhD and to gain a greater understanding of the different 'Co' approaches being used for Knowledge Mobilisation and why, how and for what purpose in the management of health conditions. Overall, the systematic review suggests that 'Co' approaches show promise in achieving successful Knowledge Mobilisation to improve the way health conditions are managed. However, the findings relied heavily on authors' beliefs, with only some supporting evidence for short term outcomes such as producing acceptable outputs. There is a need for robust evaluation to ascertain the extent to which 'Co' approaches can produce improved health outcomes. A systematic review that evaluates outputs from 'Co' approaches versus those produced using alternative approaches in a diverse range of settings is recommended to assess whether the former are more likely to achieve Knowledge Mobilisation and improved outcomes.

Undertaking research using 'Co' approaches is no easy task and it is a common criticism within the literature that authors rarely report their activities in detail nor the steps they have taken to adapt their methods to align with the key principles of 'Co' approaches (Williams *et al.*, 2020). This was also true for many of the papers included in this review. However, the framework developed in this review, see figure 7 in section3.5.3, is a form of logic model (Mills, Lawton and Sheard, 2019) displaying the pathways through which 'Co'

approaches might achieve desired outcomes. This could be used as a framework to help people using 'Co' approaches for the purposes of Knowledge Mobilisation align their chosen activities to the key aspects and mechanisms, as identified within this review, and the principles of 'Co' approaches articulated elsewhere (NIHR, 2019, Langley *et al.,* 2018). This will aid transparency in reporting and potentially improve an intervention's chance of achieving successful Knowledge Mobilisation.

Implications for the PhD

Only a small proportion of the studies in this review focused specifically on the management of MSK disorders (Dent *et al.,* 2016; Livings *et al*., 2020; Miller *et al.,* 2016, Wolstenholme *et al.*, 2019) and only one on physiotherapy management (Livings *et al*., 2020). Despite this, the framework I have developed in this review can still be used, alongside the other 'Co' approach principles already highlighted in this review, (NIHR, 2019, Langley *et al*., 2018) to guide the Creative Co-Design phase of my primary research. This is because these are overarching principles and frameworks for 'Co' approaches in health condition management, which includes many different types of conditions and disorders including MSK, and therefore can be used as a guide for healthcare research in general including my PhD focusing on MSK physiotherapy.

Creative Co-Design fulfils, in theory, many of the key aspects and mechanisms of action identified in the framework I have produced, for example bringing people together as active and equal partners, using a creative approach and iterative prototyping, attending to power and voice. I therefore used the framework to guide the Creative Co-Design workshops and activities in Phase 3 of this PhD study to ensure they fulfilled in practice the key aspects and mechanisms of action required to produce outputs that successfully aid Knowledge Mobilisation in MSK physiotherapy.

3.7 Chapter summary

Based on a systematic review of 24 papers I have produced a framework for guiding my primary research. I used this framework in Phase 3 of my PhD. By describing the 'Co' approach processes in detail, I have added to the body of evidence to enable future

researchers to examine the link between Creative Co-Design and outputs that are aimed at improving Knowledge Mobilisation.

Chapter 4
Methodology and Design of the Primary Research

4.1 Chapter overview

In this chapter, I will describe my approach to the primary research in Phase 2 and Phase 3 (the observations, semi-structured interviews and the Creative Co-Design). I will:

- Remind the reader of the aim and objectives of the primary research.
- Discuss the participatory research paradigm in which the study is undertaken.
- Present the role of stakeholders within my research and the rationale for the multiple qualitative and participatory methods I used to collect data.
- Describe the theories and frameworks within the fields of Knowledge Mobilisation and Co-Design that were considered during the primary research phase.
- Outline the ethical considerations for this study.

4.2 Aims and objectives of the primary research

Aim:

To use Creative Co-Design to improve the way knowledge is mobilised by MSK physiotherapists and patients.

Objectives:

a) To understand the factors that influence Knowledge Mobilisation in MSK physiotherapy practice from a physiotherapist's perspective.

b) To understand the factors that influence Knowledge Mobilisation in MSK physiotherapy practice from a patient's perspective.

c) To Co-Design prototype solutions to aid Knowledge Mobilisation in MSK physiotherapy practice.

4.3 Research paradigm

4.3.1 A qualitative and Participatory Paradigm

I believe that Knowledge Mobilisation is messy and unpredictable and therefore any research on Knowledge Mobilisation requires qualitative research to address this complexity. The primary research in Phase 2 of this PhD can be positioned within 'Big Q' qualitative research that '*uses qualitative tools and techniques within a qualitative paradigm*' as opposed to 'small q' qualitative research which '*uses these techniques within a quantitative paradigm*' (Braun and Clarke, 2022, p.7). Qualitative approaches are advocated within the Evidence-Based Healthcare research arena because they focus on people's attitudes, beliefs and behaviours, and how people use evidence, something that is difficult to measure and find answers to through the use of quantitative approaches (Liamputtong, 2019). Although Braun and Clarke use the term 'qualitative paradigm' (Braun and Clarke, 2013), they also argue that qualitative research is not a research paradigm in itself but an umbrella term for many different approaches that can fall under several different research paradigms (Braun and Clarke, 2022).

Locock and Boaz in their 2019 paper highlight how the boundaries between qualitative research, Patient and Public Involvement and Engagement and 'Co' approaches are less delineated than is often proposed (Locock and Boaz, 2019). I believe that qualitative research could be considered to fit within a participatory paradigm. This is because it places the perspectives, values, cultures and beliefs of participants at its heart but also, as Locock and Boaz (2019) suggest, depending on how it is undertaken, it can be an emancipatory and participatory process (Locock and Boaz, 2019). A predominantly participatory paradigm underpinned the primary research in this doctorate. A participatory paradigm is considered to be democratic, egalitarian and collaborative and involves the action, language and discourse of everyday existence within its process (Howell, 2015). It questions '*the construction and use of knowledge and the importance of power relations that permeate the research process*' (Higginbottom and Liamputtong, 2015 p.2). Participatory approaches provide people with the opportunity to actively engage in the whole research process, that is, from generating knowledge through to disseminating and implementing that knowledge

(Higginbottom and Liamputtong, 2015). They are inclusive, valuing all forms of knowledge and evidence (Brocklehurst, Baker and Langley, 2020)

Both 'Big Q' and participatory research approaches are reflexive, positioning the researcher within the research experience rather than separate to it, and produce rich, thick, descriptive data that is context specific and not necessarily generalisable (Braun and Clarke, 2013, 2022; Liamputtong, 2019; Brocklehurst, Baker and Langley, 2020). Both qualitative and participatory approaches are used for complex intervention development (O'Cathain, Croot and Duncan *et al*., 2019), such as in this research for the development and design of a Knowledge Mobilisation intervention or solution for use in MSK physiotherapy practice. Qualitative approaches are recommended to understand the setting and behaviours of people and participatory approaches to design the intervention to ensure it is fit for purpose (O'Cathain, Croot and Duncan *et al*., 2019). Involving stakeholders throughout complex intervention development and design processes is recommended regardless of the approach taken (O'Cathain, Croot and Duncan *et al.,* 2019, Skivvington et al 2021).

4.3.2 Levels of participation within participatory research

In participatory based research, different aspects of the research cycle are led by the participants, for example, setting the topic or goals of the research and implementing the findings. Other aspects are co-constructed by the participants and the researcher together, such as data collection and analysis and interpretation of results (Higginbottom and Liamputtong, 2015). In theory the whole research task should be jointly owned by both the participants and the researcher (Higginbottom and Liamputtong, 2015). However, in reality this is often not the case, with different parts of the research process often having different levels of participation (Locock and Boaz, 2019; Williams *et al.*, 2020). These different levels of participation can range from low levels, often judged as tokenistic, such as being informants in the process or consulted on certain aspects of the study, and therefore could be considered to not be participatory, through to full partnership working as described by Arnstein in her ladder of participation (Arnstein, 1969;).

In the primary research here, which uses qualitative and participatory methodological approaches, different phases of the study sit within the different parts of the ladder of participation. This was not a fully co-produced PhD study. Different levels of participation

occurred during different aspects of the research. This was for several reasons. First of all, this study was undertaken for an academic qualification, so I had to take a lead overall especially when collecting and analysing data, in order to develop my research skills. However, with my background in Co-Design and Creative Co-Design, a participatory ethos was important to me. I therefore chose a variety of approaches to participation, utilising Patient and Public Involvement and Engagement via a Patient Advisory Group and Co-Design practices, which sit along different points of the participatory spectrum. So, I took an approach to participatory research that allowed me to balance my 'PhD researcher in training role' whilst keeping physiotherapists and patients at the heart of the research process.

4.3.3 Ontological and epistemological position

Qualitative and participatory research can be undertaken within different paradigms, with participatory research viewed by some as a paradigm in itself. The philosophical position that best describes my beliefs and values when undertaking this primary research is 'critical realism'. That is, a position where the existence of truth and reality is acknowledged, but that this truth is inevitably shaped by individual values and beliefs that are bound within the social and cultural contexts and systems that researchers live and work in (Braun and Clarke, 2013, 2022). This means I believe there is not one simple reality and truth but one which is subjective, contextualised and open to multiple interpretations and perspectives (Braun and Clarke, 2022).

I have already described how my definition of Knowledge Mobilisation and how research into Knowledge Mobilisation does not sit in a positivist, evidence-based paradigm where all knowledge is deemed objective and measurable (Cresswell, 2003; Bryman, 2008). Braun and Clarke (2022) describe two epistemological viewpoints that are in contrast to this positivist stance - constructionalism and contextualism. They consider the latter to be a version of constructionalism (Braun and Clarke, 2022). They describe constructionalism to be where the researcher is considered as an *'artist or maker, a composer or storyteller, creating something with their tools and techniques, skills and cultural resources'* where *'talking and writing create realities, rather than simply reflects them'* (Braun and Clarke, 2022 p. 179). Contextualism relies on the subjectivity of the researcher where the *'knowledge produced is*

local, situated and provisional' (Madill *et al.*, 2000, quoted in Braun and Clarke, 2022, p.179) and *'depends on the contexts of the research and the interpretative engagement of the researcher'* (Braun and Clarke, 2022 p. 179). Meaning is 'Co-produced' by the researcher and participants rather than considered to be two separate entities (Braun and Clarke, 2022).

I took a contextualist stance in this PhD. This is because I believe knowledge is generated based on a mixture of perspectives. In my primary research these perspectives were my own, those of the MSK physiotherapists and patients, and they were contextually situated, specifically within the UK NHS system and an MSK physiotherapy setting (Bryman, 2008; Braun and Clarke, 2013, 2022; Green and Thorogood, 2014). I believe the knowledge generated was shaped by my own personal values and those of the MSK physiotherapists and patients, and meaning was Co-Created by my interpretation of what I perceive the physiotherapists and patients' words to represent (Braun and Clarke, 2022).

4.3.4 Experiential versus critical orientation

My aim was to understand physiotherapists and patients' perspectives with regards to evidence use in MSK practice. I therefore took an experiential rather than critical orientation in this PhD. An experiential orientation is where language is considered in a relatively straightforward way. It directly reflects people's thoughts, feelings and beliefs based upon their personal circumstances and social norms (Braun and Clarke, 2022). In contrast, a critical orientation is one where language is considered to be less explicit. Meaning is created and interpreted rather than being a reflection of what a person says (Byrne, 2021; Braun and Clarke, 2022). As is the case with most research positions, these can be thought of along a spectrum and are often not mutually exclusive. In this research, although physiotherapists and patients' accounts were intertwined with my interpretation of them, overall, it is their attitudes and opinions that are most important. I therefore consider this research to be at the experiential rather than critical end of the 'experiential – critical' orientation spectrum.

4.4 Stakeholder involvement in developing and undertaking the primary research

I bring a strong participatory ethos to my work, based on my previous Co-Design experience described in Chapter 1. I wanted to be true to this in my PhD, notwithstanding the limitations of doing the work as a PhD as previously discussed. So, to this end I tried to involve a variety of stakeholders throughout my PhD to make sure the decisions I made were in line with the views and perspectives of physiotherapists and patients.

4.4.1 Physiotherapist engagement

Informal feedback from physiotherapists, including managers, was gained whilst working as a clinician in an MSK physiotherapy department and being involved in peer support and education sessions. Prior to the COVID-19 pandemic, a MSK research group consisting of approximately 10 physiotherapists and a small number of occupational therapists and podiatrists, met quarterly at the NHS Trust in which I undertook my primary research and where I worked. It was my intention to use this group as one of my Project Advisory Groups. I presented ideas for the study to them in the early planning stages. They agreed that it was an important area of research but expressed some concerns, such as the amount of time required for the Co-Design workshops. They felt it may be difficult to release staff due to their service being appointment based and waiting-list-target driven. However, they felt with adequate forward planning, minimal disruption to the service would be possible. They particularly welcomed the opportunity to work together with patients which rarely occurs in a time pressured outpatient setting. They were keen to be involved in a research project that would develop usable practice improvement products rather than just a report. Unfortunately, the group ceased to meet during the COVID-19 pandemic so no further meetings occurred. Instead, I gave regular updates to the Trust's MSK Therapy Management Group, consisting of the MSK Therapy Lead and the two Clinical Service Managers, and to the three participating physiotherapy teams. I discussed the research during local training sessions and sought their feedback regarding plans and progress.

Overall, I presented three times each to the MSK Therapy Management Group and the three participating teams. These presentations took place in 2021 prior to the start of data collection, that is the observations and interviews, then in 2022 prior to and after the

Creative-Co-Design phase. The developed prototypes were also displayed across the MSK therapy sites where feedback was encouraged from all physiotherapy staff and patients. There was change in the MSK Therapy Management structure towards the end of the primary research phase. I therefore met separately with the new MSK therapy lead and then the MSK therapy clinical service managers in 2023. There are plans for me to present my final findings to the participating teams in October 2023 and also to the MSK wider management and governance group.

I had planned that the input from a professional advisory group would be more collaborative. However due to the restrictions that the COVID-19 pandemic posed both on time (non-clinical time including meetings were cancelled in the height of the pandemic), and to the opportunity for face to face engagement, this meant their involvement was much lower down the participatory ladder and more consultation like than I had hoped.

4.4.2 Patient and Public Involvement and Engagement

A local VersusArthritis Support Group agreed to be the Patient and Public Advisory Group for my study. Prior to the COVID-19 pandemic I had attended one of their monthly scheduled meetings to present plans for the project and to discuss the role of a Project Advisory Group with them. There were approximately fifteen people at the meeting and they agreed the topic area was important to ensure up to date evidence is used by physiotherapists so that individual patients' problems are addressed appropriately. They were pleased that patients were going to have a say in the process. They felt they could help as a group in a variety of ways, such as with recruiting patient participants, ensuring appropriate language was used in participant information, and in developing patient topic guides. They provided invaluable input into the Plain English Summary for the Physiotherapy Research Funds application that I submitted (see appendix 4a).

I decided to approach an already established patient and public group due to lack of funds for PPIE initially. They kindly agreed to support my project free of charge. Subsequently costs for their time were included in my successful Physiotherapy Research Funds application (see chapter 1 and appendix 2) and were based on payment guidance from the NIHR (NIHR 2021b).

The Versus Arthritis Support Group ceased to meet during the COVID-19 pandemic. However, five women from the group agreed to continue to support my study. Unfortunately, one of the women dropped out after the second meeting due to work commitments. The remaining group of four were all female, white, predominantly middle class, and aged over 55. We shared information via email and met online at different stages of the project. This was so we could discuss and consider different elements of the study together and I could gain their feedback and advice during the different research Phases. Their involvement included providing suggestions for recruitment, commenting on participant information leaflets, consent forms, interview schedules and Co-Design workshop plans. They provided feedback on preliminary data analysis and they will be actively involved in disseminating findings. I intended that their involvement would be more than informing and consultation. I tried to establish an environment of partnership working where the Patient Advisory Group members' opinions and suggestions were valued, listened to and acted upon. However, there were times, for example during data analysis, where I made the final decisions because it was my PhD. I set a goal to achieve more diversity for the primary research phases. See appendix 4b for Advisory group meeting dates, purpose and outcomes.

4.5 Design and overview of methods

Phase 2 of this PhD, the observations and interviews, is based on 'Big Q' qualitative research (Braun and Clarke, 2021, 2022). This is because of the disordered and unpredictable nature of Knowledge Mobilisation that requires a systems-based view (Holmes *et al.*, 2016; Braithwaite *et al.*, 2018) Qualitative research focuses on words and actions, that is the spoken, written and observed, of people's everyday interactions in the real world (Braun and Clarke, 2013; Liamputtong, 2019). Its strengths include producing holistic, rich, in-depth descriptions of people's thoughts, feelings, beliefs and values, in context, in a flexible and reflexive way (Braun and Clarke, 2013, 2022., Liamputtong, 2019).

I have found a figure in Sanders and Stappers book 'The Convivial Toolbox' (2012) very helpful in terms of helping me to understand that I wanted to go beyond what people said and their explicit knowledge and take a deeper look at what they feel and engage with their latent and tacit knowledge in Phase 3 of this study (Sanders and Stappers, 2012) – See figure

8. This felt relevant to my PhD, which uses both qualitative and participatory methods including Co-Design in Phase 3. This is because, from a Design perspective, Co-Design should include generative 'making' methods such as, imagery, collages, maps and workbooks (Sanders and Stappers, 2012). Creative Co-Design utilises generative 'making' methods unlike other Co-Design approaches. Using the range of methods in Phase 2 and Phase 3, that is observation, interviews and generative sessions, would ensure the views of all stakeholders of the MSK physiotherapy outpatient 'system' were considered in order to influence, shape and create contextualised knowledge to optimise the usefulness of what is produced (Brocklehurst, Baker and Langley, 2020).

Figure 8 Methods and knowledge access (Sanders and Stappers 2012 – with permission)
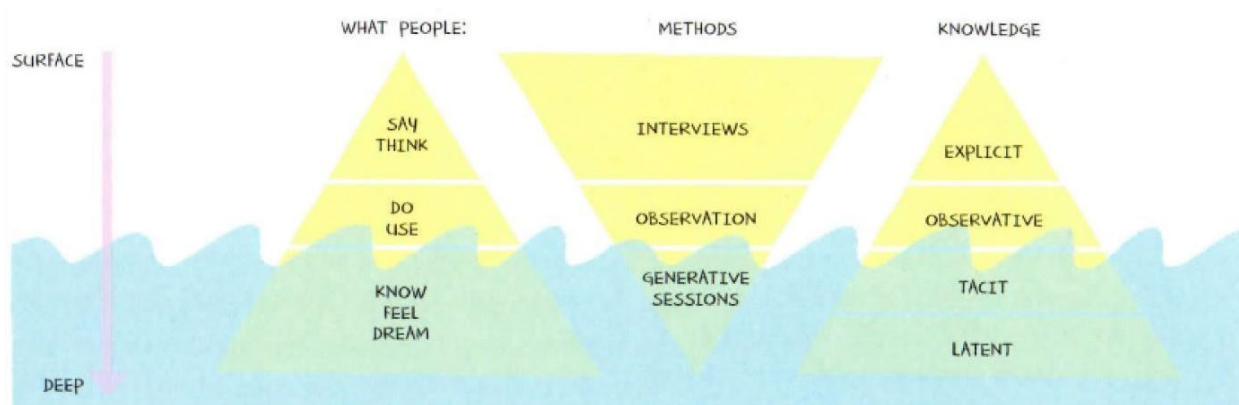
4.5.1 Study Design

The design of the primary research was a predominantly sequential qualitative study including observations, interviews and Co-Design (Mawson *et al.*, 2014; Robert & Macdonald, 2017), in two phases (Phase 2 and Phase 3 of the overall study).

Phase 2

This consisted of non-participant observations and semi-structured interviews to explore physiotherapists' and patients' experiences of using evidence in MSK physiotherapy

practice. Although these methods are used in ethnography, this was not an ethnographic study. The observation phase was not extensive and its purpose was to provide context and an understanding of working practice environments only (Green and Thorogood, 2014).

<u>Phase 3</u>

This consisted of Creative Co-Design to explore physiotherapists and patients' deeper experiences of evidence and knowledge use, identify the key issues, and generate prototype solutions.

The design is summarised in Figure 9. Next I discuss the justification for using the three methods of (i) observation, (ii) interviews, and (iii) Creative Co-Design, including prototyping.

Figure 9 Design of primary research

Phase 2		Phase 3	
Observations	Semi-Structured Interviews	Creative co-design	Prototyping

Contextual knowledge

Contextual knowledge

Idea 1

Physiotherapists experience

Idea 2

Physiotherapists experience

Patients experience

Idea 3

Patients experience

Tacit knowledge

Idea 4

Patient Advisory Group

Physiotherapy Management Group
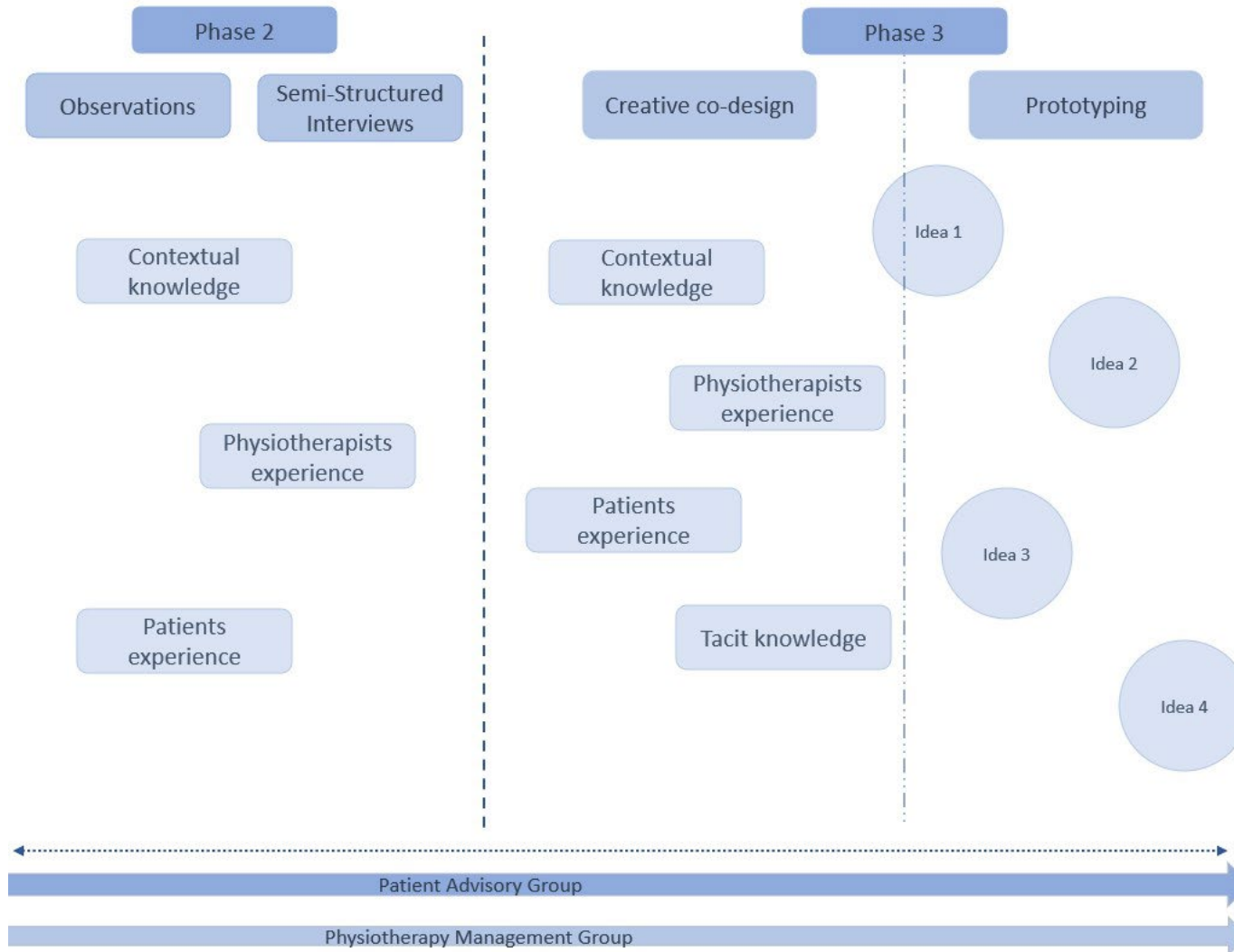
4.5.2 Observational and Qualitative Interview Research

Non-participant observation and qualitative interviews were chosen because of the flexibility qualitative methods allow and their focus on participants' perspectives and what they perceive as relevant and important (Bryman, 2008, O'Reilly, 2012). What these methods are deemed to lack in terms of generalisability is made up for by the depth and richness of the data they produce (Braun and Clarke, 2013, 2022, Bryman, 2008).

It has been suggested that observations and qualitative interviews are appropriate methods to use to assess and understand the research setting and what matters most to people when developing or Co-designing complex interventions (O'Cathain, Croot and Duncan *et al.*, 2019). Greenhalgh and Wieringa (2011) and Gabbay and Le May (2004, 2011) suggest that more research using these types of methods, especially observational work, should be undertaken in the clinical environment in order to better understand how evidence and knowledge influences the decisions clinicians make about patient care (Gabbay and Le May, 2004; Gabbay and Le May 2011; Greenhalgh and Wieringa, 2011)

4.5.3 Observations

Observations allow researchers to gain insight into people's '*behaviors, actions and interactions'* (Hennink, Hitter and Bailey, 2020) in naturally occurring everyday settings (Bryman, 2008; O'Reilly, 2012; Green and Thorogood, 2014). This can be achieved, for example, through shadowing clinical encounters and attending meetings (Green and Thorogood, 2014). This means these *'behaviours, actions and interactions'* are situated within the context of the setting within which they occur (Hennink, Hitter and Bailey, 2020). Observations, such as in the clinical environment, allow the researcher to see what people actually do, not just what they say (Green and Thorogood, 2014; Hennink, Hitter and Bailey, 2020) and record it whilst it is happening (Cresswell and Cresswell, 2018). Observations can either be participant or non-participant, or anywhere along this continuum (Bryman, 2008; Green and Thorogood, 2014; Cresswell and Cresswell, 2018; Hennink, Hitter and Bailey, 2020). Participant observation is where the observer is fully immersed and participating within the field they are researching, such as observing whilst living or working within the community they are researching (Green and Thorogood, 2014; Cresswell and Cresswell, 2018; Hennink, Hitter and Bailey, 2020). Non-participant observation is where the observer

is not a participant in the field (Cresswell and Cresswell, 2018; Hennink, Hitter and Bailey, 2020). This can even be to the extent where they are not present in the field and are observing video footage or documents (Green and Thorogood, 2014). Although I am a physiotherapist and working within the MSK physiotherapy outpatient setting, I chose non-participant observation, where I was present but not participating in the field. This was because this was not an in-depth ethnographic study and I did not want to blur the boundaries between my researcher and physiotherapist roles.

Researchers undertaking observations can undertake them covertly, where their role as a researcher is unknown to those they are observing. The alternative is an overt role, where their researcher role is declared (Bryman, 2008; Green and Thorogood, 2014; Cresswell and Cresswell, 2018). There are pros and cons to working in each way. Although covert observations can allow easier access to settings, there are significant ethical issues associated with it, particularly the inability of participants to give informed consent (Bryman 2008). However, it could be argued that when adopting a covert role the researcher will see the real natural environment as some natural behaviours can be lost when people are being overtly observed (Cresswell and Cresswell, 2018). I chose an overt role in this PhD for a number of reasons. First of all, I was already an employee in the NHS Trust I was conducting my research in. I therefore had access to members of the team including managers who I could discuss access arrangements with. Second, I hoped the familiarity of overtly being a physiotherapist and researcher, rather than just a researcher, would help participants feel at ease in my presence.

In observational research, emic and etic perspectives are important and achieving the right balance between the two can be challenging (Green and Thorogood, 2014). Being an insider can have benefits such as enabling easier access to the environment to be observed and knowing the right questions to ask, but it can mean some analytical distance and the naturalness of the encounter can be lost (Green and Thorogood, 2014). I had a predominantly insider role as I work in one of the physiotherapy teams included in the primary research, have worked in another in the past, but have never worked in one of the teams nor in their departments. This meant I already had some understanding of the issues being explored from my own physiotherapy perspective. I also had working relationships with some but not all of the participants. I therefore was familiar enough with the setting

and potential participants to enable me to ask the right questions but was unfamiliar enough with others - both potential participants and the environment - to maintain some analytical distance.

Observation work usually takes place over a prolonged period of time to enable the researcher to fully immerse themselves in the environment and gain an in-depth understanding of the participants everyday rituals and routines (O'Reilly, 2012). However, it has been argued that observations, even for a short period of time, are useful in qualitative studies to provide background, help formulate interview questions and to understand the constraints participants may be facing (Green and Thorogood, 2014). As I explained earlier, my main purpose for using it was to understand the context in which Knowledge Mobilisation occurred.

4.5.4 Qualitative interviews

Semi-structured interviews allow the researcher to focus on participants' perspectives and what they perceive as relevant and important (Bryman, 2008; O'Reilly, 2012; Hennink, Hitter and Bailey, 2020). Semi- structured interviews offer flexibility compared to structured interviews or surveys. Although a topic guide is used, so the researcher can frame their questioning in order to address their research question, it allows the researcher to adjust their questioning and focus dependent on what emerges during the interview process (Bryman, 2008). Semi-structured interviews allow unanticipated or unexpected issues that may arise to be explored and the conversation can be guided by what is important to the participant as well as the researcher (Braun and Clarke, 2013) Thus more detailed and in-depth information can be gained compared to structured interviews or surveys. In addition, individual interviews can offer depth of understanding compared to, for example, focus groups which could be argued to offer more breadth (Bryman, 2008). I chose to use individual interviews because of the deep and rich data they produce but also because I wanted all participants to be able to feel they could speak completely freely and for as long as they wished. This can sometimes be inhibited in a focus group environment where group dynamics have to be carefully thought about and managed (Bryman, 2008). Some participants may feel unable to give their honest view in front of colleagues or patients and some participants can sometimes take over (Bryman, 2008).

Face to face interviews, although more time consuming, are considered by some scholars to be superior to virtual interviews undertaken by telephone or video-call (Braun and Clarke, 2013; Hennink, Hitter and Bailey, 2020). For example, using the telephone to undertake interviews results in a loss of ability to pick up on body language and visual cues (Hennink, Hitter and Bailey, 2020). The location of the interview can impact on the data generated (Braun and Clarke, 2013; Green and Thorogood, 2014). Choosing a neutral location where the participant is more likely to feel at ease can help minimise power differentials and help establish rapport (Braun and Clarke, 2013; Green and Thorogood, 2014; Hennink, Hitter and Bailey, 2020). For example, undertaking an interview in an academic environment is likely to create a stronger power differential between researchers and participants than an interview within the participant's home.

Undertaking qualitative interviews requires skill. Attention needs to be paid to a number of factors. First, an interview topic guide that focuses on open rather than closed questions and avoids leading questions needs to be carefully developed. This is to enable participants to give more detailed answers and provide information that reflects what is important to them (Braun and Clarke, 2013; Green and Thorogood, 2014; Hennink, Hitter and Bailey, 2020). In order to help establish rapport it is important that the researcher introduces themselves and takes time to become acquainted with the interviewee (Hennink, Hitter and Bailey, 2020). The aims of the interview and the format it will take should be explained at the start before asking the interview questions (Green and Thorogood, 2014). Reassuring participants that there are no right or wrong answers can also help put them at ease (Braun and Clarke, 2013). During the interview it is important to actively listen, not interrupt, and allow silences so that participants have the time and opportunity to tell their own story (Green and Thorogood, 2014; Hennink, Hitter and Bailey, 2020). Following up with prompts and probes and even asking unanticipated questions based on participants' responses is considered acceptable and even desirable in semi-structured interviews (Braun and Clarke, 2013; Green and Thorogood, 2014). The interview topic guide should not be something that constrains the interview nor be strictly adhered to. Being flexible and allowing the interview to be led by what is important to participants is something that all qualitative researchers should aspire to (Braun and Clarke, 2013).

To my knowledge to date no published research exists that has used either observations or semi-structured interviews to explore Knowledge Mobilisation, from patients as well as physiotherapists perspectives, within MSK physiotherapy. The published literature exploring the barriers and facilitators to physiotherapists' use of evidence or Evidence-Based Practice has predominantly used surveys (see Chapter 2).

4.5.5 Creative Co-Design (including prototyping)

What is Co-Design and why use it

I introduced Co-Design and why it has become popular in healthcare research in Chapter 1. I also described how I came to choose the Creative Co-Design approach to use in this PhD. In Chapter 2 I explained how there are many terms and definitions being used in the Co-Design field which is confusing. The literature suggests that trying to unpick and give definitive definitions and labels to the many different 'Co' approaches being used is futile, can be divisive and sometimes mean important work might be missed (B. Smith *et al.*, 2022; H. Smith *et al.*, 2022; Langley *et al.*, 2022). Instead, it has been recommended that researchers accept the diversity of 'Co' approaches and focus on the underlying principles of these approaches and be more transparent in their reporting and the activities they use (H. Smith *et al.*, 2022; Langley *et al.*, 2022; Masterson *et al.*, 2022). This also corresponds to the findings of my systematic review reported in Chapter 3.

One of the key aspects of 'Co' approaches, identified in Chapter 3, is bringing people together as equal and active partners (Grindell *et al.*, 2022). It is this partnership approach where groups of heterogeneous people such as clinicians and patients are brought together, where their knowledge, experience and contributions are equally valued, and where crucially they are able to hear and see each other's different perspectives, that sets 'Co' approaches apart from other qualitative research methods. Using creative approaches is also advocated in my systematic reviews' framework- see figure 7 in Chapter 3.5.3.

What is Creative Co-Design and why use creative approaches

I have described Creative Co-Design in Chapter 1 and 2 as a collaborative approach to problem solving using creative and visual activities drawn from the field of Design (Design Council, 2023; Langley *et al.*, 2018; Wolstenholme *et al.*, 2019; Grindell *et al.*, 2022). It is this

'making' and 'doing' using generative strategies that can tap into deeper, tacit knowledge and encourage wider thinking (Sanders and Stappers, 2012; Moll *et al.*, 2020) than observations and qualitative interviews alone – see figure 8 earlier in this chapter.

Since Design tools and the involvement of a Design Researcher are important in Creative Co-Design it is logical that the Creative Co-Design process follows the Design Councils Double Diamond framework (Design Council, 2023). The Double Diamond is a visual description of the Design process (Design Council 2023). In theory it therefore could be considered a framework to be used specifically with Design tools and techniques. It consists of a series of convergent and divergent thinking stages. The purpose of this process is to ensure the right problems are identified and understood so that the best solutions, to the identified problems, are produced (Design Council, 2023). It is depicted in figure 10 below and will be described in more detail in Chapter 7.

Figure 10 The Design Councils Double Diamond Framework

Discover	Define	Develop	Deliver
A problem is explored through desk and user research. Early ideas are captured.	Research is analysed and ideas synthesised to create a problem definition.	A number of concepts are explored and developed.	Prototyping and testing leads to a final concept being chosen and taken through to delivery.

Problem
A challenge, opportunity, question or hypothesis

Problem definition
The brief

Solution
The final output is produced

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4.6 Relevant theories and frameworks

I hoped to find one theory or framework that would be central to my primary research. However, out of the many theories and frameworks that exist within the Knowledge Mobilisation and Implementation literature I was unable to find a single theory or framework that felt like a good fit. This was despite finding a paper that looked at this from a physiotherapy perspective which used a conceptual Knowledge Translation framework (Hudon, Gervais and Hunt, 2015). After reading the literature I decided that several theories and frameworks felt relevant to the focus of this research rather than trying to 'shoe horn' my study into just one. I made the decision not to narrow these theories and frameworks down for three reasons. 1. My study was inductive. 2, It explored the problems associated with Knowledge Mobilisation, which is an intangible concept. 3. Problems and potential solutions were not pre-defined from the outset. For these reasons I decided to keep an open mind throughout the primary research phases rather than be constricted by one theory or framework in this iterative and inductive PhD research process.

The theories and frameworks I considered included: Ward's (2017) 'Why, who, what and how?' framework for knowledge mobilisers. I used this in the planning stages of the study. The four questions 'Why is knowledge being mobilised?' 'Whose knowledge is being mobilised?' 'What type of knowledge is being mobilised?' 'How is knowledge being mobilised?' and their accompanying categories helped guide my thought processes whilst planning the primary research phase (Ward, 2017). I felt Gabbay and Le May's clinical mindlines were important to consider (Gabbay and Le May, 2004; Gabbay and Le May., 2011; Gabbay and Le May., 2016, Gabbay and Le May, 2023). MSK physiotherapists use clinical reasoning, which involves drawing upon, internalising and making sense of many sources of evidence and knowledge, prior to making decisions. This feels similar to the use of 'guidelines in the head' as per the mindlines model (Gabbay and Le May 2016). I decided not to dismiss the i-PaHRis framework, originally the Promoting Action on Research Implementation in Health Services framework (Harvey and Kitson, 2016) even though implementation alone was not the focus of my study. This was because I consider implementation to be the final key ingredient for Knowledge Mobilisation to be successful. The integrated i-PaHRis framework focuses on the factors required for successful implementation which includes: The quality of the evidence, the context within which it is to

be implemented (both inner and outer layers), the importance of skilled facilitation and tailoring of the evidence into practice (Harvey and Kitson, 2016). Harvey and Kitson (2016) also recognised that evidence was not used in a straightforward way by clinicians and that clinicians rarely directly applied guidelines and research in their practice but adapted it based on the situation. This resonates with the realities of MSK physiotherapy practice. The i-PaHRis also incorporates the importance of individuals both singular and collectively in the implementation and uptake of new knowledge, acknowledging the role communities of practice and collective mindlines play in the process (Harvey and Kitson, 2016). I also explored the Knowledge To Action cycle (Graham *et al.*, 2006) to see if it might be a good fit for Knowledge Mobilisation within MSK physiotherapy practice. The cyclical process consists of a central knowledge creation funnel and active application process that allows knowledge to be tailored to the needs of users (Graham *et al.*, 2006). This cyclical process felt akin to the physiotherapy consultation and tailoring to meet the needs of users is a key mechanism of action for 'Co' approaches for Knowledge Mobilisation.

I found one framework that was specific to AHP's and Knowledge translation. The Translating Allied Health Knowledge -TAHK- framework was recently developed specifically by, with and for AHP's (mainly occupational therapists) (Hitch *et al.*, 2019). It has four components: 1. Doing Knowledge Translation – focusing on the performance of doing Knowledge Translation; 2. Social capita for Knowledge Translation – focusing on the capacity of social networks and relationships to enable Knowledge Translation; 3. Sustaining Knowledge Translation – focusing on long term engagement with Knowledge Translation; 4., Inclusive Knowledge Translation– ensuring being inclusive of all stakeholders is embedded in all aspects of AHP's practice (Hitch *et al.,* 2019); Finally, I considered Langley et al's (2018) Collective Making framework for Knowledge Mobilisation because it specifically considers creative 'making' and Design practices to mobilise knowledge. Its three domains of influence - on participants, knowledge, and implementation - were used, along with the findings from my systematic review, to help guide the content and delivery of the Creative Co-Design workshops in Phase 3 (Langley *et al.*, 2018).

4.7 Ethics

4.7.1 Ethics approval

As this study involved NHS patients as well as NHS staff, NHS ethics approval was gained for the primary research. The application was reviewed by the West Midlands - Black Country Research Ethics committee and HRA approval was gained on the 31st March 2021 (IRAS ID 290081) - See appendix 4b. The project was registered with the NHS Trust Clinical Research office as they were the study sponsor.

4.7.2 Ethical considerations

Important ethical considerations for this participatory study included:

Inclusivity – Participatory research should be a democratic and emancipatory process. Therefore, it is important that care is taken during recruitment to ensure diversity is achieved from both a professional and patient participant perspective in order to fulfil the moral principle of 'no decision about me without me' (Department of Health, 2013; NIHR, 2020b).

Informed Consent- Gaining informed consent from all participants prior to their involvement in research is deemed important to ensure that they have a clear understanding of the research project and what their participation will entail (Hennink, Hitter and Bailey, 2020). Gaining informed consent ensures participants understand and are happy with what their role in the research will be and understand any risks that might be associated with this (Hennink, Hitter and Bailey, 2020).

Low Literacy or English as a second language- It is of vital importance that participants in research are able to understand any information about the research study they are provided with. To address this, study materials should be written in plain English and designed in conjunction with the patient and public advisory group (NIHR, 2014). In this PhD study it was hoped that the creative and visual activities used within the Co-Design workshops would promote inclusivity and overcome some of the barriers associated with language and professional jargon (Langley *et al.*, 2018).

Inconvenience- Involvement in this research would require giving up a significant amount of time to participate in interviews and Co-Design workshops. Thought should be given to the timing and location or venue when carrying out research to minimise inconvenience for participants, but also, in the case of this study, to minimise disruption to the MSK physiotherapy service.

Coercion **–** Recruitment to research studies is challenging. This study would require participants to invest a large proportion of their time. This could be difficult for physiotherapists due to the pressures of working in an appointment based and waiting list driven service and for patients who may have busy lives. Compensating participants for their time and inconvenience is considered good practice (NIHR, 2021b). It is important however that this is not seen as a form of coercion and that participation is voluntary (UKRI, 2023).

Conflict between participants **–** It is well known that bringing heterogeneous groups of people together who have different needs, values and priorities can be difficult due to the inherent hierarchies that exist both professionally and socially within society (Farr, 2018). During the Co-Design workshops in phase 3 there would therefore be potential for conflicting opinions and disagreements within the group. In fact, due to the power imbalances that inevitably exist it could be anticipated that some participants might not feel able or confident to voice their thoughts and opinions and some people might contribute more than others. Care should therefore be taken when developing research and Co-Design activities to ensure power and voice is considered. Using creative activities has been advocated for this reason (Grindell *et al* 2022). In addition, it could be argued that conflicting opinions should be embraced and are even necessary for innovation to occur (Langley *et al.*, 2022; Smith, H *et al.,* 2022) Therefore, the choice of activities and good facilitation skills would be key.

Distress arising from participating in research- When undertaking healthcare research, involving patients and clinicians, it is important strategies are put in place to provide support and empathy to participants should difficult or distressing situations arise. In this study, although it was considered low risk, patient participants could find talking about their experiences of living with MSK problems difficult or emotional and for some physiotherapists acknowledging that their practice could be improved could be challenging.

It was therefore important that plans were in place should these types of situations arise. For example, signposting for further support outside of the interviews and workshops, such as to their GP or counselling services or their line manager or health and well-being services at work.

Maintaining confidentiality- The Declaration of Helsinki states 'Every *precaution should be taken to respect the privacy of the subject and the confidentiality of the patients information'* (Word Medical Association, 1964). This means that information gained through research should not be disclosed to those not involved and that published research findings should protect the identity of the sites and participants appropriately (Green and Thorogood, 2014). This can be particularly difficult when doing research in familiar environments or with colleagues (Green and Thorogood, 2014), which was the case in this PhD study. See Chapter 5 for how the sites and participant identities were protected.

4.7.3 Data management

A data management plan was completed for this PhD study in line with the University of Sheffield's Information Governance policy. I provided detailed descriptions of the different data management considerations that would be needed. These included details about the type and amount of data to be generated, data storage, sharing and archiving (See appendix 4c). I completed the data management plan and shared it with my supervisors prior to commencement of data collection and I reviewed it throughout the data collection and analysis process. In addition, The University of Sheffield data management policies and national Good Clinical Practice guidelines were adhered to at all times (ICH, 2023; University of Sheffield, 2023). For example, encrypted audio recorders and password protected computers were used.

4.8 Chapter summary

In this chapter I have described the research paradigm I consider my study sits within and the critical realist and contextualist stance I take within it. I have given an overview of the and the rationale for the multiple qualitative and participatory methods I used and the many Knowledge Mobilisation theories and frameworks and ethical issues I considered.

In the next chapter, Chapter 5, I describe how the Phase 2 non-participant observations and semi-structured interviews were conducted. I then present the findings of these in Chapter 6. The Phase 3 Creative Co-Design is reported in Chapters 7, 8 and 9.

Chapter 5
Phase 2 Observations and Interviews: Methods

5.1 Chapter overview

This chapter outlines the Phase 2 observation and semi-structured interview process that was undertaken to explore Knowledge Mobilisation in MSK physiotherapy. The chapter includes:

- Aims and objectives.
- Setting and recruitment.
- Data collection.
- Analytical approach.
- Chapter summary.

5.2 Aims and objectives

The aim of Phase 2 was to understand what factors influence Knowledge Mobilisation from MSK physiotherapists and patients' perspectives.

Objectives:

a) To understand which sources of evidence and knowledge physiotherapists draw upon to inform their decision making when assessing and treating people with MSK conditions.

b) To understand the factors that impact on MSK physiotherapists' use of evidence and knowledge in their practice

c) To understand which types of evidence and knowledge patients feel physiotherapists should be drawing upon when making decisions about their care.

d) To understand how physiotherapists' use of evidence and knowledge influences the way patients understand and manage their condition.

5.3 Methods

5.3.1 Study setting

This PhD research took place in a large NHS Teaching Hospital Foundation Trust in the North of England. I had originally planned to undertake this research in two different NHS Trusts. However, the COVID -19 pandemic and subsequent cease to face-to-face working forced me to rethink this plan. In order to achieve what I set out to, in the time I had, I decided to carry out this study at just one NHS Trust, which was the NHS Trust I worked in. This NHS Trust had three MSK physiotherapy outpatient teams serving three very different communities and receiving referrals from different clinical specialities.

 - Team A serves the south side of the city which is generally more affluent, but offers specialist secondary care services for the entire city in rheumatology, neurosurgery (spinal surgery), temporo-mandibular dysfunction and audio-vestibular dysfunction.

 -Team B serves the north and generally less affluent side of the city and their secondary care referrals are predominantly orthopaedic based.

 -Team C provides physiotherapy in a community setting for the whole city with hubs in the north and south. Their referrals come from primary care.

5.3.2 Study population

There are approximately 60 physiotherapists of different grades and experience working across the three teams, serving a diverse population of patients. All of the qualified physiotherapists, NHS bands 5- 8c, who currently worked in either of the three MSK outpatient physiotherapy teams described, were eligible to participate in this study. Adult patients, over 18 years of age, who had received physiotherapy for an MSK condition, from any of the three MSK outpatient physiotherapy teams described, past or present, were also eligible.

5.3.3 Strategy for participant group recruitment and selection

A purposive approach to selecting the participant group was used (Bryman, 2008., Campbell *et al.*, 2020). The intention was to include a cross section of physiotherapists from each of the three teams of different grades and experience including managers, and patients from

different genders, age groups, social and ethnic backgrounds and with different MSK disorders, where possible. As previously stated, the three participating teams and their sites are situated in different geographical locations across the city, with varying socioeconomic status, and serve different clinical specialities, for example orthopaedics, Accident & Emergency, Rheumatology and GP practices. It was hoped that this, along with using a variety of recruitment approaches, for example, face to face, posters and leaflets, email and telephone, would help overcome some of the challenges to achieving diversity in recruitment. I hoped that those participants that agreed to participate in Phase 2 would also agree to participate in Phase 3. However, this was not an absolute requirement.

5.3.4 Participant Group size

My study sits within a participatory paradigm. I therefore chose to use the term Participant Group throughout this thesis rather than the positivist term sample which is often used in quantitative research. I planned to recruit one physiotherapist from each team to observe. For the interviews I planned to recruit physiotherapists of different grades from each team, aiming for approximately 12-20 physiotherapists in total from all three sites (4- 6 from each site). I aimed to recruit the equivalent numbers of patients.

These numbers were only a guide because in qualitative research the optimum numbers for a sample, or Participant Group in this case, is not rigid as in quantitative research. It can vary depending on the time and resources available for the study (Braun and Clarke, 2021b). It could be considered that data saturation may never be achieved in qualitative research as there are always new insights to be made if data is continued to be collected; therefore, decisions on when to stop collecting need to be pragmatic (Braun and Clarke, 2021b). Information power rather than saturation is an alternative way of looking at this (Malterud, Siersma and Guassora, 2016). Factors such as the study aim, the type of study population, the quality of the dialogue and the nature of the analysis technique all inform when sufficient information power may be reached (Malterud, Siersma and Guassora, 2016).

In this study, the aim was broad which could imply a larger Participant Group might be required. But the study population was specific, that is MSK physiotherapists and MSK patients, and therefore smaller numbers could be argued to be sufficient. I am a relatively inexperienced qualitative researcher and therefore my interview technique may not be

optimum at times; therefore, larger numbers could act as a potential safety net. In addition, because my data analysis technique, Reflexive Thematic Analysis, was in-depth, a smaller Participant Group size might be considered adequate. Due to these conflicting factors the mid-range target I set seemed appropriate. It is the richness of the data, not the statistical generalisability, that is desirable in qualitative research (Smith, 2018; Braun and Clarke, 2021b).

5.3.5 Recruitment and consent

Prior to starting recruitment to the study, I presented my project proposal to the three MSK physiotherapy teams at one of their team meetings. This was so the physiotherapy staff were aware of the project and to hopefully spark their interest. I also liaised with the Physiotherapy Service Managers of the three teams. It was agreed that those research activities that would potentially encroach on clinical time, would be planned well in advance to fit in as much as possible with timetabled non-clinical time. Once NHS ethical and HRA approval had been gained I began the recruitment process. See appendix 4b for HRA ethics approval.

First of all, an email invitation to participate in the Phase 2 observations was sent to all the physiotherapists across the three participating teams. See appendix 5a. The email included a participant information sheet, regarding this phase of the study. Once I had recruited a physiotherapist of a differing grade from each team to be observed a second email was sent, including participant information, to all physiotherapy staff across the three teams, to invite them to participate in an interview. See appendix 5b for an example participant information sheet. I collated a list of all the physiotherapists who expressed an interest to participate to ensure I had a range of staff from all three teams of different grades and genders. Reminder emails were sent until I had managed to recruit an adequate number of physiotherapists. Interestingly during the recruitment process for the interviews, I had more interest from male than female physios. I therefore had to change my recruitment focus to female physiotherapists only at one point in order to obtain a more balanced group of participants.

Posters and flyers along with participant information were made available in the departments of the three teams to aid recruitment and raise awareness of the study to both physiotherapists and patients. See appendix 5c.

Once the observation dates were agreed with three physiotherapists, I gained support of a member of the administrative team to help me identify and gain access to patients who would be indirectly observed whilst I was observing their physiotherapists. For teams A and B, this process entailed the admin assistant contacting the patients on the participating physiotherapist's list on the dates agreed. The admin assistant telephoned the patients and asked for their permission for me to contact them. I then telephoned the patients to explain the study, sent them the study details and participant information, which was also available in video format, if they expressed an interest, and then gained their consent prior to the observation taking place. For team C this process was undertaken by the physiotherapist who was being observed because they made their own appointments with their patients. Only those patients' appointments that I had gained consent from prior to the observations were observed.

Patients who had consented for me to be present in their appointment to observe their physiotherapist and had agreed to be contacted again were then approached for the interview phase via email or a telephone call. Because some COVID-19 restrictions were still in place in the participating NHS Trust, such as no group meetings and PPE requirements, I did not spend any time beyond the scheduled observations in the physiotherapy departments to minimise COVID-19 risks. This meant nearly all the patient participants in the interviews were recruited from the observations. I was contacted by two patients about my study, who had picked up a study leaflet whilst attending for their physiotherapy appointment. Only one of these patients was eligible and was recruited to be interviewed.

Despite my best effort during the challenging times of the COVID-19 pandemic, the breadth of diversity I had hoped for was not achieved. I recruited no-one from a black or ethnic minority background to my study despite a wide range of participants being approached and made aware of my study. In the end, the majority of patient participants recruited for Phase 2, and the later Creative Co-Design in Phase 3, had participated in or consented to participate in the observation phase of the study. To this extent I was limited to the type of

patient that attended for appointments on the dates I observed. It was deemed inappropriate and an unnecessary risk, whilst COVID-19 restrictions were still in place, to be present as an additional person in the department in order to recruit for the phase 2 interviews.

Funding was secured from the CSP Charitable Trust Research Funds so that participants could be reimbursed for their time (see appendix 2). Physiotherapists were able to claim extra hours for their time spent on my study. Patient participants received shopping vouchers.

5.3.6 Informed consent

Consent was gained from all the participating physiotherapists and patients in the observation and interview phase prior to the observations or interviews taking place. This was to ensure they understood and were happy with what their role in the research would be and what would be done with the data collected from them. Participant information sheets, either electronic, paper or video were made available to all those interested in participating. All participants were given ample time to read or watch these and talk through any queries with myself. A video as well as written documents were made available to those that preferred this mode of information sharing so those with lower literacy levels could be adequately informed prior to gaining their consent.

Adaptation due to COVID-19

Because of COVID-19 restrictions informed consent was gained either via video-call or telephone call for most participants. I sent the participant a copy of the consent form and then we went through it together, where I read out the consent statements and requested a Yes/No answer to each one. All participants were informed that they could stop their involvement with the study at any time and only had to disclose information that they felt comfortable to do so. I then completed the consent form electronically and sent a signed copy to the participants via email or post.

Face to face consent was gained only in the case of physiotherapists who were available to me on site during my clinical working day. An example consent form can be found in appendix 5d.

5.3.7 Researcher subjectivity and reflexivity on recruitment

I had worked in two out of the three participating teams and therefore knew some of the physiotherapists. It was therefore important that during the recruitment process the project was presented to all staff, not just those that knew me and were familiar with my research work. There was always a risk that those members of staff who had an interest in research or had research as part of their job plan were going to be the ones most likely to volunteer to participate. It was therefore important that I ensured that physiotherapists of all grades with or without research experience or interest were encouraged to engage with the project. I also asked physiotherapists to identify potential patient participants for me as it was not appropriate for me to be physically present in the departments during Phase 2 to facilitate recruitment because of COVID-19 restrictions. However, this was not very successful and led to me having to focus my recruitment on those patients who had already taken part in the observations and had agreed to be contacted again which, as I have already stated, may have affected diversity.

5.4 Data Collection

Due to COVID-19 I was required to complete a risk assessment by the university prior to starting the data collection phase. This was to ensure all COVID-19 restrictions that were currently in place at the NHS Trust were adhered to and to minimise risk of spread especially to potentially vulnerable patients. I had permission to carry out the observations face to face. But it was agreed that all interviews would be completed remotely either via telephone call or video call. This was so patients did not have to attend the hospital at any other time other than for their appointment, reducing travel time, expense and inconvenience and also reducing COVID-19 risk. Remote interviewing also offered flexibility for the physiotherapists and meant if it wasn't convenient for the interview to take place during their working day it could easily take place out of hours without having to organise a suitable venue. The original data collection plan was to observe the clinical context first and potentially alter the focus of the interview topic guides as appropriate prior to the interviews taking place. However, complications due to COVID-19 meant that the two were carried out concurrently.

Observations in the clinical environment were undertaken to gain insights into the culture and contexts of the three participating physiotherapy teams. Semi-structured interviews with physiotherapists and patients were also carried out to explore in more depth the factors that influence Knowledge Mobilisation in MSK physiotherapy practice. Written observations notes were taken, typed up and analysed. The interviews were audio-recorded and transcribed verbatim before they were analysed using Reflexive Thematic Analysis. The following sections will describe the process in more detail.

5.4.1 The observations

Once I had recruited the three physiotherapists, one from each team, to observe we agreed dates and times for these to take place. Unfortunately, due to COVID-19 these dates changed on numerous occasions and the observations took place between July – October 2021, which was a longer period than anticipated. The purpose of the observations was to gain an understanding of the different environments within which the MSK outpatient physiotherapy appointments took place and to see Knowledge Mobilisation in action. That is, I observed the behaviours of the three physiotherapists in their normal working environment and listened to and had conversations with them to gain insights regarding the culture and context of their teams and departments (Bryman, 2008; O'Reilly, 2012). I made written field notes during the observations and therefore prior to attending for the first time made a rough plan of what and how I intended to document what I observed. This plan included headings such as the time, the place and when, how and what I observed. It included both first impressions and sweeping observations as well as specific facts deemed important to the study aims (O'Reilly, 2012).

During the observations I had an overt role as a physiotherapist not just as a researcher. The intention of this was to make me appear more relatable, as I was a physiotherapist myself, to the physiotherapists I observed and hopefully make them feel more at ease and therefore carry on as normal in my presence. I attended online team meetings with teams A and C and online training sessions for all three teams, as well as observing all three physiotherapists face to face in their day-to-day clinical practice. Written field notes were used to record observational data (O'Reilly, 2012). The handwritten field notes were

transferred from my notebook into electronic form shortly after each observation session had taken place. Excerpts of my field notes can be found in appendix 5e.

5.4.2 The semi-structured interviews

I recruited interviewees and undertook the semi-structured interviews during the observation period. This hadn't been my original intention, but a number of observation sessions had to be rearranged because either the physiotherapists or myself were in COVID-19 isolation. Therefore, the interviews went ahead at the same time as the observations, that is between July and October 2021, so as not to hold up data collection and delay the study. The purpose of the interviews was to explore in more depth individual physiotherapists and patient's beliefs, attitudes and experiences of Knowledge Mobilisation in MSK physiotherapy practice.

Interview guides were developed earlier on in the study and submitted with the ethics application. The proposed questions and topics were chosen to ensure the study objectives were fulfilled (Bryman, 2008). Feedback was sought from the Patient Advisory Group in relation to the language, relevance and comprehensibility of the guide (NIHR, 2021a). Their feedback meant that the interview questions were focused on evidence and information rather than knowledge as it was felt that this would be more understandable to participants. I felt comfortable with this at the time as the physiotherapy literature also took more of an evidence rather than a Knowledge Mobilisation stance. In hindsight, I feel the language used in the interview topic guides was perhaps too positivist, especially in the physiotherapy questions. I should have offered up language more akin to Knowledge Mobilisation such as knowledge sharing to reflect that this was a PhD project that focused on Knowledge Mobilisation rather than Evidence-Based Practice. See appendix 5f for the two interview guides that the semi-structured interviews were based around.

All the interviews were undertaken via telephone or video call due to COVID-19 restrictions. They took place at a time convenient for participants and because they were undertaken remotely location was less of an issue. Most of the participants chose to join the interview from their own homes. Interviews were audio recorded with permission and uploaded to the secure university computer drive. The original audio recordings were then deleted from the audio recorder. The recordings were transcribed verbatim by external transcribers

approved by the university and the ethics committee. The transcripts were anonymised prior to being uploaded to NVivo (2020) software ready for analysis. All of the patient participants received a shopping voucher after they had participated in the interview. All physiotherapists could claim the time back.

5.5 Approach to data analysis

Reflexive Thematic Analysis was used to analyse the data collected in Phase 2 of this study. In this next section I will describe Reflexive Thematic Analysis and why it was the analytical method of choice.

5.5.1 Justification for using Reflexive Thematic Analysis

Braun and Clarke (2022) describe their Reflexive Thematic Analysis approach as being very versatile and is suitable for different types of data and research questions that aim to explore people's experiences, views and perceptions as well as people's practices and behaviours (Braun and Clarke, 2022). Reflexive Thematic Analysis was chosen above other types of thematic analysis approaches for several reasons. First, researcher bias is embraced rather than seen as a problem to be managed in Reflexive Thematic Analysis (Braun and Clarke, 2022). The researcher's position is believed to play an important part that inevitably shapes the research and the way the data is engaged with (Braun and Clarke, 2022). I am an experienced MSK physiotherapist still working a small number of hours in one of the participating teams. I would therefore be able to use my experience to help me understand the data and inform the analysis process (Braun and Clarke, 2019, 2022). Second, this approach is theoretically flexible allowing for theory to build, develop and change throughout the analysis process (Braun and Clarke, 2019). That is, a researcher does not have to have a set theoretical perspective that they adhere to from the outset like other approaches (Braun and Clarke, 2019). For example, Grounded Theory where the sole purpose of the analytical technique is to inductively generate theory during the analysis process (Glaser and Strauss, 2017) and to '*never impose anything on the data'* (Corbin and Strauss, 1990 p.94). Neither does it propose the use of a systematic code book, which could be considered more 'small q' than 'big q' qualitative research, such as in Framework Analysis (Braun and Clarke, 2019; Gale *et al*, 2013; Ritchie and Lewis 2003).

Third, Reflexive Thematic Analysis provides a set of guidelines to work with rather than rules to be strictly adhered to so a researcher can work more iteratively between the different phases of the analysis process depending on how a project evolves or if time inevitably becomes a restriction (Braun and Clarke, 2023; Braun and Clarke, 2019). Despite this, it still provides a clear process to follow which is of benefit for early career researchers such as myself and coding can be carried out accurately by one researcher alone such as in a PhD study like this (Braun and Clarke, 2019). Finally, qualitative research usually takes a primarily inductive approach to data analysis where meaning is derived mainly from the data generated, for example as in Grounded Theory (Glaser and Strauss, 2017). That does not mean qualitative data cannot be analysed using more deductive approaches where categories may already have been established in previous work or from existing theory, for example in Framework Analysis (Ritchie and Lewis, 2003). Reflexive Thematic Analysis again takes a more flexible stance regarding inductive versus deductive approaches and allows the researcher to use predominantly one or the other or often even an element of both in order to address the research question posed (Byrne, 2021; Braun and Clarke, 2022). In this study I took a mainly inductive approach to data analysis.

5.5.2 Undertaking Reflexive Thematic Analysis

Reflexive Thematic Analysis has six steps, 1. familiarisation, 2. coding, 3. generating initial themes, 4. developing and reviewing themes,5. refining, defining and naming themes and 6. writing up (Braun and Clarke, 2022). Braun and Clarke describe this as a fluid rather than rigid process to be used as a tool to guide a subjective but systematic, robust exploration and interpretation of the data to identify patterns in a flexible and iterative way (Braun and Clarke, 2023; Braun and Clarke, 2022).

Step 1: Familiarisation

Familiarisation is the start of the Reflexive Thematic Analysis process and is deemed important to develop a deep understanding of the data gathered. First a period of immersion is advocated to gain a *'deep familiarity with the content of your data'* whilst maintaining a critical distance and making notes of any thoughts, either throughout or at the end of this process, that then provide a broad overview of the data set as a whole (Braun and Clarke, 2022).

I started the analysis process by immersing myself into the data set as a whole. I did this by reading each anonymised interview transcript and my observation notes, often more than once. I then critically engaged with the data by asking questions recommended by Braun and Clarke (2022) such as 'how common sense it is', 'why I might be reacting a certain way to it'. I then made rough notes of ideas, patterns and interesting features (Braun and Clarke 2022). See appendix 5g for examples of familiarisation notes and patterns. Finally, I wrote brief but systematic familiarisation notes relating to the dataset as a whole (Braun and Clarke 2022). I presented these overall notes to my Patient Advisory Group and used these preliminary findings to think about what needed exploring further and to inform the third Creative Co-Design phase.

Step 2 Identifying codes

I reviewed all the patients' interview transcripts again and, using NVivo and post-it notes, I applied code labels to segments of data that related to the objectives of this study phase. I then undertook the same process for the physiotherapists' interview transcripts.

I identified over 300 hundred codes. There were more codes for the physiotherapists' interviews than for the patients. I was happy with this disparity because I felt that 'evidence use' was central to the physiotherapists' practice so they had more to say. I had a mixture of latent and semantic codes (Braun and Clarke, 2022). For example, the patient codes *'managing expectations'* and *'dealing with uncertainty'* were more latent and had a deeper more implicit meaning related to my perception of the data's meaning. In contrast the physiotherapist codes, *'lack of access to adequate databases'* and *'conflicting evidence'* were more semantic and explicitly related to language that the participants used in the data. I had more descriptive semantic codes overall, especially for the physiotherapists. Examples of physiotherapist codes are in Appendix 5h.

Step 3 Generating initial themes

I exported all the codes with their associated data segments from NVivo into separate physiotherapist and patient word documents. I then organised the physiotherapist and patient codes into groups of similar codes, initially by title alone and then by reviewing the data segments associated with each. At this point some codes changed names, switched groups, or were removed because they were duplicates or not relevant. Once I was happy

with the code groups, I went back through the data within each code group and explored any patterns and meanings throughout. I used 'Jamboards' (online white boards with post-its) during this process to develop rough visual maps and generate some initial candidate themes and topic summaries. See Appendix 5i for an example of a Jamboard.

Steps 4-6 Developing, Reviewing, Refining, Defining and Naming themes

I undertook the final steps of Braun and Clarke's Reflexive Thematic Analysis simultaneously. This was an iterative process where I moved back and forth between the steps until I had theme names I felt happy with and I felt best represented the data. I wrote initial topic summaries which included candidate themes. These were reviewed and commented on by my supervisors. I reflected on their feedback, reconsidered some of my themes and sub-themes and re-explored their meanings. I then started writing up the findings. During the writing process I continually refined and defined the themes in discussion with my supervisors until I felt that they were a true representation of the participants' perceptions. I then named the themes. I chose quotes that best represented the content within each theme. Some quotes demonstrated more than one issue within a theme or even spanned more than one theme.

5.6 Chapter summary

In this chapter I have described the primary research methods, non- participant observations and semi-structured qualitative interviews, that I applied in Phase 2 of my PhD study. I have also explained the approach to data analysis, Reflexive Thematic Analysis, that I used during this phase. Chapter 6 will now present the findings from the Phase 2 observations and interviews.

Chapter 6
Physiotherapists and Patients Perceptions of Knowledge Mobilisation: Phase 2 Findings

6.1. Chapter overview

This chapter presents the findings from the Phase 2 observations and physiotherapist and patient semi-structured interviews. It includes the following sections:

- Description of the participants.

- The observation findings, including reflections on their purpose.

- The semi-structured interview findings:

  o The physiotherapist interviews.

  o The patient interviews.

  o Commonalities and differences between the two sets of interviews.

- Chapter summary.

6.2 Description of participants

In total, eight sessions or 24 hours of non-participant observations of three physiotherapists, one from each participating team occurred between July – October 2021. Semi structured interviews with 14 physiotherapists and 13 patients took place concurrently, alongside the observations. Interviews lasted between 45-80 minutes.

See tables 4, 5 and 6 for details of the participants involved in Phase 2. As the tables show, I recruited a broad spectrum of physiotherapists from different grades across the three teams with a fairly even split of male to female. The patient participants however were predominantly female with a high proportion over 60 years of age.

Table 4 Observation participant details

Participant ID	Grade	Case load	Team	Observation date and site	Observation date and site	Observation date and site
PTO1	6/7	Mixed orthopaedic	Team B	July 2021	October 2021	-
PTO2	5/6	Mixed primary care	Team C	July 2021 Site 1a	August 2021 Site 1a	September 2021 Site 1b
PTO3	8a	Specialist (Joint specific)	Team A	September 2021	September 2021	September 2021

Table 5 Interview participant details - Physiotherapists

Participant ID	Sex	Grade	Site	Interview date	Phone/video/Face To Face
PT01	Female	5 Junior	B	July 2021	Face To Face
PT02	Female	7 Senior	C	July 2021	Videocall
PT03	Male	8a Specialist	C	July 2021	Phone
PT04	Male	6 Senior	C	July 2021	Videocall
PT05	Male	6 Senior	A	July 2021	Phone
PT06	Female	8a Specialist	B	July 2021	Videocall
PT07	Male	6 Senior	C	July 2021	phone
PT08	Male	5 (static) Junior	A	July 2021	Phone
PT09	Male	5 Junior	A	July 2021	Phone
PT10	Female	5 (static) Junior	B	August 2021	Phone
PT11	Male	7 Senior	B	August 2021	Face To Face
PT12	Female	7/8a Specialist	A	September 2021	Phone
PT13	Female	8a Specialist	B	October 2021	Videocall/Phone
PT14	Female	B5 (static) Junior	C	October 2021	Phone

Table 6 Interview participant details - Patients

Participant ID	Age	Sex (Male/Female)	MSK condition	Site	Interview date	Phone/Videocall
P01	79	Female	OA (multi joint)	C	August 2021	Videocall
P02	64	Female	OA Knee/surgery	A/C	August 2021	Videocall
P03	31	Male	Knee surgery	B	August 2021	Phone
P04	62	Female	Shoulder/Ankle	C	August 2021	Phone
P05	87	Female	OA hip/surgery	A/C	August 2021	Phone
P06	66	Female	Back pain/fibromyalgia	C	August 2021	Phone
P07	34	Female	Back pain	C	August 2021	Phone
P08	77	Female	Back pain	C	August 2021	Phone
P09	21	Female	Temporomandibular Joint	A	September 2021	Phone
P10	64	Female	Shoulder fracture	B	September 2021	Phone
P11	53	Male	Temporomandibular Joint	A	October 2021	Phone
P12	71	Male	Shoulder surgery	B	October 2021	Phone
P13	60	Male	Shoulder surgery	B	October 2021	Phone

6.3 The observation findings

In this section I present the observation findings. I feel it is important to highlight here that the observation data was not analysed in-depth. This was because its purpose was to provide purely background context to the three teams and their working environments. I explained in chapter 5 how it was the findings from the initial familiarisation with the observation and interview data that was used to inform the Phase 3 Creative Co-Design. This is because the in-depth interview analysis data, based on the subsequent steps of the Reflexive Thematic Analysis approach, took time and was not complete prior to starting Phase 3. Working in this way ensured that momentum was not lost during the study but also that the in-depth analysis was not rushed. The preliminary interview findings, from the familiarisation stage of analysis that were used to inform Phase 3, can be found in Appendix 6. The in-depth interview findings are presented later in this chapter.

6.3.1 Overview of the observation findings

In this section I present the key contextual and other factors that appeared to influence Knowledge Mobilisation from the observational data gathered.

The clinical environment

There were different facilities and systems available to the different teams which could affect the way evidence and information was accessed and shared. For example, different shared computer drives and different electronic booking and investigation retrieval systems.

Local training sessions and meetings

Meetings and training sessions took place separately for each of the participating Teams A, B and C. They were being delivered online during the observation period due to Covid-19. Team meetings tended to focus on operational issues and were led by the team managers. The Senior Specialist Physiotherapists predominantly led the training sessions that were more clinically focused. These seemed to be highly valued by physiotherapists. In fact, the more junior physiotherapist I observed, PTO2, relied on these the most to keep up to date clinically. These sessions were also an opportunity for staff to come together in groups. This seemed particularly important to Team A which worked more disparately.

How evidence and knowledge is accessed and used during the appointment

There was a clear difference between how evidence and knowledge was accessed and used by the different physiotherapists observed. PTO3 was one of the clinical leads who specialised in a very specific disorder. They had disorder specific evidence-based leaflets, that they had developed specifically for their speciality, that they used with patients. One of the sessions observed with PTO1 was for people who had had upper limb surgery. During this session PTO1 had access to a physical folder containing post operative protocols. The protocols had been developed by the specialist upper limb physiotherapy clinical lead together with the Orthopaedic Surgeons. So PTO1 could use these protocols to guide their patient treatment. PTO2, who had a mixed primary care MSK case load, had no access to disorder specific leaflets, protocols or guidelines in their clinical room.

Despite these differences most of the time all three physiotherapists appeared to, and confirmed when asked, to base the majority of their decision making on evidence and knowledge from memory.

How knowledge is shared with patients

All the physiotherapists observed shared knowledge and information with patients verbally. PTO3 used images from their disorder specific leaflets, either paper copies or electronically, to help with explanations to patients. This did not occur with PTO1 and PTO2. PTO1 and PTO2 did sometimes utilise printed exercise sheets with patients. The process of providing these was often time consuming especially as printers were not located in clinical rooms.PTO2 had the ability to text message links to exercises or information to patients via the electronic booking system. This system was not available to PTO1 and PTO3.

Factors that influence knowledge acquisition

PTO3, who was a specialist clinical lead, considered their knowledge and ideas to be borrowed from elsewhere. That is, courses and specialist interest groups, national and international, were their main sources of evidence and knowledge. They attributed their use of images in their leaflets to their colleagues in Holland who they believed used images and models much more in their practice and communication with patients. PTO1 and PTO2 considered training sessions, along with asking their peers, as their main source of knowledge acquisition during the working day. All three physiotherapists expressed that they accessed information from the internet via webinars and social media outside of work to differing degrees.

Influences of systems and documentation

For Team C and PTO2 all documentation was computerised. This was not the case for Teams A and B where clinical notes were still in paper form. All had the use of clinical assessment proformas to help guide their initial assessment of patients. All patient notes, whether computerised or handwritten, were completed between patient appointments, that is after one patient leaves and before the next patient is called in.

Patient appointments were made by a member of the admin team for Teams A and B. Team C and PTO2 had to make patient appointments themselves. This encroached on the time

spent with patients. Waiting times were different for each of the three teams. Team C and therefore PTO2 had the longest wait times which meant patients would often have very long gaps between their appointments. Further details from the observation findings can be seen in Table 7.

Table 7 Observation findings – Contextual factors that influence Knowledge Mobilisation in MSK physiotherapy

	Team A PTO1		Team B PTO3	Team C PTO2
	Site 1a	**Site 1b**		
Type of site	Sports Centre	Sports Centre	Hospital	Hospital
Type of case load	General MSK	General MSK	Specialist – joint specific	Post orthopaedic surgery
Environment	Treatment rooms away from main leisure centre area. Small waiting area with TV. Some posters on wall.eg. COVID- 19 and activity promotion. No leaflets visible. Small individual treatment room with a sink, desk, computer (no printer), PPE station, plinth, chair. Minimal equipment. eg. x2 dumb bells.	Waiting area directly outside treatment rooms. A few posters non MSK on the wall. No leaflets visible. Individual treatment rooms with a sink, PPE station, desk, computer (no printer), plinth, chair. Minimal equipment.	Multi discipline MSK outpatient department. e.g., Includes rheumatology department and pain clinic not just physiotherapy. Main waiting area with seating, TV – not on, no leaflets, posters etc. Small therapy gym. Small communal notes area – not really used since COVID - 19. No seating outside therapists room. Small individual room. Computer (no printer), plinth, chair, PPE. Nothing on walls.	MSK therapy outpatient specific department. Moderately sized waiting room with some leaflets in racks – some quite old and out of date and not NHS MSK therapy specific. e.g., Arthritis UK. Some research posters on wall. Small 4 bedded bay for speciality sessions. Small therapy gym. Treatment rooms with computer (no printer), desk, chair plinth. odd dumb bell. Nothing on walls
Local departmental training sessions	Observed x1 – online. Senior led – which is the norm.	Training session not observed but same format as site 1a.	Observed team meeting not training session.	Observed x1. Online.

148

	Very large disparate team therefore some training is pathway specific i.e. upper limb, lower limb, spinal in smaller groups and shared between all grades. Observed session. A service update about different classes currently running. No mention of evidence. But normally very evidence based. PTO1 states relies on training sessions to get the information they need, as can't find it on shared computer drive or do not know where to look.		General information sharing e.g., staffing, waiting lists etc. Clinical leads give any updates on service but usually new guidelines, evidence review would be in training sessions which at present are online and senior led.	Senior led. Evidence based with references. Very practical and clinically focused.
Use of explicit evidence during clinical consultation	No use of leaflets or info on computer. Evidence was not formally discussed. Relies on own knowledge from memory for clinical decision making.	Same as site 1a. Occasional explicit evidence use with patient eg. Movement and strengthening is best for arthritis. Public health messaging used eg. smoking affects healing. Relies on own knowledge from memory for clinical decision making.	Specialist clinician, specialising in one disorder/joint. Has developed own specialist leaflets, some have links to evidence on them. Uses these with patient either on computer screen or as physical paper leaflet. Uses acupuncture even though low evidence. '*Doesn't care if psychological response if works for patient.' 'Can show people*	Folder with post operative protocols in room. No obvious use of formal evidence. Post op protocols developed by Extended Role Physiotherapist and orthopaedic surgeon. Uses post op protocols as appropriate otherwise relies on own knowledge from memory for clinical decision making.

149

			pain can change and give them hope.' Relies on own knowledge from memory for clinical decision making.	
Knowledge and information sharing with patient	Verbal. Sometimes gives email links to videos, websites etc. Sometimes hand draws exercise or videos patients doing them on patients' phone. Did not do this during observation period. Can text message patients web links etc through electronic booking system. Deals with expectations and motivation to some extent by advising patients it takes a long time (months) to see changes in strength when exercising.	Verbal. Printed out an exercise sheet for a patient but process was time consuming. Had to leave patient in room while went to printer. Wrote down a website for another patient to look at with son (as no internet their self).	Verbally but with support of images from information leaflet that puts up on computer screen e.g. Images of anatomy, visuals of exercises. Did reference evidence e.g. Evidence from Holland regarding choice of exercises given to patient. Uses term 'Gold standard' in relation to imaging/MRI. Treatment described as '*homework*' to patient. Uses reminders with patient e.g. stickers around house or App. Advises 2 months to see change. One patient has previous leaflets in folder at home.	Verbal. Use of printed exercise sheet with x1 patient but again time consuming and had to leave room to get printed sheet.
Acquisition of knowledge and evidence	Too much information sent via email.	As for site 1a	Clinical lead.	Training sessions.

150

	Shared computer drive – too much and disorganised. Colleagues available to ask. Particularly likes messaging function on computer booking system when can't access colleagues FTF. Local training sessions are the best place to get evidence and find out where it is on the shared drive etc. Use of google to look up things during work and social media in own time. Some posters with info re ex referral scheme, walking groups for pts etc, staff PROUD values in waiting area but little in physiotherapy room		Has done international training and has links internationally for specialist area. They lead the training sessions. They have developed evidence-based leaflets for speciality area. All ideas/information are *'stolen' – 'not mine'*– from courses etc. Specialist joint treatment is prescriptive but adapts to patient. Perfect outcome is patient understands benign diagnosis. ie; fears allayed. Assessment/treatment format is: looks, talks, shows, gives leaflet. All visuals came from Dutch colleagues who use images and models much more in their practice. Courses and special interest group is their main source of evidence.	Is reliant on what is taught by others/asking other colleagues (Extended Scope Physiotherapists) – *'how would you know what you don't know without ESPS'.* Accesses colleagues face to face no messaging function on computer system - different system to site A. Although now have MS teams but isn't used for this purpose. A 'mini' mentor session took place with senior during observation. Few minutes spent discussing problem patients. Post op protocols in folder on desk to refer to. Filing cabinet in room used mainly for notes or paper work but does contain a paper copy of L.Funk shoulder rehab book with lots of shoulder exercises to refer to. Accesses online courses, online videos/webinars in own time e.g. Jo Gibson shoulder assess videos *'Don't always use best evidence but do my best'*

			Specialist consultant who they work closely with emails research papers to them. Can't access university system even though teaches at University. NHS library charges to get papers for you. Describes the joint they specialise in as one joint two muscles. If know pathology and anatomy much easier to diagnose and treat. There is one specialist or '*Guru'* they respect and use their evidence a lot – YouTube videos.	Google, research papers, shoulder doc website *'Choose what works and what's doable'.* *'Lazy evidence, what has worked before what used to.'* Uses *'Common sense and evidence.'*
Systems and documentation	Proforma on electronic system to guide assess. Notes computerised and linked to electronic system- can access GP notes, bloods etc, Can message GP and colleagues via the system and share information for advice on. Notes written after patient leaves and before next patient called in.	As for site 1a	Uses joint specific proforma to guide assess. Uses information from referral letter and how to relieve symptoms leaflet to aid assessment and treatment. Paper notes. Written during and after appointment/between patients.	Paper assessment proforma to guide assessment. With space to write which post op protocol used. Blank sheet used for follow up appointment notes. Paper notes filed in physios own draw in filing cabinet in notes area – separate to treatment room. Written during appointment and after patient left room.

	Physio manages own diary therefore makes own follow up appointments while patient with them. 6-8 weeks between appointments.		Appointments made at reception i.e. doesn't take up appointment time. 3-4 weeks between appointments.	Next appointment agreed with patient and made at reception by admin team. 2- 4 weeks between appointments.

6.3.2 Reflections on the observational data collection and its use

Understanding the environment and context within which research is to be undertaken or a complex intervention is to be used is important (Green and Thorogood, 2014; O'Cathain, Croot, Duncan *et al., 2019*; Gibbons, 2000). I therefore felt at the start of this PhD that observations were an important, even if only small, part of this study.

Originally, I had planned to carry out the primary data collection in two different NHS MSK physiotherapy departments. That is, not just in the NHS Trust that I work in and am familiar with. I therefore felt that observations of the environment and Knowledge Mobilisation in action would be essential, to understand and compare the different NHS MSK physiotherapy teams. Unfortunately, due to Covid-19 this did not happen. I made the decision to carry out the primary research at one site and chose the site I was familiar with. I felt that this was the best decision at the time because Covid-19 restrictions were going to make face to face data collection difficult. I felt that undertaking data collection at a site where I already had connections would make this already difficult situation slightly easier.

 I gained some useful insights observing the physiotherapists from the three participating teams, as can be seen in section 6.3 and Table 7. I was however already familiar with two of the settings and had some understanding of the team dynamics. In hindsight, my already embedded knowledge of the inner workings of the teams and of MSK physiotherapy practice may have diminished the significance of the observation data that I collected. This meant it did not have as big an influence explicitly on Phase 3 as perhaps it could have. Despite this diminished role I still feel the observations played an important part in the study. However, it was implicit through my own (unconscious) subjectivity and reflexivity rather than explicitly articulated during the planning and execution of Phase 3.

6.4 The semi-structured interview findings

In this next section I present the in-depth findings from the semi-structured interviews. I present the physiotherapist and patient findings separately because I used separate topic guides and questions with a slightly different focus for the physiotherapist and the patient interviews. I asked the physiotherapists specific questions relating to how they accessed research evidence and knowledge, as well as how it influenced their practice, whereas the

patients' topic guide focused on the information that they received from their physiotherapists rather than information that they accessed themselves. In hindsight I could have explored this in the patient interviews but instead explored it in the Phase 3 Creative Co-Design workshops. I then discuss the differences and similarities between the two sets of findings. I present the findings from the physiotherapists first because it feels important to understand how the physiotherapists interact with evidence and knowledge, from the start to the finish of the Knowledge Mobilisation process. That is how they access evidence and knowledge in the first instance, then make sense of it and share and use it within their practice. It is this process that influences how patients receive and then perceive the information from their therapist.

Quotes have been selected to illustrate the findings. Each quote is labelled: PT=Physiotherapist and P=Patient.

6.4.1 Overview of themes from the physiotherapist interviews

I identified seven themes from the physiotherapist interviews:

1. Access to and accessibility of evidence and knowledge.
2. What's the difference between evidence and knowledge?
3. Influences on Knowledge Mobilisation.
4. The challenges of applying research evidence in practice.
5. Trust in the evidence.
6. Evidence and knowledge sharing.
7. Knowledge Mobilisation requires a person-centred approach.

I describe each theme and their sub-themes below.

1. Access to, and accessibility of, evidence and knowledge

This theme highlights how the landscape is changing, where 'evidence on demand' via internet and social media sources are favoured over the less accessible traditional research evidence and database searches. 'Second-hand evidence', that is, evidence and knowledge that has been accessed and synthesised by others into more digestible forms, is also popular. Peers act as 'human databases' and appear to be the 'database' of choice in day-to-day practice.

1.1 Gold standard, traditional evidence is problematic for physiotherapists

From the data generated it seems that physiotherapists respect research and guidelines and consider them the 'gold standard' evidence that they should always try to incorporate it into their decision making. They admit that the pace at which new research is being produced, although a good thing, means the sheer amount of it can be difficult to keep abreast of and accessing it is not always easy. Research papers themselves were considered quite inaccessible because they tend to be too long, considered boring by some, and difficult to understand and process. The terminology used in them was deemed inaccessible and unnecessarily complicated, putting some physiotherapists off reading them. Physiotherapists found it frustrating that the amount of time it took to read and make sense of research papers did not always equate to time and energy well spent, especially if the findings were not significant or relevant to their practice. Many of the interviewees felt that they did not have the skills or the time to search out and critically appraise research papers properly and therefore were unable to make an informed decision about whether it was relevant or useful for their practice. Overall, there was a desire and preference for research papers and guidelines to be presented in more bite-size, simple, to the point, relevant chunks but without important detail being lost.

> *'One, the accessibility of it. Two, the time it takes to read it. And I think the bulk of it. And when they talk about the quality of evidence at uni and the fact that you've got to appraise it and work out whether it's of good quality or bad quality. And obviously, that takes time that I don't tend to invest in doing something like that and working out whether it is good quality or not'* Junior PT01

Many of the physiotherapists interviewed rarely carried out a formal database literature search to access research papers. The physiotherapists in this study mainly had access to database searches via NHS Athens. If they used this - which many did not- they found it to be far inferior to the access some of their colleagues had via the university. One of the biggest issues was lack of access to free full text papers. This was a huge barrier for a lot of the physiotherapists who felt very strongly that they should not have to pay to read a research article, especially when it may not be useful to their practice. Therefore, a lot of the NHS physiotherapists interviewed would rely on colleagues or family members with university affiliation to access papers for them. Some physiotherapists in the participant

group acknowledged that access to research papers was improving with more open access journals. But using an academic database was still a huge barrier because most physiotherapists felt they were not easy or intuitive to use without training. They would sometimes default to 'google' or 'illegal' sites such as sci-hub, where papers that should be behind paywalls, are made available instead.

> *'I don't think that's very good for us at all. You try and go through Athens at work and it's just terrible. Whereas I know, and don't quote me on this, but x can go through their partner from the university and obtain any paper they want. I can't, unless I'm prepared to pay, which I'm not prepared to pay, left, right and centre, out of my own money for articles. So, I just don't access them or I use these sites that you're not really meant to use, like where you type in the DOI number or whatever it's called and, yes, you can find your article, but is that really the right way to do it? I think some access to academic research is really, really difficult for us.'*
> Specialist PT13

None of the physiotherapists interviewed used the hospital library to access evidence such as research articles or books. Neither did they seek support from a librarian to help them access what they needed. It was clear that those affiliated with the university or doing university courses had much better and easier access to a wider range of databases and evidence resources.

1.2 'Second hand' knowledge and evidence is more accessible

'Second hand' knowledge and evidence, that is, evidence and knowledge resources that have been sourced or recommended and often reviewed and synthesised by other professional colleagues, appeared to be the most popular way of accessing evidence and knowledge within the physiotherapy teams interviewed. There were different types of 'second hand' evidence that the physiotherapists appeared to be drawn to.

Most of the physiotherapists relied on resources that were available to them locally where they work, because of the time and effort and other access issues related to traditional research databases. This included resources such as training session PowerPoints, research articles, post-surgery protocols and national guidelines that were stored on local computer shared drives. These resources were usually curated by their peers such as the Extended Scope or Extended Role physiotherapists (ESP/ERP's) who lead their specialty service

pathways (for example, spinal, upper limb and lower limb). Even though these locally stored resources were there ready and waiting to be read and used, they were not always accessed because there was so much, and it could still be difficult to find.

> *'There's a lot on the (shared) drive and like I said, there's specific folders I go to, but I don't go trawling through every folder because it's massive (the shared drive) I get lost in it, there's that many folders inside folders.'* Junior PT10

Local training sessions were highly valued. They were deemed a useful way to gain access to knowledge and evidence from their peers. These local training sessions were usually led by a senior colleague, who gathered, reviewed and presented the latest evidence-based treatment recommendations in a way that felt more relevant, relatable and applicable to practice than research and guidelines on their own. These local training sessions were an alternative to national courses and conferences which come at a cost, both time and money, especially to more junior or non-specialist physiotherapists who were less likely to receive funding or study leave to attend them.

Small group or one to one supervision or mentoring sessions were another way of seeking knowledge and advice from peers. In these scenarios less experienced physiotherapists would get guidance from more experienced colleagues on how to manage and progress specific patient cases. These one on one or small group sessions would rarely be used to discuss specific recent research findings or papers but offered advice based on their peers' own evidence-based knowledge and experience.

> *'So, for example, things like spinal tracts and cranial nerves. I had a patient that it was all relevant to and I read loads, but I didn't really get it. So, then my senior did an in-service training on it, and we talked about how that all related to my patient, and it made a lot more sense.'* Junior PT01

1.3 The internet and social media as 'evidence on demand'

Where physiotherapists look for and gain access to evidence and knowledge has changed significantly over recent years. The internet and social media has offered opportunities to access both formal evidence such as research papers but also training sessions and discussions with national and internationally renowned, or at least internet and social media renowned, experts and peers. For some of the physiotherapists in this sample, this has revealed a whole new world of opportunities to gain evidence and knowledge as they can

easily access these platforms anytime, anyplace, anywhere via their phones or other digital devices.

> *'But in terms of my keeping current with the evidence, podcasts, webinars, whatever you want to call it, they're part of it now, as much, if not more so, than reading paper journals.'* Senior PT11

Podcasts are one of the new media that seem to have offered an alternative way for physiotherapists to engage with evidence. The data suggests they have been particularly helpful for those physiotherapists who find research papers unappealing or prefer an audio rather than written format. Some of the interviewees reported accessing them whilst walking or driving to work. However, some of the interviewees felt they could be quite long and cause information overload that could be difficult to retain.

> *'I've got a member of staff who would not read an academic paper at all. They're really put off by it, not academic in the slightest. But podcasts have been a real eye-opener for them because for the first time they've engaged with real concepts and recent up-to-date evidence.'*
> Specialist PT03

Webinars have also grown in popularity and offer an alternative to the traditional face to face course or conference. They have the added advantage that they are often free and can be recorded so the physiotherapists can watch them back in their own time from the comfort of their own home. Some of the participants felt that even though some webinars or online conferences such as 'Therapy Live' come at a price, they were still cheaper than attending a traditional face-to-face course or conference, plus there were no travel or accommodation expenses to worry about.

> *'Rather than going to an all-day conference and paying money and travelling, all that kind of stuff, it sounds like a bit of a farce. You can just get the recordings and watch them when you want to. I think it's a lot cheaper, isn't it, than some of the conferences.'* Senior PT04

YouTube videos were a popular way of quickly and easily refreshing assessment and exercise prescription skills. They were also used to access free talks from respected professional peers. Twitter and Instagram were being increasingly used by interviewees, some more than others, to be able to quickly access bite-size pieces of knowledge and

evidence in more accessible and visually appealing formats such as video or infographics. Some physiotherapists reported also being able to access research papers more easily on these platforms. Although some physiotherapists acknowledged that Twitter for example does offer up avenues for discussion and debate, none of the physiotherapists in the interviews talked about engaging in discussions themselves on social media. They therefore seemed to mainly 'lurk' and appeared to be more 'passive recipients' rather than 'actively engaging' in evidence and knowledge acquisition and sharing on these platforms. It seemed that the abundance of differing opinions and heated debates could sometimes be a turn off. However, these heated debates were recognised as a way to see different points of view rather than just one person's opinion.

> *'Accessibility to articles now is something that it's never been before with the use of social media in particular.'* Senior PT05

Various websites were also being used to gather both evidence and knowledge for both the physiotherapists and their patients. It was noted that there were increasing numbers of MSK physiotherapy-specific sites offering access to research summaries and infographics, online training courses and videos. In addition, some national organisations were acknowledged as offering a wide variety of free resources such as the British Elbow and Shoulder Society, National Axial Spondylarthritis Society, and the National Spine Network websites. Information overload was also an issue here. The physiotherapists described how hard it was for them to navigate, choose and absorb the overwhelming amounts of information. The internet and social media could therefore be considered both a gift and a curse:

> *'Sheer volume, just the sheer volume of it. Perhaps there always was the volume but it was buried in the abstracts in the library, and if you didn't go to the library you weren't faced with it. But because it's more on social media, there are more links and more talk about it, more chatter in the workplace about it, you're more aware that there is more out there. And yet for every one podcast you listen to they reference another six.'* Senior PT11

1.4 Peers as human databases

Peers were highly valued sources of evidence and knowledge themselves and were often favoured over seeking out a research article or guideline. They seemed to be the first port of call for physiotherapists if they had a query during their working day. These informal

interactions tended to take place 'on the hoof' either face-to-face, over the phone or via email. There was even an 'ERP hotline', where a specialist physiotherapist would be available for a certain period each day for urgent questions from those physiotherapists who worked in isolation. Those physiotherapists who worked in departments with other members of their team still worked in individual, private treatment rooms. This meant they did not always see their colleagues unless they purposefully sought them out. There was an overall feeling though that there was an open-door policy with regards to access to peers for advice when needed.

> *'I haven't got the time to research the elbow, the this, the that. I mean, I would do, if I needed to, you know, but I just go to x and say, x, what are we doing for Achilles tendinopathy at the minute?'* Specialist PT12

From the data generated it seemed that the specialist physiotherapists, that is the clinical leads, were gatekeepers or curators of evidence and knowledge. Less specialised physiotherapists relied upon them to recommend and signpost them to what they should be reading or needed to know relevant to their practice. Most of the physiotherapists interviewed preferred receiving recommendations from their peers rather than spending the time having to look for less accessible evidence and information themselves.

> *'I'd rather have something recommended to me and someone say, this is going to be really good for you, you need to research this, or talk to somebody that anecdotally has a lot of experience in that area and can help inform you that way rather than spend hours reading research that is not relevant and takes up a lot of time and isn't that applicable to your practice.'* Junior PT10

2   What's the difference between evidence and knowledge?

From the interview data generated it was apparent that the terms 'evidence' and 'knowledge' meant different things to the physiotherapists. Using the two terms during the interviews drew out different responses and encouraged the physiotherapists to consider more broadly what knowledge, not just scientific knowledge i.e., research evidence, influenced their decision-making and practice. This theme gives an indication of how the

physiotherapists perceived these terms and also how their attitudes towards the more positivist research hierarchy, that they are perhaps more used to, were beginning to change.

2.1 A different hierarchy of evidence

The physiotherapists interviewed considered drawing from numerous different sources of evidence and knowledge to inform their practice. Research and guidelines were considered the 'gold standard'. The hierarchy of evidence was acknowledged by some with systematic reviews and randomised controlled trials considered top of the hierarchy. Qualitative research was also recognised as being important. Some physiotherapists felt that qualitative research was important in order to gain a better understanding of patients' experiences, wants and needs, because patients are at the heart of what they do. So, for some of the interviewees there was a sense that this type of evidence was more meaningful to them and was more likely to influence their practice.

> *'So, I suppose you'd be looking for your randomised control trials in terms of the specific evidence that you might be looking at, the double blind one, the gold standard, if you can. Some sort of qualitative data would be useful as well, a combination of those two sorts of things.'* Senior PT05

The physiotherapists interviewed felt that they drew upon anecdotal evidence and did not dismiss it despite this usually being considered bottom of the evidence hierarchy. This was because they recognised that using evidence and knowledge in their practice was not a straightforward process, that is, it is not as simple as 'the formal evidence says this, so you do it'. They described how other knowledge influences the Knowledge Mobilisation process. Experience appeared to play a significant part in physiotherapists' clinical decision-making and physiotherapists of all grades expressed using it to some degree.

> *'I don't really have my own hierarchy, I don't think. I know the academic hierarchies and what I should say, but in reality, day to day, I really do take a big array of all of that. It's not like I would reject an anecdotal bit of advice because that's low hierarchical evidence. I don't actually, it's far more complex than that.'* Specialist PT03

2.2 Combining evidence and knowledge

For the majority of interviewees, the term evidence seemed to mean hard, factual, scientific, published research and guidelines. Whereas knowledge had a different meaning

and was considered a broader concept to encompass experience and learning gained through day-to-day clinical practice and routines. There was a consensus that a combination of evidence and knowledge including published research and also anecdotal evidence acquired through their own, their colleagues, peers and patients' experiences and discussions were what really influenced their practice. The interviewees accepted that it was not only research evidence that influenced their practice because sometimes evidence is lacking for some MSK presentations. Also, for some patients and physiotherapists the formal evidence did not work for or fit them. In addition, interviewees expressed that guidelines, by the very nature of their name, guide practice rather than dictate it and therefore they do not always have to be followed to the letter.

> *'I pull on a little bit from everywhere, but I don't necessarily feel like I use just purely evidence-based practice. I go a lot off anecdotal evidence because it is just so hard to find and it's so hard to put into practice and select what you want to use. Not everything is about research, you can't use evidence that's not there.*' Junior PT10

3 **Influences on knowledge mobilisation**

Key factors affecting Knowledge Mobilisation were physiotherapists' motivation and time, stage or type of career, and whether the evidence and knowledge were on clinical topics that they were familiar with or not.

3.1 Motivation and time

Some physiotherapists were more motivated than others to take the time to search and read all the research evidence and knowledge potentially available to them. That is, some physiotherapists really enjoyed reading research and therefore were happy to invest their time and energy in doing this outside of work, as rarely is time dedicated to this during a busy outpatient physiotherapy appointment-based day. For others maintaining a good work-life balance was more important and therefore they preferred to keep work within their contracted hours. There was a feeling that keeping on top of all the evidence and knowledge available to them could consume their life if they let it. This seemed to correspond with the reliance on their colleagues and peers and other 'second hand' evidence sources that were easier to access and use in their working day. There was a sense

of an underlying feeling of pressure to be up-to-date more so than perhaps in other physiotherapy clinical specialties.

> *'I find it hard enough to catch up with my friends sometimes out of work, so the last thing I want to do is sit and watch a webinar of somebody else on Facebook talking about some pathology. Which I think is great, but I also think then it becomes a pressure that you have to watch it. I overheard a colleague saying to one of our junior grades, when you go to the gym, you can listen to podcasts. So, I turned to this band five and said when you go to the gym it's okay to put your earphones in and listen to your music, you don't have to listen to work all the time.'* Specialist PT13

All the physiotherapists interviewed appeared to be invested in doing the best that they could for their patients. They all seemed keen to know what was new out there, regardless of how committed they were to seeking it out in or outside work, so they could feel confident they were doing the right thing for their patients. Most of the time this thirst to improve, progress and learn needed to be self-driven especially as most physiotherapists had to be prepared to self-fund and use their own time to advance their knowledge. This was something that some physiotherapists were happier to do than others dependent on personal circumstances. That said, even for the keenest research reader, it was still difficult to keep up with the vast amounts of research and guidelines that are available to them. It was acknowledged that it takes a lot of time and effort to try and keep abreast of this.

> *'I think the only other thing I would say is it's quite hard, even with someone as motivated as myself, it's quite hard to keep up-to-date with the vast volumes. So I'm pretty good at endurance, and ploughing on and keeping going. But I can imagine for people to keep topside of it, it does take a lot of time, it does take a lot of effort.'* Specialist PT03

The pressures of working in a target and time restricted environment, often seeing lots of patients with different and often complex conditions, was acknowledged as being draining at times and therefore a challenge to staying motivated. Work fatigue was recognised as a potential reason why some physiotherapists may not have the motivation or energy to invest the time that is needed to keep themselves abreast of all that is new out there.

> *'Others that are maybe disheartened and just not particularly loving their post at that moment in time, or they might have other pressures on them outside of work, and they're exhausted. Are they really going to be at the forefront of clinical reasoning, are they going to be pushing the boundaries and engaging with the most*

recent evidence, to put that all in place and juggle that in a 20, 30 minute session with a complex patient? Probably not.' Specialist PT03

3.2 Stage or type of career

There were some differences in physiotherapists' attitudes and motivation towards evidence use depending on the stage of their career. Those physiotherapists earlier on in their career seemed to prefer to consolidate their knowledge and skills on the job rather than going on courses and conferences. They felt attending these types of knowledge-sharing events would be more appropriate once they were more established and confident in their role. Once physiotherapists were at a point in their career where they had become more specialised or were working in an area that they felt more passionate about, they seemed to become more inspired to engage with the research evidence. This was because they felt they could be more focused on what they wanted and needed to access which makes the overwhelming amounts of research evidence out there feel more manageable to tackle. So, engaging with evidence was more challenging for generalists than specialists.

> *'I think the more specialised you are the easier it is because you're seeing similar things so you can read more specifically. Whereas band 6 MSK GP physio, you just see what you're given, and it could be anything under the sun.'* Senior PT09

Lack of career progression also seemed to be an inhibiting factor that could affect physiotherapists' motivation to invest the time required to search out and keep on top of the research evidence, as could numbers of years of experience. It was acknowledged by some of the physiotherapists that more years of clinical experience did not necessarily mean more experienced, skilled and keen to engage with the evidence. The longer physiotherapists have practised can sometimes mean they become set in their ways and may be less open to advances in knowledge and treatment. Some of the interviewees appeared very aware of this fact and were keen to make sure that they did not end up like this.

> *'I guess I've been practising for over 20 years now, you know. So I guess there is part of me that has some bits of my practice that are just entrenched.'* Senior PT02

There were some differences with regards to evidence use between those physiotherapists who were active in academia, for example doing a master's degree or engaged with

teaching at a university, compared to those who were purely clinical in their role. Most of the physiotherapists felt that they developed literature searching and critical appraisal skills during their university training to some degree. But most felt that these skills were gradually lost once they started work clinically because they did not get to use them on a regular basis. This was because their days were spent purely treating patients with little time to do anything else.

> *'No, I think it's just hard to interpret research when you don't necessarily get that much training on it – not three years post uni like I am. I can read a research paper, but I wouldn't be able to properly pick it apart like I used to be able to. And you don't really go through that, do you, unless you do a master's or further Uni stuff. So, it's tricky without doing it on a regular consistent basis, which people don't have time to do or can't do, unfortunately.'* Senior PT04

Those physiotherapists who were actively involved in higher education seemed to feel more confident in searching and appraising the literature. One of the reasons for this was the fact that access to databases and articles appeared to be easier with university rather than NHS affiliation (see earlier access theme). This does not mean that those physiotherapists who are not active in higher education are not well read, inquisitive and up-to-date with the latest knowledge and evidence. It just can be more difficult for them to access and have the confidence and skills to make sense of it. One of the physiotherapists interviewed felt it made no sense at all to lose access to university systems and support, which was usually the case once a course was complete. This left physiotherapists unable to build on the skills acquired through completing a university course, such as searching and appraising evidence.

> *'The NHS Athens isn't adequate, in my view. If they want NHS people to access papers and stuff, it seems like it's confined to a select exclusive group of people who can access the papers who happen to be involved with the university, and if you are doing a master's you've got that access but then it's taken away just when you should be trying to develop it.'* Specialist PT06

3.3 Familiar vs. unfamiliar topics

A good grounding in basic physiotherapy assessment and treatment skills provides the foundations for physiotherapists to build upon. It seemed that interviewees felt that getting

to grips with the basics was more important before trying to grapple with some of the more complicated aspects of MSK physiotherapy, academic research included.

> *'There's still a role for the textbooks and learning the basic stuff about the anatomy and conditions and pathology and so on. And some of this stuff that's been discussed in the podcast is almost sort of nuanced on top of that. They need the basics to understand it, I think.'* Senior PT11

Some of the new, more accessible ways of accessing evidence and knowledge, such as podcasts and webinars, although useful, could sometimes feel like too much to process, especially if they covered topics the physiotherapists were less familiar with. The data suggests it was easier to understand and absorb those podcasts and webinars that were on topics the physiotherapists were more familiar with and had practical experience of treating clinically. This seemed to be because they could relate them to their practice. This was also found in relation to reading research papers and guidelines. Those physiotherapists who lacked confidence in their appraisal skills felt more at ease reading something related to a topic they had more clinical experience in.

> *'I'm more confident looking at research that's written within subjects that I feel clinically, really confident with. Obviously, I found those a lot easier to read and to relate to as well. But if I'm trying to look at something a bit more outside the box, I'll probably be a bit more of a skim reader and not particularly analyse it awfully well.'* Specialist PT12

4   **The challenges of applying research evidence in practice**

Being able to apply knowledge and evidence in MSK physiotherapy practice is not a straightforward task. The physiotherapists' clinical reasoning skills and confidence in their clinical judgement played an important part in deciding which knowledge and evidence to incorporate into their decision-making processes. Being autonomous practitioners was seen as important but was both a help and a hindrance.

4.1 Clinical reasoning and judgement is necessary

Interpreting the knowledge and evidence and deciding whether they should or could use it with their patients was identified as another challenge to the Knowledge Mobilisation process. Physiotherapists felt they should be careful to not 'jump on the band wagon' and immediately apply and use all new evidence and knowledge in their practice, even if it

appeared to be strong and reliable evidence relevant to their practice. They wanted to weigh up the pros and cons of whether the new knowledge was suitable to be applied to the patient in front of them, whether it needed adapting, whether they had the skills to carry it out and also whether it was safe to use. In some cases, new evidence may suggest the use of an intervention that is not usual practice and therefore training may be required. Sometimes it may conflict with what they are used to doing (habits) or believe in. Sometimes it may make sense and they may feel they want to try it out, but it has not been endorsed by their senior colleagues.

> *'So, we do occasionally get these conflicts where evidence will suggest we do something, but your ability to do that is questionable.'* Specialist PT03

> *'I feel like I need to find out more about it before I use it. I don't know. I feel a bit reticent. But I feel I want to (use it) because there are papers about back beliefs and lifting but I feel that I need to see more on the specific really heavy deadlifting and gym strength and conditioning rather than just give a free rein to the persistent back pain patients.'* Specialist PT06

Having the opportunity to go on a course and learn new skills could sometimes confirm what they have read or heard about and then this gave them the confirmation and confidence to use it. In some situations, some of the physiotherapists felt confident to apply the new evidence because they believed that most physiotherapy treatments were exercise and activity based and therefore low risk. That is, most MSK physiotherapy treatments do not involve introducing new medications or invasive interventions that could have serious side effects.

> *'a barrier to implementing the evidence whole-heartedly was my own confidence. Because this was something I was doing myself. I'd not been told by an ESP that it was the best way. So I was a little bit unsure as to whether it was right or not. And because I had evidence and the understanding of what we were doing, I knew it was not doing any harm. It's not like I was giving someone a crazy medicine, we don't do that as physios.'* Senior PT11

There was a strong feeling amongst the physiotherapists interviewed that it all came down to clinical judgement because: treatment may differ slightly between therapists; research evidence is constantly evolving; and there is not always a lot of strong evidence for specific exercises or approaches. In the end physiotherapists must choose what they feel is relevant

for each situation. This lack of clarity could feel frustrating to some but often a pragmatic approach to incorporating new knowledge and evidence was taken.

'and it's picking bits out that you feel are more relevant to what you want. Because obviously it's really hard, you get all these things that are set things of what patients should do or not. And you think, I don't really always agree with all of that or I don't want all that, I want bits from there and bits from there and it's pulling out those.' Specialist PT06

4.2 Experience and autonomy is important

Being autonomous practitioners, who do not follow a script, meant that for some of the interviewees the lack of clear direction from, for example research, could be embraced rather than considered a hindrance. On the other hand, because MSK physiotherapy interventions often vary between therapists, as may the way they choose to interpret and apply new evidence, it may not always be clear cut what the physiotherapy intervention needs to be and for some this could feel challenging. The ability to act autonomously and make independent decisions on how best to incorporate the evidence in order to be able to safely apply it in their practice, could be seen to be related to physiotherapists' clinical experience or role. For example, a less experienced physiotherapist might seek guidance from more senior colleagues to make sure they are accessing and reading about the right things and may need support to decide whether to implement a new treatment or not. A more experienced physiotherapist might be happy to try a new treatment especially if they or a colleague had previous experience of using a related technique and have seen it work on someone with a similar problem before. The data suggests that some physiotherapists with years of experience treating certain types of conditions base, change and adapt their practice on what they have seen work or not in the past.

'I suppose it gives you flexibility for it to not be so specific. And, you know, we are autonomous practitioners, aren't we? We make the decisions based on the patient in front of us and I think it gives you that latitude to get creative with some of your patients that are challenging or who are a bit stuck, you know. You can try different things with them. And I think without it, it just becomes a formulaic session, really. We're not thinking of the patient, we're not thinking of ourselves as autonomous clinicians. You know, to just follow a script. It's just not what we do. And I don't believe we should. I think we should be able to adapt our practice and that makes us better clinicians.' Senior PT02

169

Including patients' experiences within their decision-making process was considered important to the physiotherapists interviewed. There was a general feeling that no one person, condition or intervention ever really fits completely with the evidence. It is experience, both that of the physiotherapists (wealth of it or not) and their patients, that can help or hinder how research evidence is interpreted and moulded and carved into their practice.

> *'Because there was a real frustration for me in my younger years when I was working, but now I feel a bit more confident just to be flexible with that, to work with the people and, you know, not necessarily expect the research article to give me an answer.'* Senior PT05

5 <u>Trust in the evidence</u>

As discussed in earlier themes, there is an overwhelming amount of evidence and knowledge available to physiotherapists. It can be challenging for them to know which are the most credible and trustworthy to use in their practice, especially with the growing amount available online. Physiotherapists discussed how they decide what to trust, how the re-emergence of guru culture and fashions and trends complicates this, and how they deal with bias.

5.1 What evidence to trust?

Evidence from senior colleagues and local resources on local shared drives appeared to be deemed trustworthy sources of evidence and knowledge that the physiotherapists interviewed regularly drew upon. There seemed to be an assumption, for the local resource stores, that because a 'senior' had put them there that it was a credible and trustworthy piece of evidence or knowledge that they should utilise. They would seek recommendations from their trusted colleagues too as to what they should be reading and watching to improve their knowledge base. To some degree there appeared to be an element of blind trust in their clinical leads, in that interviewees would happily follow advice without question or without always knowing the source of that advice. There was an assumption that senior colleagues would be up- to- date and that the advice they give would be drawn from the best evidence and knowledge. There was a suggestion from some of the physiotherapists interviewed that this was not always the case and sometimes they did not

follow their seniors' lead. This seemed to be linked to either the physiotherapists' experience and confidence to be autonomous and also to being person-centred in their treatment approach.

> *'My use of it is based on instruction. Is that too strong a word? From the ESP. So I'll be honest, I'm saying I'm using an evidence-based practice but I don't have fluency / currency with that evidence. I'm getting it second-hand from the ESP, because through our formal services, we have been encouraged to do that. They may well have presented the evidence at the time, but I can't recall, to be honest. I'm going to say there's enough, that they've made a decision that it's something we should all be doing.'* Senior PT11

There was also trust in research that was in reputable journals and trust in the peer review process. There was an implicit trust in some evidence because of its authorship by trusted names or organisations e.g., NICE and well known academics in the MSK physiotherapy field. Looking at authors' credentials such as university affiliation, numbers and types of papers written, and where they worked, for how long and in what role was also used as a way to decide whether someone or something that someone had said or written was credible.

For the internet and social media it was a little more complicated. Most physiotherapists veered towards websites and webinars through recommendations from their peers or because they were recognised and respected names. Deciding who to 'follow' was often decided in a similar way too and then would snowball from there. This sometimes could lead to the risk of an echo chamber by listening to and following the same people or those with similar opinions.

5.2 Gurus, fashions and trends

There was some concern expressed regarding the re-emergence of celebrity 'gurus'. The physiotherapists talked about people who were making a name for themselves on the internet and social media and there was a feeling that these people were not always renowned and respected for the right reasons. There was a sense from the interviewees that some of these 'gurus' were renowned because they were good at selling themselves, or had a product or business to sell, or were just good at getting their voice heard above everyone else's.

'I think I had a bit of a feeling recently, and again, this goes back to my training, that the podcast age and the way certain people have got to the forefront of podcasting and within webinars, certain people have made a name for themselves as being gurus in a certain area. Or at least just made a name for themselves. I feel that we're almost going back to being gurus. With the new gurus, those who are best at getting their face forward, through the new media' Senior PT11

There was a strong feeling that physiotherapists should not be going back to the days of 'guru' led treatments or fashions and trends like 'core stability' exercises for example which were not supported by strong evidence. From the data generated it seems that the physiotherapists believe that they should not be 'one- man bands' in terms of the treatments they choose to use but a 'broad church' utilising a variety of evidence-informed treatment approaches. Some of the physiotherapists felt that the internet and social media were dangerous places and to be avoided because there was not a formal vetting process for content. This meant there was uncertainty regarding its trustworthiness.

I think because evidence often goes in more when there's a story. And if there's a person leading that story, a guru that's the figurehead, and they're articulate and they're engaging, even if the evidence is very much front end initial principle evidence, that grows a theory, and before we know it we're at a treatment and everybody's doing that treatment.' Specialist PT03

5.3 Dealing with bias

The physiotherapists appeared to be very aware of the impact of bias, both their own and that of the evidence and knowledge they draw upon to inform their practice. The hierarchy of evidence was utilised by some to help them minimise this. RCT's were recognised as the gold standard formal evidence to draw upon. However, as discussed earlier, it was also recognised that not everything can be controlled for especially in an MSK physiotherapy setting and sometimes the findings may be irrelevant or not applicable to practice.

Although a lot of the physiotherapists interviewed welcomed the wealth of evidence and knowledge now available to them on the web, they were aware that some of the content they access could be biased. For example, webinars and podcasts could be classed as 'second hand evidence' in that it is another person's interpretation of other people's work. This is also the case with local training sessions too. The physiotherapists interviewed seemed aware of this, with some of them explaining how they might follow up on the

references given, for example after listening to podcasts, to verify the information they had listened to. Others were conscious that they should be mindful that any webinars, podcasts, videos or similar could be based on personal preferences and biases as well as evidence. The fact that those physiotherapists who used social media tended to follow people they knew and respected, or based on recommendations of people they knew and respected, could mean they were prone to only getting one view of the evidence base. Again they seemed to be conscious of this and tried to ensure they were always questioning what they read, watched and listened to.

6 <u>Evidence and knowledge sharing</u>

Sharing evidence and knowledge is an important element of Knowledge Mobilisation. From the data it could be seen that sharing of evidence and knowledge occurred between physiotherapists so that best practice recommendations were spread, and between physiotherapists and patients so that patients understood the decisions being made about their care. This latter issue could be considered crucial to complete the Knowledge Mobilisation process, from acquisition to use, so that physiotherapists incorporate what patients share with them into their decision making process and so patients act on the advice and information shared with them.

6.1 Sharing from physiotherapist to physiotherapist

As discussed in previous themes, the clinical leads in departments have a huge influence on physiotherapists and how they manage certain MSK disorders. By far the most popular way favoured by this group of physiotherapists were discussions with their senior colleagues and peers. Advice and information from peers were usually shared via ad hoc informal discussions throughout the working day. The physiotherapists interviewed were more likely to ask a colleague than seek out the research or guideline, especially during a busy clinical day. It appeared that sharing knowledge between each other was an embedded part of the work culture. This was seen in a very positive light by the interviewees, and they wanted to do more it formally.

> *'So, amongst my colleagues, amongst us sharing, discussing, talking about information, that's really, really easy because we've got a culture of sharing knowledge. If we're given the opportunity to have the time away from patients to actually do it, not just trying to squeeze it into two minutes left and right but given*

appropriate times to talk about it. Providing you get the opportunity to chat with your colleagues, then that's good.' Specialist PT13

Use of communal spaces where these informal conversations with peers would often occur were being used less since the COVID-19 pandemic. In fact, during this data collection period they were not being used at all. This meant that peer-to-peer communication and knowledge sharing occurred via other avenues such as Microsoft Teams instead, where they might share interesting research papers, infographics or online courses they have come across.

6.2 Sharing between physiotherapists and patients

Sharing of knowledge and evidence between therapist and patient occurred predominantly verbally. However other forms of information and knowledge sharing were also reported to occur. The physiotherapists seemed aware that the amount of information patients were given verbally during their appointment was often overwhelming. They sometimes gave written information, such as leaflets and or even handwritten exercises, so that the patient could take this away with them and not have to rely on memory to enact advice given. More recently, especially during COVID-19 and since, the physiotherapists described signposting patients to what they considered to be useful web-based resources via links to websites, videos and even podcasts. Sometimes they might use infographics during the physiotherapy session itself, shared via their computer screen, to aid in explanation of complex information. This was facilitated by the addition of technology within consultation spaces during the pandemic.

> *'One of the benefits, I suppose, of the pandemic and having to be set up with more virtual stuff is that every cubicle now has two monitors and a computer and a phone and all that kind of equipment that we didn't have before. So now I'm able to get up clips from YouTube, I'm able to put up infographics, I've got a stash of infographics that I'll use. Probably one I use quite a lot of is about diagnostic imaging.'* Senior PT05

The type and format of any additional information they might share with patients was very much dependent on patient preferences. However sometimes what was shared was reliant on what the physiotherapists were able to access in the time pressured MSK outpatient environment.

7 <u>Knowledge Mobilisation requires a person-centred approach</u>

The physiotherapists interviewed felt that how they applied and shared evidence and knowledge in their practice was very much dependent on the person in front of them. Managing their patients' expectations and considering their personal preferences influenced the Knowledge Mobilisation process.

> *'But I like to feel like I've been personalising treatment for quite a long time before it became trendy, if that's the word.'* Specialist PT06

7.1 Evidence is a poor fit for some patients

How much physiotherapists followed the evidence and used it in their practice with their patients seemed to vary and be patient dependent. The interviewees acknowledged that practice was not standardised even if there was very strong evidence to support a certain treatment. This was because it would inevitably need to be adapted to suit the person they were treating and patients' MSK problems were rarely straightforward. It was common to see people with multiple problems, for which there would not be clear evidence to support them all. Therefore, relying solely on research evidence and guidelines to treat these kinds of patients was difficult.

> *'I suppose it's a difficult one in terms of a lot of the people I see have multiple problems at the same time, so there's not necessarily one form of evidence that covers all of those areas.'* Senior PT05

The previous theme described how the Knowledge Mobilisation process for MSK physiotherapists is not straightforward. Physiotherapists draw on several sources to make their clinical decisions. They also consider the patient they are treating. The physiotherapists felt that research and guidelines do not give them all the answers and they have to work holistically and consider what will work best for an individual patient. The physiotherapists were aware that evidence drawn from multiple sources, and that has been proven to work on large numbers of people, is considered the best to base their practice on. However, this 'best evidence' may not be suitable for certain individuals and therefore not applied in practice.

'And I think it's about understanding the patient and what they need and the questions they're asking as to what extent and what degree you go into it and the amount of research you use and give them.' Junior PT09

7.2 Negotiating with patients to facilitate Knowledge Mobilisation

Gaining a good understanding of each patient was considered paramount in order to be able to decide whether incorporating the evidence would be appropriate for that person and their MSK problem. The physiotherapists interviewed recognised that there were many factors that needed to be taken into account before deciding which evidence and knowledge should be applied. Understanding patients' expectations was considered important. Meeting their expectations, to a greater or lesser degree, influenced Knowledge Mobilisation both in terms of which knowledge and evidence the physiotherapist chose to share and use, but also which evidence and knowledge the patient would choose to listen to and act upon.

'There's this real fundamental thing, if you sat down with the patient and your expectations don't match their expectations, you've got a problem of what your treatment session is going to be about.' Senior PT11

Interviewees discussed how treatment decisions may need to be adapted depending on a patient's culture and beliefs. Some of the interviewees felt that all cultures shared a belief in the medicalised model of care, that is, the need for a definitive diagnosis in order to get the right treatment and then being a passive recipient of that treatment. MSK physiotherapy has been moving away from this medicalised model of care for some time now and the data indicates that the physiotherapists felt it could be difficult for patients to understand and come to terms with this. Physiotherapy, especially MSK physiotherapy, has a history of being a 'hands on' profession. Some of the physiotherapists felt that there was often the expectation or the belief that physiotherapy was going to be massage and manipulation and explaining that this may not be the case to a patient could be difficult.

'I have at least two conversations with patients most days about whether or not they want a scan, and do you argue the toss with it even though you know it's not best practice, or do you just bite your tongue and say 'we're not getting anywhere with rehab, I'm going to put them with someone who can at least order

imaging and then at least they understand their problems and have a discussion around it.' Senior PT04

The physiotherapists recognised that developing a good relationship with their patients and using their knowledge and experience to get them on board, to agree with and to some extent believe in the treatment plan, was important. For this reason they would sometimes carry out treatments that were not in line with the best evidence or what the physiotherapist thought would be the best treatment of choice. They would use this in the short term to get the patient onside, and gain their trust and engagement, if it felt the appropriate and safe thing to do.

> *'I have tried, what I call the 'hairdresser technique', where I'm almost like feeling the back. So I'd basically do some hands on, but not for long, have a feel, where I find out more about what they did, what they're wanting to do. And then suggest that actually if they want to try and manage it long term these are the type of things. So again, I think it's about making it very personal to the patient, very functional to what they want to do. But in the long run to me, that's not the way forward to do a passive treatment on someone with a persistent back pain problem, based on what I know.'* Specialist PT06

The physiotherapists acknowledged that adherence to treatments, such as exercise and self-management, could be challenging for some groups of people more than others, and therefore considering patient adherence played a part in whether physiotherapists applied any evidence completely or not. The physiotherapy consultation was therefore seen as a negotiation process between the patient and the therapist, although rarely would the therapists describe disregarding the evidence completely. Their aim was to take a less evidenced-informed approach initially to keep the patient onside, and bargain and negotiate with their patients to try and incorporate a more evidence-informed approached going forward. Sometimes physiotherapists would explicitly explain the research evidence or guidelines to their patients in order to justify their treatment choices. The interviewees felt that by explaining the evidence behind why they might or might not be choosing a certain treatment might result in patients being more likely to trust in what they were saying and asking them to do.

The physiotherapists recognised that their 'bed side manner', that is, their rapport, with their patients played a part in the Knowledge Mobilisation process too. They realised that appearing knowledgeable and communicating clearly with their patients could help gain their patients' trust and confidence in them.

7.3 The aim of Knowledge Mobilisation is to get the best outcome for patients

The physiotherapists gave a number of reasons for trying to mobilise evidence and knowledge in their practice. Evidence was used to ensure consistency of management of some conditions (recognising the need also to tailor evidence to individual patients), and to keep some physiotherapists interested, motivated and engaged in their job. There was a sense that continually learning new things was something most physiotherapists liked to do so as not to become stale and complacent.

> *'So if someone's doing an upper limb update, I'll join it, you know, because I don't get that formal mentoring myself. And I think it's important to just not become complacent and stick with the same old things that's always worked.'* Specialist PT12

Another reason the physiotherapists gave for using evidence in their practice was to guide and justify their choice of treatments. This was so they could feel confident that what they were doing with patients was safe. There was also an element of ensuring they were maintaining professional standards and keeping within their scope of practice.

Physiotherapists discussed using evidence as a tool to help them engage with their patients, provide reassurance to patients and instil confidence in their therapist and the advice they are given. However, the most common reason the physiotherapists gave for trying to stay abreast of evidence was to provide the best treatment and outcome for patients. The desire to do the best for patients was a common theme throughout many of the interviews.

> *'I must say, I like my job and I think a lot of the NHS works on the basis of that to be honest. You love your job and you want to do the best by your patients, so you always put the effort in.'* Specialist PT03

6.4.2 Overview of themes from the patient interviews

Two themes with related sub themes were developed from the patient interview data. The themes were:

- The importance of research evidence to patients, with subthemes:
    - 'It's about more than research evidence',
    - 'Research evidence is rarely visible',
    - and 'Should research evidence be visible?'
- Relationship building as a key part of Knowledge Mobilisation, with subthemes:

    - 'Patient expectations may damage Knowledge Mobilisation',
    - 'Building rapport between patient and therapist',
    - 'Tailoring to individual needs',
    - and 'Trust and confidence in the physiotherapist and their knowledge'.

1 <u>The importance of research evidence to patients</u>

This theme is about patients' perceptions of how important it is for physiotherapists to use research and guidelines to inform their decision-making during an appointment. The use of research was not always visible to patients and, whilst use of research was important to patients, this did not always matter to them as other factors were more important to them.

1.1 It's about more than research evidence

Research and guidelines appeared to be important to most of the patients interviewed. They felt that it was essential for physiotherapists to have an understanding of factual, scientific knowledge about MSK disorders so that they knew what they should and should not be doing with patients. The patients felt that physiotherapists should be using the latest research and guidelines to ensure they were up to date with the best ways to treat MSK problems. However, despite the importance they placed on this, patients' main priority seemed to be getting better and reducing pain regardless of the type of evidence physiotherapists draw upon.

> *'Well, I suppose keeping up to date with the latest thinking and ideas and research is very important because like I say things do change and improvements are made and surgery changes and so guidelines will change. We seem to advance so quickly*

medically, I expect that all of that will change how a physio has to approach things and so I think being up to date is very, very important.' Female P04

Patients felt that research evidence should not be the sole source of knowledge and evidence that physiotherapists base decisions on. Some patients felt that the use of research evidence was unnecessary because the use of traditional treatments and techniques, that have been well used and tried and tested over the years, could be better than attempting to use new and less familiar ones. Patients also valued alternative sources of knowledge. For example, they felt it was also important to understand patients and draw from the experiences of both physiotherapists and patients. They also felt that physiotherapists could learn on the job and from their senior colleagues. Another important alternative source of knowledge was investigations, such as scans. The lack of use of scans to inform decisions about patient care seemed to be a real barrier to successful Knowledge Mobilisation from patients' perspectives.

> *'So I think it's probably always good to be up to date on stuff, but then I always think you can't go wrong old school.'* Female P07

> *'I think a more thorough physical examination, and referrals for earlier scans to identify what the actual problem is. Because I always feel like they don't really know what they're treating without proper investigation.'* Female P06

1.2 Research evidence is rarely visible

It appeared that research was rarely explicitly communicated to patients. On the occasions that it was, it was received positively and seemed to increase the confidence of the patient in the physiotherapist and the treatment and advice they were given. One example in the data was how, because the patient had heard and seen similar advice being given elsewhere, in this case in the media, their physiotherapist's evidence-based advice was more accepted and made more sense to them. Another patient's positive perception of their therapist and their therapist's expertise was clearly influenced by the fact the therapist had explicitly mentioned the research behind their treatment. The patient seemed to be impressed that their therapist had worked with international specialists in the specific MSK area and this validated the advice the patient was given.

'I thought oh, I've struck lucky getting this particular physiotherapist, who's gone through this research and travelled to work alongside contemporaries to find out more about the treatment. But I didn't know if that was widespread amongst many physiotherapists. So, I felt confident in particular seeing that particular one. I feel my particular experience with that physiotherapist was that I felt in safe hands, because he seemed to be quite knowledgeable, because of this research he'd done.' Male P11

Most of the patients interviewed were not aware of research evidence or guidelines being shared with them. It appeared that patients placed trust in the physiotherapist knowing best. They considered physiotherapists to be professionals and therefore assumed that they based their decisions on the best available evidence.

1.3 Should research evidence be visible?

Whether patients wanted to hear explicitly about research and guidelines related to their treatment varied from person to person. Preferences seemed to depend to some degree on the patient's background. For example, one patient had worked in research in the past and therefore was really interested in hearing about it. For others, it was of little interest and potentially off putting. Some of the patients felt that they did not want to be bombarded with the latest research on top of everything else they were trying to take in. For them, the most important thing was knowing and understanding what they needed to do in order to get better. Whether this was evidence based or not was not their priority.

'but I think if I think for myself and probably for most people being bombarded with a lot of latest research isn't the way forward because all you're focussed on is, I want to do this to make myself better and reduce the pain.' Female F04

2 Relationship building is a key part of Knowledge Mobilisation

Developing a good relationship with their physiotherapist seemed to play an important role in the Knowledge Mobilisation process. It appeared to be a key factor that influenced whether patients felt satisfied with their care and therefore whether they were likely or not to take on board the information and advice shared with them and adhere to it.

2.1 Patient expectations could damage Knowledge Mobilisation

Patient expectations, high or low, appeared to impact on a patient's readiness to engage in the assessment process. If patients judged that a physiotherapist had made a good

assessment of their health problem, then this seemed to positively influence patients' engagement in the treatment suggested. It was also the case that patients appeared to be less likely to listen to and place less value on a physiotherapist's advice if their expectations about their needs were not met. This would then lead to unsuccessful Knowledge Mobilisation because they would be less likely to take on board and act upon the information shared with them.

Because the physiotherapy appointment did not always meet patients' expectations some patients expressed dissatisfaction with the encounter. They recounted that it did not feel like the assessment was thorough enough or that it lacked elements that they had been expecting. They felt that often there was too much time spent asking and answering questions and too little time spent on examination and receiving treatment. In most cases this was in respect to the lack of 'hands on' assessment and treatment that it seems a lot of patients still perceive is what physiotherapy entails. Patients felt that their physiotherapy treatment often seemed too basic and was mainly 'just exercises'. The fact that their physiotherapy encounter felt inadequate meant that for some patients their appointment had not felt worthwhile. Some of the patients interviewed felt that they could have found the same information and exercises on the internet without spending the time and effort going to their physiotherapy appointment.

> *'I think, to be honest, all I felt like I came away with was some at home exercises, which I don't know if maybe I'd got it wrong in my head, but I always assumed if you have physio it's quite hands on... So it just almost seemed a bit DIYish. And I get that they want people to be kind of doing their bit, and I'm fine doing that, but I think you want a bit more, as in you almost want them to wave their magic wand and do something that you couldn't just go and find yourself online. I feel like I could probably do with a bit more than just a couple of exercises'.* Female P07

Patients described leaving their appointment feeling ill equipped in terms of knowing what was wrong, what the treatment plan was, and what to do. In particular, the lack of a clear diagnosis seemed to set a negative tone for the whole experience and contribute to a mismatch in expectations between the patient and therapist. Patients did not understand why investigations or scans were not carried out in order to inform clinicians' knowledge about what was wrong. Physiotherapy was then perceived to be a dumping ground for doctors when they did not know what else to do with their patients.

Not all the patients interviewed had negative experiences. Some patients expressed satisfaction in their physiotherapy encounters. In some cases this appeared to be because their expectations were met, for example, they got the injection they were looking for. In other cases, this seemed to be due to clear communication at the start of their physiotherapy appointment about what the appointment would entail. This meant any uncertainty about what was going to happen was removed and expectations were set or reset.

> *'Anyway, the last physio I saw, because by now I was saying do I need injections in my knees? And the X-ray showed that I have moderate arthritis in my knees. So, they referred me to another physio who could do knee injections. So, I went to see him face to face and he was good, he was really good, and he cited evidence the whole time. It was amazing.'*
> Female P01

This could also be influenced by the type of condition people were attending physiotherapy for. For example, expectations appeared to be more readily met if a patient was having physiotherapy after they had had orthopaedic surgery. This could be because they had a specific diagnosis for their MSK disorder and something had been done to address it. In contrast, if a patients' MSK disorder had an unclear diagnosis, they had no investigations or investigations giving no clear answers, and surgery was not an option, then patients were dissatisfied.

Expectations could be perceived to be higher (or lower) in situations where physiotherapy was seen by the patient to be their last hope or because they had already had repeated failed physiotherapy interventions. However, some patients did acknowledge that their expectations could be unrealistic. For example, even if they already knew that their condition could not be cured, such as arthritis, they still hoped that physiotherapy may be a 'miracle cure'.

> *'I think as patients we want a miracle cure, and there isn't one. So it is difficult.'*
> Female P06

2.3 Building rapport between patient and therapist

Good open and honest communication and interpersonal skills appeared to be another key factor to building a good patient-therapist relationship and creating the conditions for two-

way knowledge sharing associated with Knowledge Mobilisation. This included, from a patient perspective, explaining things in clear, consistent and understandable terms; agreeing a treatment plan; showing interest, empathy and understanding, as well as taking the time to listen to what the patient had to say.

Patients felt that some physiotherapists had better 'bedside manners' and were better communicators than others and this could affect rapport. In some circumstances poor communication led to patients feeling lost, labelled, and sometimes dismissed. Some patients felt that their experience was quite generic and impersonal. This left them feeling unsatisfied and potentially less likely to act on the knowledge and information shared with them.

> *'I don't know, it just felt very tick boxy. I feel like it was just quite shut down. But then again I don't know if this is just NHS, but it just feels a bit cattle marketish, like you've got your ten minutes, let's get you in, get you out. It's like they hear you but then they kind of like right, let's move on. It's just kind of like oh yeah, noted, off we go.'* Female P07

> *'I think I just feel I was a number at the first place. I've got to admit I think you only had something like, it was 30 minutes at the most and they were really, like, strict on leaving and things like that. I did really feel Like I was just a number, type of thing*.' Female P02

In contrast, other patients described the opposite experience, they were seen by physiotherapists who were friendly, accessible, encouraging and interested, who took the time to listen to them and gave them the opportunity to ask questions. These positive two-way knowledge sharing experiences seemed to leave patients feeling more confident in their physiotherapist and what they were advising them to do. They were therefore potentially more likely to act on the knowledge and information shared with them.

2.4 Tailoring evidence and care to the individual

It has already been highlighted that some patients felt that their physiotherapy encounter was impersonal and generic. Patients felt that physiotherapists did not always appear to consider their individual circumstances or needs when offering advice and treatment and therefore did not always feel it was suitable for them or that they would be able to carry it out. This was not the case for all the patients interviewed. Some patients did feel like their

treatment was individualised and this gave them the motivation to carry it out. Patients thought that research, guidelines and post-surgery protocols were important and should be followed but that physiotherapists should consider each individual they treat first and foremost.

> *Well not every individual's ability is the same, like I said, it's alright saying, oh, it's this for this injury, but if you've got someone that's in their 60s they're not going to be able to do what I can do. To be honest, I take my hat off to them, because think how many people they must see in a day or a week, how many different age groups, how many different personalities, how many different statures, bodies, abilities. And to create a programme by just meeting in a half an hour period first off, that suits each individual person, I mean, that's brilliant to be able to do that.'*
> Male P03

How patients preferred to receive treatment advice and information from their physiotherapist was person dependent. Most of the patients interviewed were happy with advice and information being shared with them verbally, however some preferred that this was backed up with an additional resource that they could take away with them after the appointment, for example a leaflet to read or video to watch, as information overload during the physiotherapy appointment was often a problem. The format, appearance and amount of detail of these information resources varied from patient to patient. 'Off the shelf' information leaflets such as NHS leaflets or those provided by MSK charities were considered impersonal and a 'one size fits all' approach to knowledge and information sharing by some of the patients interviewed. Some patients expressed that being given adequate and personalised information in their preferred format was something that could help motivate them and give them the confidence to act on the knowledge and advice shared with them.

> *'it's a lot to take in, when you go for an appointment, you've got a lot going on in your head. And you're trying to follow it, you're trying to remember everything that you've been told, and they've explained things to you, and what you've got to take away with you to do for next time. but it is very hard at first to take things in and absorb the information that you're being given. And you're really trying, and you're trying to cope, and it's almost too much at first. That's how I felt. So maybe, just to say to me, that's okay, which I think they did actually, that's okay, if you don't remember this, we've got some leaflets for you, we'll get you booked in next week and we'll go over it.'* Female P10

2.5 Trust and confidence in the physiotherapist and their knowledge

So far this theme and its sub-themes have illustrated some of the key factors that can help, or hinder, a good therapeutic relationship being developed. Patients described how, if their expectations are well managed, good rapport is developed and they have received tailored, individualised advice and information, a sense of trust and confidence in their physiotherapist could develop. Subsequently patients may be more likely to have trust and confidence in the information they receive from them. For some patients the fact that they considered physiotherapists to be qualified professionals was enough for them to trust in their knowledge and skills alone. If their physiotherapist appeared confident they felt confident in the advice they were being given regardless of whether it was evidenced based or not. For other patients the reassurance that their treatment was explicitly based on research or similar evidence meant they were more likely to feel confident to act upon what was being recommended to them.

> *'They didn't have to tell me that they had been reading the latest research, but I think that they knew what they were doing, they made me feel confident in what they were telling me to do and saying what would help me, and they took an interest in me as a person. The whole thing gelled together to make me feel positive and persevere with all their suggestions.'* Female P05

> *'They could be a bit more vague about it and say, well, you know, I have read quite a few things and this may work. So they could perhaps say it like that, kind of thing. Which I think it would fill me with confidence thinking, oh, yeah, it's going to work let's give it a go. I might do the exercises a lot more than I do.'* Female P02

Patients described several other factors that could influence their confidence in their physiotherapist and motivation to carry out the treatment advice they had recommended. These included: if they were making positive progress and their condition was improving; if they saw the same physiotherapists regularly or were being given the same consistent message. Even the environment that the appointment was carried out in appeared to influence the amount of trust and confidence patients had in the physiotherapy interaction and their motivation to act upon it. For example, the size and interior of the space, such as whether it was new and well equipped or old and shabby. Patients seemed to have greater confidence in those physiotherapists they saw in a hospital setting rather than in a

community setting. Some patients assumed that the hospital physiotherapists were more knowledgeable because they worked more closely with their colleagues and other healthcare professionals such as doctors, when in reality this isn't always the case.

> *'I've had physio before but I've always had it in the main building at x. And I've not found them, like, they're alright but it's not, you know, when it's literally half an hour one on one sessions in the actual sports gym, It's got a gym, swimming pool, all the equipment you need. It's like, right, okay, I need to react to this, this is brilliant.*
> Male P03

> *'But I think the ones that I saw in the hospital seemed far more professional and geared up to knowing what they were doing. I think the one that I had beforehand, maybe she wasn't as experienced, but I just didn't gel at all with it. I think in the hospital situation, I felt that they would have had a lot of experience of people in that condition. I mean, there's more than one physio there, and so there'll obviously be senior ones and more junior ones, and I presume, I would hope they would all be learning from each other.'* Female P05

Patients' own self-confidence played a part in the Knowledge Mobilisation process too. Not all of the patients interviewed felt equipped with sufficient knowledge at the end of their physiotherapy appointment consultation. Some patients discussed not feeling confident enough in themselves or in their relationship with their therapist, to let their physiotherapist know this. Therefore, they would leave their appointment unsure how to act on the new knowledge and information they had been given. This perhaps reveals an unspoken power imbalance between patients and their physiotherapists. That is, some patients seemed to feel that the physiotherapists held all the worthwhile knowledge and experience over their own. This could explain why some patients felt they could not question the physiotherapists' decisions.

> *'You've got to listen to what somebody with more intelligence than you have got in that particular sphere. You've got to listen to them and do what you're told, basically. If they told me to jump off a cliff, I more likely would. If they said it would reduce your pain, just jump off that cliff, I would do it. I wouldn't question them, no. Because, again, it comes down to same thing, they're professionals. And you don't question professionals.'*
> Male P12

The patient interviews suggest that building up a trusting and more equal relationship between patients and physiotherapists, where patients feel that they have been listened to

and their knowledge and experience has been taken into account before decisions are made about their care, could aid the Knowledge Mobilisation process.

6.4.3 Similarities and differences between the physiotherapist and patient interviews

The findings demonstrate that physiotherapists and patients both considered research and guidelines to be important and that they should be used when making decisions about patient care. But both physiotherapists and patients felt that other factors and other forms of knowledge should also be considered.

Physiotherapists and patients agreed that personalised care was very important and this could impact on how and whether 'evidence' was or should be used. However not all the patients interviewed felt that they had been considered as an individual during their MSK physiotherapy experience. This lack of personalisation had the potential to impact negatively on Knowledge Mobilisation.

Not meeting patients' expectations was a problem for Knowledge Mobilisation from a physiotherapist and patient perspective. Physiotherapists however used research evidence and knowledge as a useful tool to help them manage their patients' expectations and to try and engage them with their treatment plan.

Two-way knowledge sharing was considered important, both physiotherapist to physiotherapist, physiotherapist to patient and patient to physiotherapist. However, patients felt that the latter was sometimes inadequate and could negatively affect Knowledge Mobilisation.

Good communication and rapport were considered vital from a patient perspective. They felt it was important so a good relationship could be formed with their therapist and for successful Knowledge Mobilisation to occur. From a patient perspective many different factors could affect this relationship, both positively and negatively, such as time and the clinical environment.

Trust and confidence were common themes in both sets of data. From a physiotherapist perspective this was regarding which evidence and knowledge, from the wealth available to them especially via the internet and social media, they should trust. From a patient perspective this was with regards to trust and confidence in their physiotherapist and the information they received from them. Physiotherapists seemed to place highest value and trust in their senior colleagues and peers as sources of knowledge and evidence. Whilst

patients trusted their physiotherapists implicitly. Patients trusted that physiotherapists would be using the best evidence in their decisions whether it was explicitly explained to them or not. Ultimately patients' priority was to get better whether there was evidence to support their treatment or not. Whereas physiotherapists priority was to use the best evidence to make the best decisions to get patients the best outcome.

6.5 Chapter summary

In this chapter I have presented the findings from the observation and interview data that were used to inform Phase 3. I have presented the themes and subthemes that I developed from the in-depth analysis of the semi-structured interviews with physiotherapists and patients. There were some key similarities and differences between their perspectives such as: person centred care was important to physiotherapists and patients and this could affect how and if research evidence should be used; patient expectations could negatively impact Knowledge Mobilisation, but physiotherapists used research and guidelines as tools to help them manage their patients' expectations and improve the Knowledge Mobilisation process. The next three chapters will focus on Phase 3 - Creative Co-Design.

Chapter 7
Phase 3 - Creative Co-Design: Methods

7.1 Chapter overview

The following three chapters cover Phase 3 of this PhD study, which comprised of a series of Creative Co-Design workshops and prototype development meetings. This chapter focuses on the methods and preparation for the Co-Design workshops and prototype development meetings. Chapter 8 describes the content and delivery of the Co-Design workshops and presents the key issues and needs that were identified along with the idea themes generated. Chapter 9 outlines how the prototype development meetings were carried out and presents the Prototypes that were developed. This chapter includes the following sections:

- The aim and objectives of Phase 3.
- The adaptation of the Creative Co-Design approach due to COVID-19.
- The methods, including Co-Design Participant Group recruitment and consent.
- The planning and development of the Creative Co-Design workshops and activity packs.
- The planning and development of the prototype development process.
- The analytical approach used.
- Chapter summary.

7.2 Aim and objectives of phase 3

The aim of the Creative Co-Design phase was to work with physiotherapists and patients, alongside a Design Researcher, using creative activities drawn from Design, to encourage further exploration of evidence and knowledge use in MSK physiotherapy and develop prototype solution(s) to address the key issues identified.

The objectives were:

- To build on the findings from Phase 2 and gain further insights into the factors that affect Knowledge Mobilisation in MSK physiotherapy practice.

- To identify, from the Creative Co-Design workshops, the key Knowledge Mobilisation issues and needs experienced by physiotherapists and patients and synthesise these findings with the key preliminary Phase 2 findings.

- To generate ideas to address the key Knowledge Mobilisation issues and needs identified.

- To prioritise the ideas generated and develop prototype solution(s) to aid Knowledge Mobilisation in MSK physiotherapy.

7.3 The influence of Phase 1 and 2 on Phase 3

The Phase 3 Creative Co-Design process was influenced by the previous two Phases of this study. The framework developed from the Phase 1 systematic review helped shape the planning and delivery of the Phase 3 Creative Co-Design workshops. How the principles from the framework were incorporated are explained in section 7.8. The Phase 2 findings were synthesised with the Creative Co-Design workshop data during the Phase 3 analysis process described in section 7.9. Figure 11 demonstrates the influences of Phase 1 and 2 on Phase 3.

Figure 11 Influence of Phase 1 and 2 on Phase 3 Creative Co-Design process
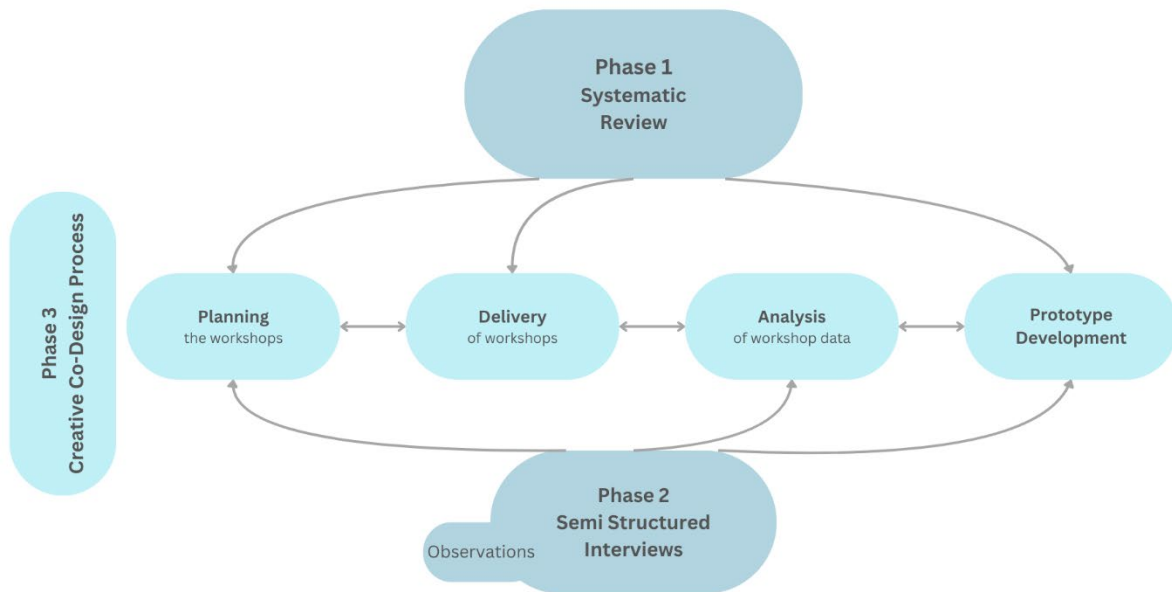
7.4 The Creative Co-Design process and adaptations due to COVID-19

The workshop, where people interact in real time in a shared physical space, has been a fundamental part of the Co-Design process for many years (Davis *et al.,* 2021). Phase 3 of this PhD study took place during the COVID-19 pandemic at a time where some restrictions were still in place. This meant the Phase 3 Creative Co-Design workshops could not take place face to face. Fortunately, the Design Researcher, who worked with me during Phase 3, had continued to conduct Co-Design throughout the pandemic and had experience of adapting Co-Design in different ways to accommodate the restrictions that were in place (Lab4Living*,* 2019).

At a time when most researchers were exploring the use of purely digital platforms, the Design team at Lab4Living, along with Design researchers in Australia, were trying out alternative approaches to Co-Design that drew upon their existing Design skills and the adaptation of Design tools. They recognised that solely moving to digital Co-Design formats would immediately exclude some people from participation, that is, those without digital access or low levels of digital skills (Davis *et al*., 2021; Langley *et al*., 2021). They also recognised that carrying out Co-Design remotely might actually include people who would

have been excluded by a face-to-face format. This was because it offered people the opportunity to be part of the Co-Design process from a location convenient for them, for example from the comfort of their own home, negating the need to travel to a different, often unfamiliar, location (Davis *et al.*, 2021; Langley *et al.*, 2021). This international group of Design Researchers therefore carried out and reflected upon different spatiotemporal ways of undertaking what they termed 'Low Contact Co-Design' during the restrictions of the COVID-19 pandemic. These different spatiotemporal ways included both digital and non-digital formats (Davis *et al.*, 2021; Langley *et al.*, 2021). Figure 11 below shows an example of different spatiotemporal ways of undertaking Co-Design.

Figure 12 Example of the different spatiotemporal quadrants of co-design approaches (Davis et al 2021).
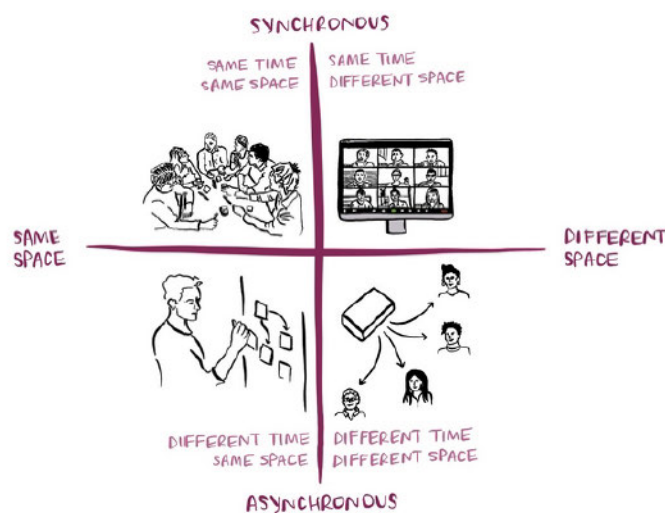
The Design team at Lab4Living, with whom I worked during Phase 3 of my study, had some success using a blended approach to Low Contact Co-Design that utilised a mixture of synchronous and asynchronous approaches (as depicted in figure 11). That is, same time and different space digital online workshops as well as different time and different space non-digital 'insitu' Co-Design that used physical prompts and workbooks. The latter had the

advantage that participants could complete the Co-Design tasks at a time and place to suit them without the need for a digital device.

After discussion with the Design Researcher and my Project Advisory Group and taking into consideration the COVID -19 restrictions that were still in place and the different personal circumstances of the participant group, I decided to use a blended approach for the Creative Co-Design workshops in Phase 3 of my study. I hoped using a blended approach would help maximise participation at a time when minimal face to face contact was taking place. I decided to combine the use of non-digital activity workbooks with digital (online) group workshops. This meant those participants that were happy to attend an online group workshop could undertake the Creative Co-Design activities together with facilitation from myself. Those participants who did not wish to engage digitally or could not or did not wish to attend the online workshops could complete the same activities via a workbook at a time and place to suit them, with or without support from myself if required.

7.4.1. Creative Co-Design guiding principles

A number of frameworks and guiding principles were considered during this phase to ensure that the Creative Co-Design was carried out in a way that paid attention to the factors that are thought to be required for optimal Co-Design to occur.

First of all, the workshops themselves were developed based on the Design Council's Double Diamond Framework (Design Council, 2023). This process involves a series of convergent and divergent stages. The first divergent stage ensures all possible issues are identified and considered at the start of the process, then deciding in the next convergent stage which key issues or problem to address (Diamond one). In the second divergent thinking phase, all ideas and potential solutions are considered before prioritising those to take forward to prototype, test and eventually implement (Diamond 2) (Design Council, 2023).

In this thesis the Creative Co-Design process was split into two stages to correspond with the two Diamonds in the Double Diamond framework. Diamond 1 included Creative Co-Design workshops 1 and 2. Diamond 2 consisted of Creative Co-Design workshops 3 and prototype development. See figure 13.

Figure 13 The Design Councils Double Diamond Framework (adapted) and the Phase 3 Creative Co-Design process
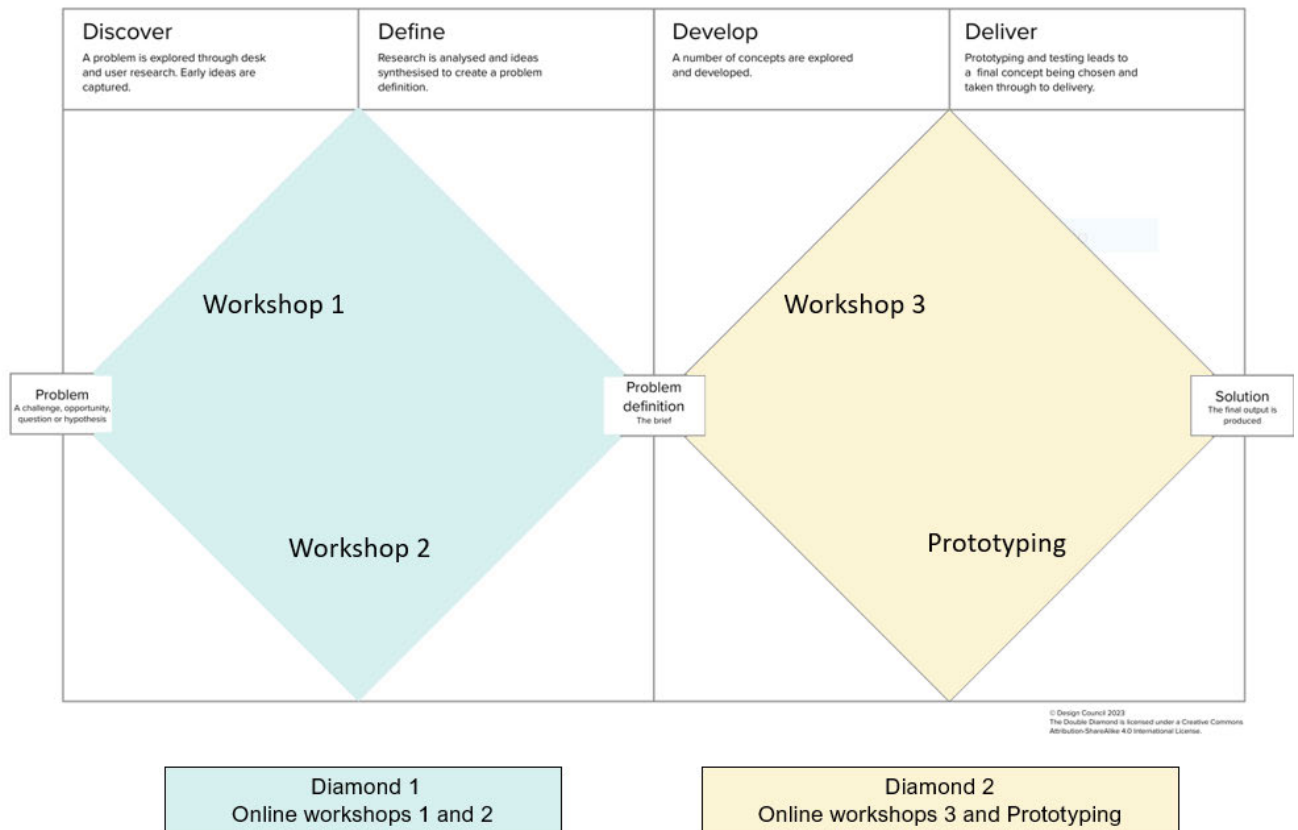
In addition, the framework I developed in my systematic review reported in Chapter 3 (see Figure 7) along with Langley et al's (2018) Collective Making Framework were used to guide the development of Creative Co-Design activities and the way the workshops were carried out and facilitated. These two frameworks were chosen because they are both specific to Knowledge Mobilisation and advocate the use of creative approaches including prototyping (Langley *et al.*, 2018). I used them as a guide to ensure I considered and incorporated as many of the key principles of 'Co' approaches as best I could in the challenging circumstances of COVID-19 restrictions.

7.4.2 Working with the Design Researcher

I worked with a Design Researcher from Lab4Living at Sheffield Hallam University during this phase of my study. I had previous experience of working with the Design team at Lab4Living and with the Design Researcher who would be working with me during this phase. We had

worked together during my master's placement and my time working in the NIHR CLAHRC YH TK2A theme (See Chapter 1). The Design Researcher and I were therefore already aware of how our mixture of design and healthcare knowledge and skills could complement each other and we had a positive working relationship. This meant, when I started working with the Design Researcher on my PhD study, we understood how each other worked and trusted each other's skills and judgement which helped the workshop development process. However, the Design Researcher's involvement changed part way through Phase 3. This will be explained in Chapter 9.

7.5 The Creative Co- Design process – Overview of methods

Figure 14 shows the whole Creative Co-Design process from preparation of the first workshops to displaying and gaining feedback on the Co-Designed prototype solutions. It shows that there were 3 workshops, followed by 2 prototype development meetings, culminating in a display of and gaining feedback on the prototypes developed.

Figure 14 Overview of the Creative Co-Design and prototyping process
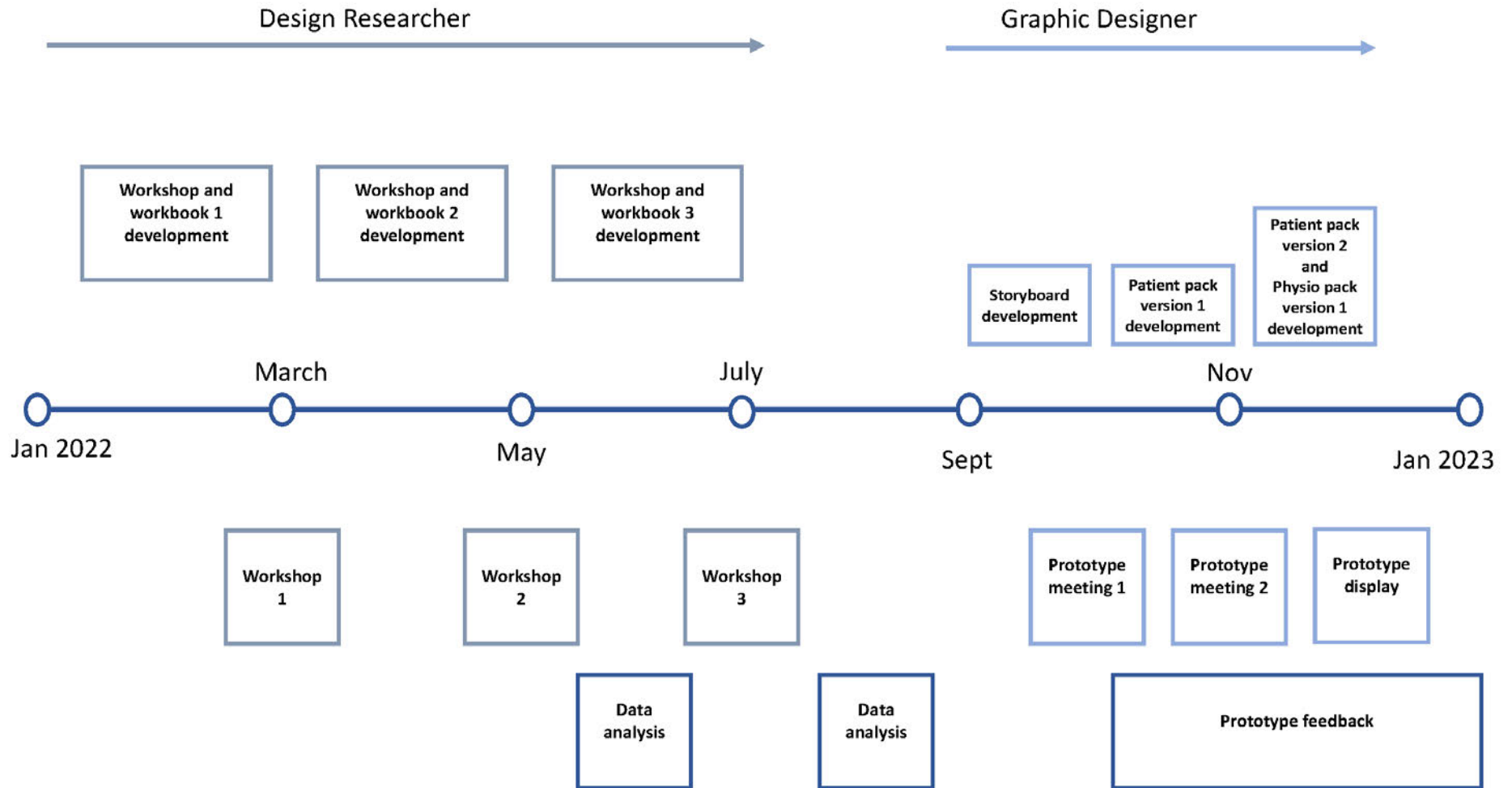
This next section will focus on describing the study population and the recruitment and consent processes for the whole of Phase 3, that is the Creative Co-Design workshops and prototype development.

7.5.1 Study setting and population

Phase 3 took place in the same NHS Foundation Trust with the same three MSK outpatient physiotherapy teams and their patients as Phase 2 and is described in Chapter 5.3.

7.5.2 Strategy for participant group recruitment and selection

I planned to use a mixture of approaches, both purposive and convenience sampling, to select the participant group for the Phase 3 Creative Co-Design (Bryman 2008) as per Phase 2 described in Chapter 5.3. I planned to invite all the participants that had already been involved in Phase 2 to participate in Phase 3 if they wished. However, I intended that recruitment would remain broad utilising the variety of recruitment techniques already described in Chapter 5.3.3

7.5.3 Participant Group size

As with qualitative research, it is the depth, richness and context of the data generated in Co-Design practice that is important rather than statistical generalisability. I hoped to recruit a broad cross section of physiotherapists and patients from the three MSK outpatient physiotherapy teams. This was to ensure a good understanding of the issues related to Knowledge Mobilisation from different physiotherapists and patients' perspectives was gained and also specific to the three different MSK physiotherapy teams contexts. Therefore, a participant group size as per Phase 2, see Chapter 5.3.4, was aimed for.

7.5.4 Recruitment and consent

All the physiotherapists from the three teams were invited to participate in Phase 3, that is Creative Co-Design workshops and prototype development, via email, regardless of whether they had participated in Phase 2 or not. I also contacted all the patient participants who had been involved in the previous phase of the research and who had agreed to be contacted again. This was carried out either by email invitation or a telephone call.

Not all the previous physiotherapist and patient participants agreed to continue into this phase of the project. Therefore, further recruitment was needed. As recruitment took place in the winter of 2021-2022 some COVID-19 restrictions were still in place, this made identification of alternative patient participants difficult. Project flyers and project information summaries (see appendix 5c) were made available in the waiting areas and consultation rooms of various sites of the participating teams, as per the previous phase of the study, to aid patient recruitment. However, as this method of recruitment had previously been relatively unsuccessful and, as some face-to-face physiotherapy consultations were occurring, it was agreed with the service leads of the three participating physiotherapy teams that I could be present in the waiting areas for Teams A, B and C, to hand out flyers and participant information summary leaflets to patients. The dates and times that I would be present in their waiting areas were agreed in advance based on which clinics were running. For example, as I had not managed to recruit many male patient participants to this phase of my project, I arranged to be present in Team B's waiting area to coincide with a lower limb rehabilitation class which had a predominantly male clientele. Although several people of different ages and ethnicity agreed to be contacted further about the study during this face-to-face recruitment, only two additional male patient participants agreed to take part.

Overall, throughout the whole of Phase 3, 18 physiotherapists out of approximately 60 from across the three teams consented and took part. A total of 12 patients with experience of physiotherapy for an MSK condition initially consented to take part. An additional patient consented to be part of the Co-Design Participant Group after workshop 1 had taken place, as did an additional two physiotherapists. Unfortunately, three out of the 12 patients who consented to take part in Phase 3 did not complete their first packs and did not continue in the study. Not everyone who consented took part at every stage of the process as there were new recruits but also people who did not continue through the whole process. Details of exact numbers of physiotherapists and patients that took part in each stage of Phase 3 are detailed in Chapter 8, tables 11 and 12.

In order to try and maximise attendance at the online workshops, the Co-Design Participant Group were offered a choice of dates to attend for each workshop. Workshops were then arranged for the most popular dates. Workshops 1 and 2 ran twice and workshop 3 ran

three times. Two prototype development meetings took place. Meeting 1 ran twice and meeting two three times. Members of the Co-Design Participant Group only attended one workshop at each stage (workshops 1-3, prototype meetings 1 and 2). At all stages there was the option to be involved outside of the online workshops, by completing the activity workshops, and being involved in prototype development, via email, phone call, video call and on one occasion face to face.

Informed consent

I gained informed consent from the Phase 3 Participant Group prior to them being involved in the Creative Co-Design process. Participant information (see appendix 5b) was included with all email invitations. I explained the research verbally to those potential participants that were contacted by telephone. I then sent participant information out to them, either via email or Royal Mail, if they expressed an interest in being involved. I then agreed a time to call them back once they had time to think about the information I had spoken to them about or after they had received and read the information I sent out to them. I sent reminder emails one week after the initial email invitations were sent.

I then arranged a convenient time with all those that had agreed to participate in Phase 3 to go through the consent form and gain their consent prior to their involvement. Consent was gained either over the telephone or video call and, for a small proportion of the physiotherapists, it was obtained face to face on my clinical working days. See table 9 workshop delivery.

7.6 Developing the Co-Design packs and online workshops

I decided to take a blended approach to Low Contact Co-Design so as not to limit participation to only those who had digital access or were digitally literate. I used workbooks alongside the online workshops (Davis *et al.*, 2021; Langley *et al.*, 2021). Examples of workbooks from other Lab4Living Co-Design projects during COVID-19 were used for inspiration and informed the development of the workbooks for my study's Phase 3 Creative Co-Design.

The online Creative Co-Design workshops were developed through a series of meetings with the Design Researcher who had experience of undertaking Co-Design healthcare projects

throughout COVID-19 in this way. The workshop development meetings took place mainly via video call and on occasion face to face, due to the new norm of hybrid working during and post COVID-19. The development meetings generally followed the same format set out in table 8 below:

Table 8 Workshop development process

1	I explained my thoughts and ideas. For example, in the first instance I explained the findings from the prior phase of the research and what I was hoping to achieve from the Creative Co-Design phase.
2	The Design Researcher listened, sketched and made notes.
3	We would then discuss their notes and drawings and iteratively work up activity ideas together.
4	The Design Researcher would then develop an initial activity template/resource.
5	We would discuss, try out and change the activity based on the template/resource developed.
6	This process (step 5) would continue until we were happy we had an activity that was engaging, would best draw out the information we wanted from the Co-Design group and that we felt would work both in an online workshop but also if completing an activity workbook independently.
7	I would then draw up a detailed and structured workshop plan to ensure the activities would fit into the agreed two hour workshop schedule.
8	I then wrote a detailed step by step instruction booklet so that all the activities could easily be completed by members of the Co-Design group in their own time if they could not or did not want to attend the online workshop. In addition to this, for the first pack only, I developed a booklet with information about the project and a description of the process the Creative Co-Design phase would follow.
9	The Design Researcher produced all the resources and instruction and information booklets, making them visually appealing and professional in their appearance. During this final stage the Design Researcher would often make minor changes to maximise layout and look.
10	I reviewed and agreed all content prior to the electronic resources being printed.
11	I then packed the printed materials and any additional items into A5 letterbox boxes and posted these out to all members of the Co-Design participant group prior to the workshop.

See appendix 7a for images of the Co-Design pack that was sent out to all the Co-Design Participant Group.

7.6.1 Adapting the Creative Co-Design work to online delivery

Activity packs were provided to all members of the Co-Design Participant Group so they could work through the activities in a non-digital format either during the online sessions or independently, depending on their preference. Several other modifications were made due to COVID-19 restrictions. The online workshops ran for two hours. In the past I had run face to face workshops for longer periods of time, for example, from three hours up to a whole day. The decision to reduce the length of the workshops online was based on several factors but mainly the risk of screen fatigue. This issue had been identified by the Patient Advisory Group, the Design Researcher and myself based on experiences of participating in online meetings. In addition, in order to maximise participation so those who worked during the day could attend, the workshops took place in the evening when people's concentration levels were likely to be reduced. This tight time schedule meant the workshop plan and choice of type and number of activities was crucial to ensure everyone had the time and space to think and thoroughly explore the questions and their answers to the activities they were undertaking.

In the past, when I had undertaken workshops face to face, refreshments were provided. Also, I would carry out a short creative warm up activity with the group at the start of the session to help people get to know each other, put them at ease and introduce them to the creative approach (Grindell *et al.*, 2022). As the workshops were taking place online I would not be able to carry them out in the same way. Therefore, in addition to the activity resources and instructions, the final Creative Co-Design packs that I sent out to the Co-Design Participant Group included a small gift or fun activity. In the first pack this was an Origami activity for people to complete if they wished prior to the workshop. I chose Origami as it was easy to fit into a small box and would give people the opportunity to try a creative task. A tea bag and pen were also included. These extra 'gifts' became part of each subsequent pack.

7.6.2 Creative Co-Design workshop delivery

I led and facilitated the on-line Creative Co-Design workshops which were each delivered using a similar format. The Design Researcher was present for most of the workshops and helped with technical issues, organising breakout rooms and grouping of the key issues

raised from the discussions in the session on a separate Miro board that was not visible to the group. An overview of the workshops' delivery process is outlined in Table 9.

Table 9 Overview of workshop delivery process March – July 2022

Prior to the online workshops
1. Potential workshop dates and times emailed to the group.
2. Confirmation of the dates and times, sent via email, based on individual preferences.
3. Activity packs sent out, through the post, to everyone in the group.
4. I emailed the link to the online room to all members of the group along with instructions on how to use the chosen online platform, Blackboard Collaborate.
5. I gained informed consent via video call, which gave everyone the opportunity to practice entering the online room and try out the different online room functions with myself prior to their first online workshop. I gained consent via phone call if the latter was not possible or preferred.
During the online workshops
1. I introduced and facilitated the session.
2. Activities were completed individually, as per the 'Do' and 'share' format.
3. Discussion, focused on the completed activities, occurred in small groups (breakout rooms).
4. Feedback from small group discussions was given to the entire group ('Share').
5. Key points from the whole session were summarised by myself or the Design Researcher.
6. I explained the next steps and closed the session.
After the online workshops
1. I sent 'Thank you' emails to everyone who had attended or who had completed and returned a pack in their own time. I encouraged feedback about the online session and the activities.
2. Completed activity packs were returned to me via Royal Mail.

7.7 Prototype development preparation

A lot of preparation went on behind the scenes prior to the prototype development meetings taking place, as it had for the Creative Co-Design workshops and workbooks. This included organising the involvement of a new Design Researcher, as unfortunately the Design Researcher who had been working with me left their employment prior to the final Creative Co-Design workshop 3 taking place. Table 10 below demonstrates the behind the scenes work prior to prototype development meeting 1. Box 1 shows the process undertaken between meetings 1 and 2 and meetings 2 and the final prototype displays.

Table 10 Preparation for first prototype development meeting

August 2022	Meeting with the Design team leader to discuss the stage of the study, outcomes of ideation and how to progress, including allocation of new Design Researcher.
September 2022	Meeting with the new Graphic Designer and their team leader to discuss the study and their involvement. I produced very rough draft storyboards of the overall prototype concept idea for the Graphic Designer to develop.
October 2022	I met with the Graphic Designer to present and discuss my draft storyboards for them to develop. I met with the study advisory group to discuss the plans for prototyping. First versions of the prototype concept storyboards received from Graphic Designer – no time to make amendments. Storyboards printed and packs sent and emailed to Co-Design participant group ready for first prototype development meetings. First prototype development meetings took place.

Box 1 Overview of subsequent iterative prototyping process October – Dec 2022

1. Meet with the Product Design team lead and Graphic Designer to discuss and agree what changes to be made and feasible timescales and deadlines.

2. Interim prototype development meetings and email correspondence with a small number of the Co-Design Participant Group.

3. Prototype content sent to the Graphic Designer.

4. Prototypes received from the Graphic Designer for review.

5. Prototypes printed and packed.

6. Prototypes reviewed by physiotherapists and patients in the prototype development meeting and feedback gained.

7. Prototypes refined based on feedback.

7.8 Applying the principles of 'Co' approaches

I used the framework developed from the systematic review in Chapter 3 – see Figure 7 to guide me whilst planning for and undertaking the Creative Co-Design workshops and meetings. I combined these with some of the overlapping principles from Langley et al's (2018) collective making framework (Langley *et al.*, 2018) and the NIHR Co-Production principles (NIHR, 2019). I considered and applied these frameworks and principles in several ways. First of all, ground rules were set with the group for the workshops and meetings. This was so everyone understood the inclusive and equitable ethos of the process. Warm up activities were used to put the group at ease and develop rapport. A creative approach was used from the outset and creative activities were developed that aimed to be suitable for everyone in the group to be able to complete. The creative activities were developed to enable the Co-Design Participant Group to engage with the session by 'thinking while doing' rather than forcing immediate verbalisation of their thoughts and ideas. The creative activities gave everyone the opportunity to express their thoughts and views through completing the activity sheets regardless of whether they spoke in or came to the online workshops and meetings. The 'do' then 'share' format of the workshops meant everyone

who attended the online workshops had the opportunity to share and hear the perspectives of the different members of the group, so they could understand everyone's views and needs. Finally, tangible outputs were developed, such as visual summaries of the issues and needs identified and the development of prototypes, to demonstrate how everyone's views and ideas had been considered and incorporated during the process.

7.9 Analytical approach

The analysis of the data collected during the Creative Co-Design phase was based on Sanders and Stappers (2012) 'on the wall' approach (Sanders and Stappers, 2012). However, as is often the case with 'messy' Co-Design work, data collection and analysis did not always happen in distinct phases (Langley, Knowles, and Ward, 2022). For clarity in this thesis, I describe the analysis as per the two Double Diamond stages, with Diamond 1 covered in workshops 1 and 2 and Diamond 2, in workshops 3 and the prototype development meetings.

Analysis process – Diamond 1 – Discover and Define

The large amounts of data generated from both Creative Co-Design workshops 1 and 2 were analysed using a research wall to visualise, synthesise and make sense of the data collected (Stickdorn *et al.*, 2018). The technique used was based on Sanders and Stappers (2012) 'on the wall' light analysis technique that involves ordering the data into groups and hierarchies (Sanders and Stappers, 2012). This approach to analysis of generative research data was chosen as it allows the data to remain visual, unlike on a database, and is flexible and quick. This sense-making process would usually be participatory, using a real life wall, and with other members of the research team or Co-Design group being involved (Sanders and Stappers, 2012). As this was a PhD project, but also because COVID-19 restrictions were still affecting the workplace, I carried out the 'on the wall' analysis on my own. I sorted the data into groups and hierarchies using post it notes and flip chart paper on a wall in my home office to aid a more active, flexible and iterative approach (Sanders and Stappers, 2012). See appendix 7b for images of the 'post-it wall'. The Creative Co-design workshop 1 and 2 findings were then synthesised with the preliminary interview findings. They were then summarised into key insights, a concise and actionable format, to communicate and agree upon the findings with the Co-Design Participant Group (Stickdorn *et al.*, 2018).

<u>Analysis process – Diamond 2 - Develop and Deliver</u>

During workshop 3, and subsequent prototype development, data analysis was again based on a version of the 'on the wall' analysis technique (Sanders and Stappers, 2012). This was because it could be used during the workshops to quickly and flexibly move and group ideas into themes. A mixture of a shared virtual wall using a Miro board and a small, actual wall was used this time. The Design Researcher and my supervisors had access to the Miro board wall, see appendix 7c for images of the Miro Board. This virtual wall was used iteratively, first of all during the workshops by the Design Researcher and myself and then afterwards once all completed packs and workbooks were returned. Ideas were iteratively grouped into themes during and after the workshops. Prioritisation by voting, took place at the end of each of the ideation workshops. Further prioritisation occurred in the first prototype development meeting and was also based upon what already existed locally and what might be most feasible to achieve in the remaining short time frame. That is, analysis did not always occur as a distinct separate phase but sometimes concurrently during the workshops and meetings (Langley, Knowles and Ward, 2022).

7.10 Chapter summary

This chapter has described the methods used during the Phase 3 Creative Co-Design and the preparation and process for the Co-Design workshops and prototype development meetings. The next chapter describes the content and delivery of the online workshops 1-3. Then Chapter 9 presents the prototype development.

Chapter 8
The Creative Co-Design workshops 1- 3 - Content and Delivery

8. 1 Chapter overview

In this chapter I describe the content and delivery of the Creative Co-Design workshops 1-3. I will present these as per the two Stages of the Double Diamond Framework, that is Diamond 1 (Discover and Define) which includes workshops 1 and 2, followed by Diamond 2 (Develop) which includes workshop 3. The final 'Deliver' stage of Diamond 2, that is Prototype Development, will be presented in Chapter 9. This Chapter includes:

- Diamond 1 - Discover and Define. Aims and objectives and content and delivery of online Creative Co-Design workshops 1 and 2.
- The key insights and needs identified from workshops 1 and 2.
- Diamond 2 - Develop. Aims and objectives and content and delivery of online Creative Co-Design workshops 3.
- The ideas generated.
- Chapter summary.

8.2 Diamond 1- Discover and Deliver– Creative Co-Design online workshops and activity packs 1 & 2

In this section I will describe the first stage of the Creative Co-Design process, that is Diamond 1 - Discover and Define. I will outline how online workshops 1 and 2 and the completion of the accompanying activity workbooks were carried out. I will set out the aims and objectives of each individual workshop before detailing with whom, when and how they were undertaken. The key insights and needs identified from each workshop will be summarised in section 8.4.

8.2.1 Online workshop and workbook 1 Aim and Objectives

The aim of the first Creative Co-Design workshop and accompanying activity workbook was to explore more broadly, that is not just for the purposes of the MSK physiotherapy appointment, the different types of evidence and health information MSK physiotherapists and patients access and use.

The objectives were:

- To understand which sources of evidence or health information MSK physiotherapists and patients do and do not use.

- To understand which sources of evidence or health information MSK physiotherapists and patients use the most and which they use the least and why.

- To understand which sources of evidence or health information MSK physiotherapists and patients find the easiest and which they find the hardest to access and why.

- To understand which sources of evidence or health information MSK physiotherapists and patients find the easiest and which they find the hardest to understand and why.

- To understand which sources of evidence or health information MSK physiotherapists and patients find the easiest and which they find the hardest to apply, either to their patients or to themselves and their MSK problem(s), and why.

- To understand how, when and where MSK physiotherapists and patients access evidence and health information.

8.2.2 The Double Diamond - Discover

The focus of workshop 1 was the first Diamond's divergent phase, 'Discover'. That is opening up and exploring the Co-Design Participant Group's experiences of evidence and health information access and use. This was to ensure that myself and the Co-Design Participant Group fully understood all the potential issues MSK physiotherapists and patients face and didn't jump to conclusions and solutions too quickly (The Design Council, 2020).

8.2.3 Online workshop and workbook 1 Co-Design Participant Group

Thirteen physiotherapists and six patients were due to attend one out of two online workshops which took place between 7pm – 9pm on the 28th and 31st March 2022. However, two patients did not attend due to ill health on the day of the workshops. They completed the activity workbook that they had received through the post, independently instead. An additional two physiotherapists and three patients chose to complete an activity

workbook in their own time. See details of the Co-Design Participant Group and their involvement throughout Phase 3 in tables 11 and 12.

Table 11 Phase 3 Creative Co-Design Participant Group MSK Physiotherapists Details

Participant ID	Professional grade	Gender	Role /case load	Team	Online co-design workshop 1	Online co-design workshop 2	Online co-design workshop 3	Online prototype development meeting 1	Interim prototype meeting	Online prototype development meeting 2	Prototype display and feedback (Dec 15th 2022-31st Jan 2023)
PTCo1	Band 8a	Female	Service Manager	B, C	Attended	Did not attend /complete	-	-	-	-	FTF meeting Feb 2023
PTCo2	Band 5	Male	Clinician Mixed	A, C	Attended	Attended	Attended	Attended	-	Attended	Site 3 and via email
PTCo3	Band 5	Male	Clinician Mixed	C	Attended	Attended	Attended	Attended	-	Attended	Site 3 and via email
PTCo4	Band 6	Male	Clinician Mixed	A, C	Attended	Attended	Attended	Attended	-	Attended	Site 1a and via email
PTCo5	Band 7	Male	Clinician Mixed (acute)	C	Attended	Attended	Attended	Attended	-	Attended	Site 3
PTCo6	Band 6	Female	Clinician Mixed	A	Attended	Attended	Attended	Attended	Physio resource pack via email	Attended	Site 1a and via email
PTCo7	Band 5	Female	Clinician Mixed	A, B	Self-complete	Attended	Self-complete	Via email/post	-	Attended	Site 2
PTCo8	Band 8a	Male	Extended Role Physiotherapist Spinal/mixed	A	Attended	Attended	Attended	Attended	Patient resource pack (face to face)	Attended	Site 1a and via email
PTCo9	Band 8a	Female	Extended Scope Physiotherapist Shoulder/elbow	C	Attended	Attended	Attended	Via email	-	Via email	Site 3
PTCo10	Band 7	Female	Specialist Clinician	B	Attended	Attended	Attended	Withdrew from study	-	-	Site 2

			(Rheumatology)								
PTCo11	Band 7	Female	Clinician Mixed	C	Attended	Self-complete	Attended	Attended	Physio resource pack via email	Attended	Site 3
PTCo12	Band 6	Male	Clinician Mixed	A	Attended	Attended	Attended	Attended	-	Attended	Site 2
PTCo13	Band 8a	Male	Extended Role Physiotherapist Spinal/chronic pain	A	Attended	Attended	Attended	Attended	Patient resource pack Via videocall	Attended	Site 1a and via email
PTCo14	Band 7	Female	Clinician /Operational Manager Mixed/chronic pain	A	Attended	Attended/Self-complete	Attended	Attended	-	Attended	Site 1a
PTCo15	Band 7	Female	Clinician Mixed	A	Self-complete	Self-complete	Self-complete /did not return	withdrew	-	-	Site 1a
PTCo16	Band 5	Female	Clinician Mixed	A, B, C	-	Attended	Attended	Via email/post	-	Attended	Site 1a and via email
PTCo17	Band 6	Female	Clinician Mixed	A, B	-	Attended	Attended	Via email	-	Via email	Site 3
PTCo18	Band 5	Female	Clinician Mixed	C	-	-	Attended	Attended	-	Attended	Site 3 and via email

Table 12 Phase 3 Creative Co-Design Participant Group Patient Details

Participant ID	Age	Sex	Physio team	MSK condition	Online workshop 1	Online workshop 2	Online workshop 3	Prototype development meeting 1	Interim prototype development meeting	Prototype development meeting 2	Prototype display and feedback
PCo1	65yrs	Female	C	Shoulder fracture	Self – complete	Self-complete	Attended	Withdrew from study	-	-	-
PCo2	62yrs	Female	A, B	Osteo-Arthritis (OA)	Self-complete	Attended	Attended	Attended	Attended	Self-complete	Attended Site 2
PCo4	71yrs	Male	C	Shoulder (surgery)	Attended	Attended	Self - complete	Attended	-	-	-
PCo5	32yrs	Female	A	Lower back	Attended	Attended	Attended	Attended	Via email	Attended	Sent in post
PCo7	66yrs	Female	A	OA knees	Attended	Attended	Attended	Attended	-	Attended	Attended Site 1a
PCo8	21yrs	Female	B	Temporo-Mandibular Joint	Self-complete	Self-complete	-	Withdrew from study	-	-	-
PCo9	77yrs	Female	A	Knee	Self-complete	Attended	Attended	Attended	-	Self-complete	Sent in post
PCo10	25yrs	Male	B	Knee (surgery)	Self-complete	Self-complete	Self-complete	Attended	-	Attended	Attended Site 2
PCo11	61yrs	Female	B, C	Rheumatoid Arthritis	Attended	Attended	Attended	Attended	-	Attended	Attended Site 2
PCo13	80yrs	Female	A, B	OA hips	-	Attended	Attended	Attended	-	Attended	Sent in post

8.2.4 Online workshop and workbook 1 Content and Delivery

The two online workshops followed the same schedule and included the following:

1) Optional pre workshop activity – origami - to get the group in the creative spirit; 2) A short PowerPoint presentation introducing the study, the aims of the workshop and the ground rules for the session. This included reassurance that they would be in a confidential and safe environment and that everybody's views would be welcomed and valued; 3) A short warm up activity to get to know each other and to introduce the format the activities would take; 4) A series of creative co-design activities based on the workshops aims, including card sorting and ranking and design prompt sheets, following the 'do' and 'share' format; 5) Summary of the session and next steps.

Table 13 gives a detailed description of workshop 1 activities and their purpose.

Table 13 Online Creative Co-Design workshop 1 detailed schedule

Time	Activity	Purpose of activity	Additional detail
19.00-19.05	Welcome and PowerPoint introduction	To explain: - The purpose of study, - The key questions to be answered - The different study stages and progress so far - The purpose of co-design sessions and aim of each one - The aim of this session - Set ground rules for this and sessions	PowerPoint slides To make clear that the focus of the first workshop is on evidence and information access and use in general, that is outside the physiotherapy appointment. The next session will look at evidence and information sharing and use in the physiotherapy appointment.
19.05- 19.10	Warm up activity	To introduce one another and demonstrate the 'do' then 'share' format. To get used to giving short and succinct feedback ready for the breakout rooms.	Beginning with myself and the design researcher everyone took turns to complete the sentences below: 'Hello my name is… One of the best pieces of advice I've been given is… I'm here today because of my experience as a …'
19.10-19.20	Activity 1 Step 1: Evidence and information card sorting Use/never use (individually)	To discover the different sources of evidence and information used. Physio's - to inform their practice Patients - to find out what's wrong and what they can do about to Not what you think you should be using or know should be using but what you actual do.	Using the pack of cards in envelope 1. Each person to go through their pack and separate out any evidence or information sources that they never use. Then discard the 'never used' pile.

		No judgement need to know the reality.	
19.20-19.30	Activity 1 Step 2: Evidence and information ranking	To discover which evidence and information people use the most, least or sometimes.	Using the ranking sheet in envelope 1: Stick the remaining cards, using the glue stick provided, on the ranking sheet. Ranking them as most, sometimes, or least used.
19.30-19.40	Break out rooms Small group discussion (3-4 people, physiotherapists and patients, per group)	To compare and discuss each other's card placements. To discover what are your group's top 3 information sources are. i.e., Those you use the most. To discover what your group's bottom 3 information sources are i.e. Those you use the least. To describe two things that you find surprising or two things you find most interesting from your group.	Using the pen and activity booklet in your packs to make notes during the discussion and nominate a speaker to feedback to the whole group at the end.
19.40–19.45	Share back to the whole group	So each group can share back their top and bottom three information sources and their two most surprising and/or most interesting findings. To allow the whole group to hear everyone's different experiences.	Each group take it in turns to feedback from their discussion using their nominated speaker.
19.45-19.55	Activity 1 Step 3 Stickers	To explore ease of access, understanding and use of the information sources on each person's sheet. Use the stickers to indicate: a) Which information is the easiest/hardest to get hold of/access/find?	Stick the stickers on the information cards on the ranking sheet where applicable. More than one sticker can be applied to each card.

		b) Which information is the easiest/hardest to understand/make sense of/digest c) Which information is the easiest/hardest to apply to themselves or their patients	
19.55- 20.05	Breakout rooms	To share each other's insights from step 3. To discover what the two most surprising and/or interesting findings were for each group	Using the pen and activity booklet in your packs to make notes during the discussion and nominate a speaker to feedback to the whole group at the end
20.05-020.10	Share back to whole group	To share each group's most interesting/surprising insights To allow the whole group to hear everyone's different experiences.	Each group took it in turns to feedback from their discussion using their nominated speaker.
20.10 -20.15	Break		
20.15 -20.25	Activity 2 Mapping exercise (individual)	To explore what, why, where and when of the most and least used information sources	To use the two templates in envelope 2. Complete one for the evidence/information card they used the most. Complete one for the evidence or information they use the least. Using the prompts provided on the sheets. Circling the icons to indicate: Why they use it the most Where/how they access it. When they access it.

			Considering how trustworthy it is.
			Completing the missing sentences: I use this the most because… If only it…
20.25- 20.35	Break out rooms	To share, compare and discuss each other's most and least used info and why. To discover what are the three most surprising and interesting findings?	Using the pen and activity booklet in the packs to make notes during the discussion and nominate a speaker to feedback to the whole group at the end
20.35-20.40	Share	To share back the 2 most surprising and interesting findings from each group	Each group take it in turns to feedback from their discussion using their nominated speaker.
20.40-20.50	Final quick question: What types of information don't I use but I wish I could/did use?	'Round robin' to see if there is anything else that the discussions may have sparked	Each person took it in turns to answer the question
20.50-21.00	Round up and next steps	To explain what will happen next and likely dates of next workshop	

The activity packs for workshop 1 can be found in appendix 8a including introduction and instruction booklets and activity sheets.

8.3 Diamond 1 – Discover and Define – Creative Co-Design Online workshop and workbook 2

8.3.1 Aim and Objectives

Workshop 2 aimed to build on the understanding gained from workshop 1 but focus on the physiotherapy appointment itself. The aim was to understand physiotherapists' and patients' experiences of evidence and health information access, sharing and use during the whole physiotherapy outpatient appointment process, including before, during and after the appointment. See figure 5 in chapter 2.

The objectives were:

- To understand the proportion of time spent, gathering and sharing different types of evidence, knowledge and information, during the whole MSK physiotherapy outpatient appointment process, to inform safe decision making from a MSK physiotherapist and patient perspective.
- To understand what knowledge and information patients want to share and receive, during the MSK physiotherapy outpatient appointment process, so they understand their MSK problem and how to manage it.
- To understand when different types of knowledge are mobilised by physiotherapists and patients during the MSK physiotherapy outpatient appointment process.
- To understand what successful Knowledge Mobilisation looks like from a MSK physiotherapist and patients' perspective.

8.3.2 The Double Diamond – Discover and Define

Creative Co-Design workshop 2 continued the divergent 'Discover' phase. It explored evidence and health information access, sharing and use but this time specific to the MSK physiotherapy outpatient appointment. Then the knowledge generated from workshops 1 and 2 were analysed, following the Double Diamonds convergent 'Define' phase, in order to identify the key issues and needs from the workshop data.

8.3.3 Online workshop and workbook 2 Co-Design Participant Group

Sixteen physiotherapists from across the three teams and ten patients attended one out of two online workshops or completed an activity workbook in their own time. Although some members of the group did not complete workshop 1 and subsequently withdrew from the study, an additional two physiotherapists and one patient, who was a member of the project advisory group, consented to be part of the continuing Creative Co-Design process, See Tables 11 and 12. The workshops took place on the 19th and 23rd May 2022 between 7pm-9pm.

8.3.4 Online workshop 2 content and delivery

Again, this workshop was run twice with both workshops following the same schedule. The creative activities included completing pie charts and a journey map/timeline. The final activity used quotes from the Phase 2 interviews to stimulate thought and discussion within the group. The workshop schedule included the following:

1) An optional pre workshop activity and gift – lettuce seeds and compost to plant and grow - to represent the group growing in their relationships with each other, sharing experiences and growing ideas; 2) An introduction to the session and its purpose; 3) A short warm up activity similar to workshop 1; 4) A series of Creative Co-Design activities based on the workshops aims, including a pie chart and journey map, carried out in the 'do' and 'share' format; 5) A summary of the session and next steps.

The table in appendix 8b gives the detailed schedule of workshop 2.

The activity pack that the Co-Design Participant Group received can be found in appendix 8c including the workbook and activity sheets.

8.4 The key insights and needs identified from Creative Co-Design workshops 1 and 2

Before the final ideation workshops, that is workshop 3, took place I analysed the data and knowledge generated from the first two workshops based on Sanders and Stappers (2012) 'on the wall' light analysis, as described in chapter 7 (Sanders and Stappers, 2012). See appendix 7b and 7c for examples of real and virtual research walls used. I synthesised these

findings with the Phase 2 preliminary interview and observation findings presented in chapter 5. Here I present a concise and actionable summary of the key issues identified as recommended by Stickdorn et al (2018), as described in Chapter 7.8 (Stickdorn *et al.,* 2018). Summaries of the key insights and needs identified, that were distilled into the key issues to be addressed, were shared with and agreed upon with the Co-Design Participant Group prior to stage 2 (Diamond 2, online workshop 3). They are summarised below.

- Physiotherapists find (research) evidence hard to find, access and make sense of.
- Peers are valued sources of evidence.
- Personal preference plays a part and is influenced by many things including personality and age.
- The physiotherapy appointment process starts much earlier for patients than for the physiotherapists i.e. From the point at which they are referred.
- Physiotherapists and patients have different expectations for the appointment.
- Relationship building and rapport are key.

Infographics, developed by myself and the Design Researcher, of the key insights and needs that were shared with the Co-Design Participant Group prior to workshop 3, can be found in appendix 8e. The group also received a copy of the key issues, see Box 2, in their workshop 3 activity packs. They were given the opportunity to add, alter and agree on the issues to be kept on the list. It was this list, in box 2, that they used to focus their ideas for solutions in online workshop and activity workbook 3, that I will describe in the next section.

In addition, between workshop 2 and workshop 3, I developed posters and postcards with the Design Researcher that summarised the key findings from Phase 2 and workshops 1 and 2. These were displayed in various locations around the participating sites, such as waiting rooms, rehab spaces and staff bases. Their purpose was to raise awareness and spark interest in the study and its findings prior to the next ideation and prototyping stage. Example posters and postcards can be found in appendix 8f. Finally, a longer, more detailed document of the

findings was produced for the Co-Design Participant Group and physiotherapy team managers to read if they wished. Some of the more in-depth findings can be found in appendix 8d.

Box 2 The key issues identified that the Co-Design Participant Group based ideation on

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Key Issues

1. **Making evidence accessible**: How do we make data more accessible for physiotherapists to use in day-to-day practice and give them the skills and confidence to be able to use it?

2. **Setting/managing expectations:** How do we meet the appointment needs and expectations of physiotherapists and patients?

3. **Making communication of information/evidence clear:** How do we ensure that patients receive all the information they need to be able to understand their problem and how it can be managed?

4. **Having confidence and capability to act**: How do we ensure patients feel confident and capable to act on the information they receive after, and in between, appointments?

5. **Building relationships:** How do we make sure that positive relationships are formed between patients and physiotherapists, so patients trust their physiotherapist and the information they receive?

6. **Adapting to changing and varied needs**: How do we ensure that everyone's information preferences are catered for (physiotherapists and patients) dependent on their personal circumstances?

Key Issues

7. **Making evidence accessible**: How do we make data more accessible for physiotherapists to use in day-to-day practice and give them the skills and confidence to be able to use it?

8. **Setting/managing expectations:** How do we meet the appointment needs and expectations of physiotherapists and patients?

9. **Making communication of information/evidence clear:** How do we ensure that patients receive all the information they need to be able to understand their problem and how it can be managed?

10. **Having confidence and capability to act**: How do we ensure patients feel confident and capable to act on the information they receive after, and in between, appointments?

11. **Building relationships:** How do we make sure that positive relationships are formed between patients and physiotherapists, so patients trust their physiotherapist and the information they receive?

12. **Adapting to changing and varied needs**: How do we ensure that everyone's information preferences are catered for (physiotherapists and patients) dependent on their personal circumstances?

8.5 Diamond 2 -Develop – Creative Co-Design online workshops and workbook 3

8.5.1 Online workshop and workbook 3 Aim and Objectives

The aim of the third online workshops and workbook was to generate many ideas for potential solutions to the issues and needs identified in Phase 2 and Phase 3 (Diamond 1) and prioritise which ideas to develop into prototypes.

The objectives were:

- To use warm up activities to encourage creativity, quantity over quality and demonstrate how constraints can encourage lateral and creative thinking.
- To stimulate ideas using prompts and build on ideas by 'stealing' features from other popular services.
- To prioritise, by voting, which ideas to take forward to prototyping.

8.5.2 The Double Diamond – Develop

Online workshop and activity workbook 3 followed the Double Diamonds second divergent stage, 'Develop' (Design Council, 2023). That is, activities were carried out that encouraged the Co-Design participant group to think of as many ideas as possible to solve the issues and meet the needs identified and agreed upon during the Discover and Define stage of Phase 3. By the end of the online workshop and workbook 3, the group would begin the final convergent thinking stage of the Double Diamond 'Develop'. That is, prioritising and deciding upon, which of the many ideas generated, to develop into physical prototypes.

8.5.3 Online workshop and workbook 3 Co-Design Participant Group

Seventeen physiotherapists from across the three teams and nine patients attended one out of three online workshops or completed an activity workbook in their own time. See tables 11 and 12 earlier in this chapter.

Originally, two online workshops were planned for the evening of 14th and 18th July 2023. However, three physiotherapists and two patients couldn't attend at short notice due to ill health (COVID-19 and other illnesses). Therefore, a third workshop was arranged for a later

date on the 28th July to allow these members of the group to still engage together online. The online workshops all took place in the evening between 7-9pm.

8.5.4 Online workshop and workbook 3 Content and Delivery

The three online workshops followed the same format and used creative warm up activities, Design and service prompt sheets to stimulate broad and uninhibited thinking and idea generation. The workshop schedule included:

1. An optional pre workshop activity and gift – a Caesar salad recipe to make using the lettuce grown from the seeds received previously, with the option for an individual twist, to show we all have different ideas, preferences and tastes; 2. A presentation of the key issues and needs to the Co-Design participant group prior to, via email, and at the start of workshop 3; 3. A series of short warm up activities to encourage creativity and discourage self-editing; 4. Two ideation activities; 5. Grouping of the ideas generated into themes; 6. Voting for top 3 idea themes; 7. A summary of the session and the next steps.

Appendix 8g gives the detailed schedule of online workshop 3. The activity pack for workshop 3, including the workbook and activity sheets, can be found in appendix 8h.

8.5.5 The ideas generated

Table 14 presents the themes generated from all the ideas across the three online workshops along with examples of the ideas generated, issues and needs they address, and the corresponding number of votes received during the workshops. For more details about the ideas generated and the issues and needs they relate to, please see appendices 8i.

Table 14 Idea themes, ideas, issues/needs and number of votes

Idea Theme	Examples of related ideas	Examples of the issues and needs the ideas address	Number of votes
Evidence on demand	A one stop evidence shop/repository (online) An App or portable pocket book of reliable up to date evidence summaries Evidence summary templates 'Evidence in a box'	**Making evidence accessible** Clear, concise, visual and easy to find Varied sources Credible Condition specific	**15**
Information in different formats	A reliable and respected online patient information repository A library/catalogue of clear, concise evidence based leaflets Step by step 'recipe' cards App to access exercises with diary to track progress 'Physio in a box'	**Making communication of evidence clear** Information on what is wrong, what the plan is, what to do and time to practice Good quality evidence informed information eg individualised exercises	**9**
Pre appointment information	Pre appointment information leaflet/video/department and staff profiles	**Setting/managing expectations** Clear communication that removes uncertainty and provides information	**8**

	Pre appointment questionnaire/workbook	on what to expect and why questions are being asked To understand a patients expectations of the session	
Between the appointment	Physio 'hotline' A 'buddy' system A summary of each physiotherapy session	**Having confidence and capability to act** Good quality evidence informed information eg individualised exercise sheets Suitable follow up and support, encouragement and reminders 24/7 access to info	8
Location	Choice of locations/where to see your physio, including in your home. Pop up physio clinics in community centres, shops etc. Better healthcare environments with health and wellbeing focus rather than illness and disability focus. Modern environments that are better equipped.	**Building relationships** **Setting/managing expectations** Suitable environment to engage	8
The appointment (how it is carried out and documentation)	Change the script – incorporate touch and movement at the start whilst gathering other information ie more patient led.	**Building relationships** **Managing expectations** Less talking more doing Trust and confidence building	6

	Have templates to change flow of appt/streamline subjective/objective assessment Something/someone to record the session and make concise, clear bullet points and visuals for patients to take away		
Identity – trust confidence, shared identity across depts /nationally	One brand across three physiotherapy teams Not reinventing the wheel, bringing brands/depts together (locally and nationally).	**Making evidence accessible** Credible, varied	**2**
Incentives	Discounts to patients eg; gym membership/ discounted equipment, shopping/food vouchers Discounts/rewards to physios for going on courses (or reduced rates/free courses) Staff as shareholders. That is they have more influence on decisions, how things are run. 'Rebel against the rotas'.	**Making evidence accessible** Support to share and contribute evidence at all grades	**0**

8.6 Chapter summary

In this chapter I have detailed the content and delivery of the online Creative Co-Design workshops 1-3 that took place during Phase 3. This is from the first 'Discover' stage of the Design Councils Double Diamond Framework through to 'Develop' where many ideas were generated and prioritised to take forward to the final Prototyping 'Deliver' stage. This final stage of the Double Diamond, and of the Creative Co-Design process, will be described and the prototypes presented in the next chapter.

Chapter 9
Prototype Development

9.1 Chapter overview

In this chapter I describe the final 'Deliver' stage of the Double Diamond and Creative Co-Design process. I present the iterative process of prototype content development, feedback and refinement. The chapter includes:

- Aims and objective.
- The development of the overall prototype concept storyboards.
- The content and delivery of the prototype meetings.
- The prototype display and feedback.
- The final prototypes.
- Reflections on applying the principles of 'Co'approaches.
- Chapter summary.

9.2 Diamond 2 - Deliver- Iterative Prototype Development

9.2.1 Aim and Objectives

The aim of prototyping was to develop prototype solutions with the Co-Design Participant Group and the support of the Design Researcher. The prototype solutions would be based on the ideas generated in workshop 3. They would aim to address the Knowledge Mobilisation issues and needs that were identified through the Phase 2 and Phase 3 process, to help improve Knowledge Mobilisation at different points along the MSK physiotherapy outpatient process.

The objectives were:

- To agree on which idea or theme(s) to develop.
- To develop a prototype(s) through an iterative process of content development, feedback and refinement.
- To produce a final prototype(s) based on the feedback obtained.

This was the final phase of the Double Diamond process, iteratively developing and 'Delivering' physical prototypes.

Change in Design Researcher

Due to unforeseen circumstances, the Design Researcher who had been working with me from the start of Phase 3, moved to a new employer just before completion of the final three Co-Design workshops. Unfortunately, the team I collaborated with did not have any other Design Researchers with suitable skills and were only able to offer me a Graphic Designer to work with. Therefore, I lost the embedded Design Researcher at a critical point in the project. My plan to work together with someone who knew the project well, who could make suggestions and continue to provoke ideas within the group about what the prototypes might or could be, was no longer possible. That is, they were not involved in the prototype development meetings. Instead, I provided basic, rough versions of the prototypes and their content for the Graphic Designer to transform.

Co-Design Participant Group

Two online prototype development meetings took place in October and November 2022. The first meeting was repeated twice on 14th and 17th October and the second meeting was repeated three times on the 21st, 22nd and 24th November 2022 between 7pm – 8pm. Fifteen physiotherapists and seven patients were involved either in the meetings themselves or via postal packs or email. Four physiotherapists and two patients were involved in interim prototype development work between the meetings before example prototypes were made. See Co-Design Participant Group details and prototype meetings in Tables 11 and 12 earlier in Chapter 8.

9.3 The development of the overall prototype concept storyboards

The Co-Design Participant Group were sent a summary of the ideas and idea themes generated after workshops 3. See appendix 8j. However, I was keen that we had something more tangible that would allow the Co-Design Participant Group to imagine what some of their ideas could become. As a number of the idea themes drew similar amounts of votes and some of the themes overlapped it was difficult to decide on one single theme to develop into a prototype. Therefore, I decided to develop an overall digital concept, that

incorporated a number of the ideas from across a number of the themes, which would demonstrate to the group that all their ideas had been heard and considered.

I worked with the Graphic Designer to develop storyboards of the overall digital concept. The idea being that the Co-Design Participant Group would then decide which elements from the overall concept they would like to develop further. See appendix 9a for my original rough sketches of the storyboards that the Graphic Designer then developed into the physiotherapist facing digital concept storyboard - 'Evidence in a Box', and patient facing digital concept storyboard - 'Physio in a Box', shown in Figures 15 and 16.

These storyboards were sent to the Co-Design Participant Group and formed the basis of the first prototype development meeting that is described in the next section.

Figure 15 MSK physiotherapy evidence and information hub concept - Evidence in a Box

Figure 16 MSK physiotherapy evidence and information hub concept – Physio in a Box

9.4 Prototype development meeting 1

The aim of the first prototype development meetings was for the Co-Design participant group to review the overall prototype concept storyboards (Figure 15 and 16) and agree which components to develop further. The first prototype development meetings took place online and took the following format:

1. Welcome and introduction to the prototype phase; 2. Review of the prototype evidence and information hub concept storyboards; 3. Feedback and suggestions for amendments; 4. Presentation of examples of the individual items from the digital concept; 5. Agreement on which items to develop; 5. Time scales and next steps explained; 6. Request for volunteers to be involved in the content development outside of the meetings.

A detailed meeting plan and accompanying information that was sent to the group prior to meeting 1 can be found in appendix 9b and 9c.

9.4.1 Feedback from Prototype Development meetings 1

The storyboards and overall concept

A positive response was gained about the overall MSK physiotherapy evidence and information hub concepts, 'Evidence in a Box' and 'Physio in a Box' depicted in the storyboards. Although there was some concern about the digital nature.

Individual items to develop further

The Co-Design participant group agreed that we would develop the following patient facing prototypes first based on the 'Physio in a Box' concept:

- Pre appointment information.
- Pre appointment questionnaire.
- Exercise 'recipe' cards and log.
- Personal rehab plan.

I would work with volunteers from the Co-Design participant group to develop the content for these items.

The Graphic Designer would transform the rough drafts ready to be reviewed in prototype development meeting 2.

9.4.2 Interim prototype content development meetings

Interim meetings and discussions, with four physiotherapists and two patients, took place between meetings 1 and 2 and then between meetings 2 and the presentation of the prototypes to the physiotherapy departments. Their purpose was to help develop the content of the patient-facing 'Physio in a Box' prototypes and then the content for the physiotherapist-facing 'Evidence in a Box' prototypes respectively. See Co-Design Participant Group details in Tables 11 and 12 in Chapter 8.

9.5 The patient pack prototype version 1 - 'Physio in a Box'

The first versions of the patient-facing prototypes - 'Physio in a Box'- were developed as described in Box 1 in Chapter 7. The 'Physio in a Box' pack, that each member of the Co-Design Participant Group received prior to prototype development meeting 2, can be seen in appendix 9d, along with the complete version 1 booklets and leaflets.

9.6 Prototype Development meeting 2

The aim of the second prototype development meeting was to present the initial versions of the patient facing prototypes to the group and give them the opportunity to agree, recommend changes or disregard them.

Three meetings took place in November 2022 with thirteen physiotherapists and five patients. Packs were sent to those that could not attend online – see Tables 11 and 12 in Chapter 8. The plan was for the meetings to follow the same format. However, the use of role play in the first meeting was unpopular, so I decided to change this to scenarios for the following two meetings. The overall format was:

1. Welcome and introduction to the session; 2. Review of the individual prototype items guided by the questions provided; 3. Feedback and suggestions for amendments; 4. Role

play and scenarios to help the group consider how some of the items might work in practice; 5. Updated timescales and next steps presented; 6. Volunteers requested to be involved in content development of the physio facing items.

A detailed meeting plan can be found in appendix 9e.

The additional items, that were sent to the Co-Design Participant Group in the prototype pack prior to meeting 2, can be found in appendix 9f and includes the scenarios used and feedback forms.

9.6.1 Feedback from prototype development meeting 2

The changes made to the 'Physio in a Box' prototypes, based on the feedback gained from the Co-Design Participant Group after meeting 2, are shown in Table 15 below. The feedback included suggestions for more icons and less words generally and some changes to the layout and wording of the pre appointment questions and personal rehab plan.

Table 15 Feedback and changes made to 'Physio in a Box' prototype Version 1 following meeting 2

Feedback	Changes
Disliked colour of box	Colour of box changed

Pre-appointment information booklet
   ● More icons less words
   ● Image on front does not reflect content
   ● Colour of booklet NHS blue
	● Reduction and edits to words
	   ● Front image changed to reflect content ie. Wearing shorts
	   ● Colour of booklet changed

Pre appointment questionnaire
   ● Wording of questions needs refining
   ● More space needed for medical details and medication
	● Questions re worded and made more open
	   ● Spacing changed

Exercise cards and log
   ● Exercise not for everyone
   ● Log/diary better as a separate document
   ● Weekly and monthly diaries to give patient more choice
	● Changed to exercise and activity
	   ● Exercise cards and log/diary made into separate cards
	   ● Separate weekly and monthly diaries developed and format changed

Personal rehab plan
   ● Patients really liked it
   ● Physios unsure
 	
Recommended changes:
   ● Remove list numbers
   ● Re- word so able to focus on what is important for each person to know rather than specific problem list
   ● Physios wanted timescales removing, patients didn't ie. How long until improves, how often will be reviewed
   ● Everyone liked the icons – more icons!
   ● Not enough space to write
   ● Lacking contact details/questions between appointments
	● Lists/numbers removed
	
	   ● Questions reworded
	
	   ● Review time removed. Time to improve remained with slight rewording
	
	   ● Made into 4 page booklet with more icons and more space
	
	   ● 'Ask My Physio' postcards developed
	
	   ● Next appointment and contact details added

9.7 The physiotherapist prototype pack Version 1 - 'Evidence in a Box'

A first iteration of the physiotherapist facing prototype items 'Evidence in a Box' were then developed prior to all the prototypes being displayed in the physiotherapy departments. See overview of their development process in Box 1 in Chapter 7.

The 'Evidence in a Box' prototype items can be found in appendix 9g and are listed in Table 16 in the following section.

I had hoped that a small number of physiotherapists from the Co-Design Participant Group would test the 'My Personal Rehab Plan', from the patient resource pack, with a small number of their patients during the Prototype display period. However, no physiotherapists volunteered so this did not occur.

9.8 Presentation of the whole prototype concept storyboards and individual Prototype packs

Image 1 The prototype display in the physiotherapy departments

9.8.1 The physiotherapy departments prototype displays

The new versions of the prototypes were displayed in the departments of the three physiotherapy teams between 15th December – 23rd December 2022, as per Davis et al's (2022) Low Contact Co-Design same space, different time spatiotemporal quadrant. See Figure 11 in chapter 7. The display included:

- Updated posters of the storyboards
- Version 2 of the patient-facing prototypes, 'Physio in a Box'.
- A first version of the physiotherapist-facing prototypes, 'Evidence in a Box.'
- A larger box to represent the overall digital hub and additional items it could contain.

As Team C worked across multiple sites, the prototypes were displayed at site 1a to coincide with a team away day that was taking place. This was so as many physiotherapists as possible from Team C had the opportunity to see the prototypes and give their feedback on them. The Prototypes were displayed in the waiting areas of Team A and B so both patients and physiotherapists could see and give feedback on them. The patients from the Co-Design Participant Group were invited to attend the displays at their preferred site. If they were unable to physically attend onsite the prototypes were posted out to them for their feedback. The revised storyboards, 'Physio in a Box' version 2, and the feedback forms used can be found in appendices 9h, 9i and 9j.

Copies of the storyboards and the physiotherapist 'Evidence in a Box' and patient 'Physio in a Box' prototype packs, along with the feedback forms, were left in communal office spaces at the three sites beyond these dates so physiotherapists who had not had the opportunity to look at them whilst they were on display in the waiting areas could do so.

Table 16 lists all the items included in the prototype display and links them to the issues and idea themes identified throughout the primary research phase of this study.

Table 16 List of all the prototype items developed and displayed linked to the issues/themes generated from Phase 2 and 3

'MyPhysio' Evidence and Information Hub digital concept (storyboards)	
Physiotherapist resource pack – Evidence in a Box	**Patient resource pack – Physio in a Box**
NHS knowledge and library services information booklet *Access and accessibility*	**Pre-appointment information booklet** *Managing setting expectations* *Clear communication*
Evidence appraisal and discussion template *Access and accessibility* *Trust and confidence*	**About me questionnaire** *Setting expectations* *clear communication* *Person centred*
Mentor and supervision discussion template *Peers as human databases* *Trust and confidence*	**Personal Rehab plan** *Clear communication* *Confidence and capability to act* *Person centred*
Evidence and Information online resources booklet *Evidence on demand* *Access and accessibility* *Trust and confidence*	**Exercise and activity cards** *Clear communication* *Person centred* *Confidence and capability to act*
Ask My Mentor postcards *Access and accessibility* *Peers as human data bases*	**Exercise and activity diaries** *Managing expectations* *Confidence and capability to act* *Person centred*
	Ask My Physio postcards *Clear communication* *Access and accessibility*

Additional examples in the 'hub' box:	
	Patient stories *Peers* *Trust and confidence* *Confidence and capability to act*
	National and local Evidence and Guideline summaries and protocols *Access and accessibility* *Trust and confidence*
	MSK condition specific information booklets *Access and accessibility* *Clear communication* *Trust and confidence*
	Exercise and activity library *Tailored/individual/adapt to varied and changing needs*

9.8.2 Feedback about the prototypes

Four out of the seven remaining patients from the Co-Design Participant Group attended one of the sites to view the prototype displays and give their feedback. Three patients were sent the prototype items that were displayed because they were unable to attend either of the sites in person. They returned completed feedback forms to me. Only two physiotherapists from the Co-Design Participant Group completed the feedback forms, despite the forms being emailed to the whole group. One additional physiotherapist from the Co-Design Participant Group provided feedback via email.

No further feedback forms were completed despite the prototypes being left in communal areas of the three sites after the large displays had been taken down. A summary of the patient and physiotherapists' feedback is presented below.

Summary of Co-Design Participant Group physiotherapist feedback

Only three of the Co-Design Participatory Group physiotherapists provided written feedback. They were still unsure about 'My Personal Rehab Plan'. They thought that the questions regarding the treatment plan and alternatives might be 'overkill' for some types of patients. They liked the icons in the prototype plan but felt some goals were vague and that they took up a lot of space. They suggested that the 'Evidence Appraisal Template' could include more classic critical appraisal factors or a 'limitations' section to reflect on sample, bias etc. Finally, there were concerns regarding the cost of the boxes and individual items and how they would fit with existing resources. Their preference was for an online resource rather than paper ones, but they were concerned about who would curate it and keep it up to date.

Summary of Co-Design Participant Group patient feedback

Overall positive feedback was received for the whole 'Physio in a Box' pack and story boards. Suggestions made for small changes to wording and layout. For example,

- o   Remove 'they' and use names in the storyboards.
- o   Remove numbers in the treatment plan section of the personal rehab plan.
- o   More space to write in the exercise diaries.

Summary of feedback from patients and carers in the physiotherapy waiting area

Feedback was gained from four patients and one carer who reviewed some of the Prototype leaflets whilst they were waiting for their physiotherapy appointment. All four patients liked the pre appointment information and would have liked to have received it prior to attending their first appointment. They felt it would help allay fear and anxiety prior to attending. A carer and patient with autism particularly liked the personal rehab plan. This was because they would have it as a record to keep. They felt they could use it to inform college about what they should and shouldn't be doing. Finally, the visuals and icons received positive feedback. They felt they may act as conversation starters for goal setting as they would be easier to understand for some patients.

Feedback from the physiotherapy team managers

I met separately with the three MSK physiotherapy teams service managers to show them the prototypes as they were unable to attend the December displays. The overall concept was received positively by them. They felt that the pre appointment information could be incorporated into the current service easily and were keen for this to happen. However, they felt that he pre-appointment 'About me' questionnaire needed a little bit more thought. This was with regards to where to best place it within the current electronic system and when patients would receive it.

Feedback from the wider Advisory Group

I have presented to the Charity support group who provided members for my Advisory Group since the December display. The group, predominantly made up of older women, were particularly interested in the physiotherapy pre-appointment information booklet.

9.9 The final prototypes

Small changes only were made to the storyboards and 'Physio in a Box' and 'Evidence in a Box' prototypes based on the feedback gained from the displays. However, no elements have been formally tested so they are all likely to need further refinement in the future. There are already plans in place to use some of the prototypes developed by the participating teams. This will be discussed in the following final chapter.

Finally, the prototypes developed span the whole Knowledge Mobilisation process, from knowledge and evidence acquisition through to use by MSK physiotherapists and patients. They also span the

whole physiotherapy appointment and can be used by physiotherapists and patients, before, during

and after the MSK Physiotherapy appointment. This is demonstrated in Figure 17.
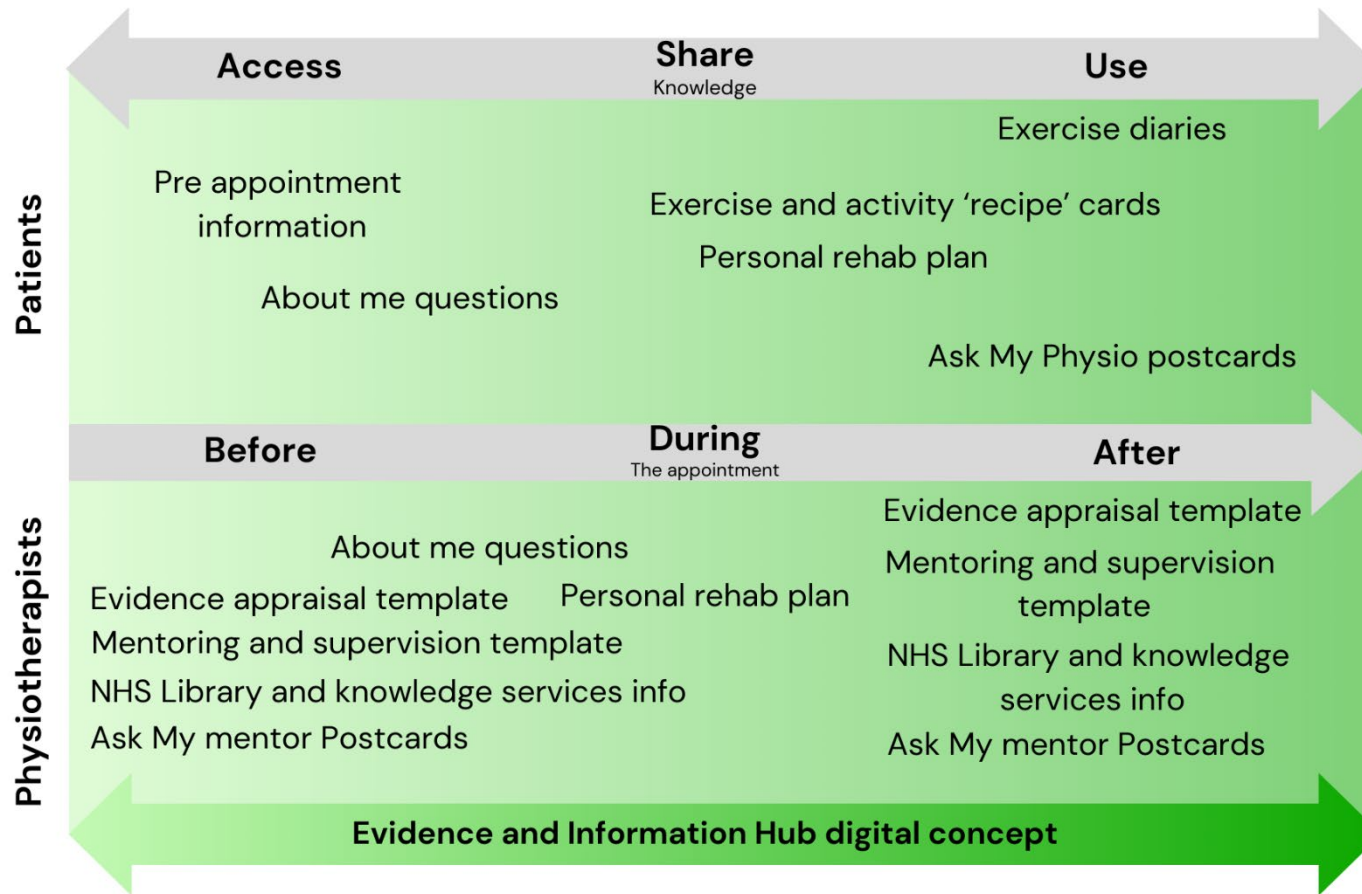
9.10 Reflections on applying the principles of 'Co' approaches during Phase 3

In chapter 7.7 I set out how I applied the principles of 'Co approaches to the way I carried out the Creative Co-Design in Phase 3. Here I briefly reflect on whether my application of the principles influenced Phase 3 as I intended.

I took a thoughtful, structured and iterative approach to the Creative Co-Design process that was guided by the Design Councils Double Diamond framework. This led to the Co-Design Participant Group's needs being identified in the first instance and then visibly met in the form of the physical prototypes by the end of the process.

I thought carefully about how to bring the physiotherapists and patients together so they would feel like active and equal partners in the online workshops and meetings. I used creative activities and a 'do' then 'share' format. This gave the physiotherapists and patients something (their completed activity) not only to talk about but to show to each other and discuss together in the workshops. I feel that this enabled the Co-Design Participant Group to see, hear and understand the issues from each other's perspectives and come to a shared understanding of what was important to address. I think the prototype storyboards played a crucial role in showing the group how everyone's ideas could potentially work together. These, together with the development of the individual prototype items, helped the Co-Design Participant Group to see that their knowledge and ideas were valued. This was because the groups ideas were clear to see in the prototypes themselves.

I believe the clear and visible steps I used in the Creative Co-Design process, incorporating the key aspects and mechanisms of action from my systematic review framework within it, helped create an overall feeling of trust and confidence. This was trust and confidence within group, with me and with the prototypes that were developed. It genuinely felt like a joint effort throughout and I think the Co-Design Participant Group felt a sense of pride and ownership over what we developed together. However, it was a time consuming and physically and mentally challenging process to do well. At times things did go wrong. I stayed focused on what was important to the group and tried to embrace the uncertain, unexpected and odd mistake. I feel this helped to keep it a real and human experience for everyone. I think this human element was important in breaking down the natural hierarchy that could have existed within the group. I believe it also helped keep everyone engaged, along with the activity packs they received prior to each workshop, in anticipation of what

would come or happen next. In the end the numbers that were maintained throughout the Creative Co-Design process speak for themselves. 17 out of 18 physiotherapists and Seven out of ten patients continued to the end of Phase 3. I think this is another indication that the underlying principles and frameworks that I used enabled the success of the Creative Co-Design process.

9.11 Chapter summary

In this chapter I have reported the final stage of the Creative Co-Design process – 'prototype development'. I have presented the overall digital evidence hub concept in storyboard form. I have presented the accompanying suite of physiotherapist and patient Knowledge Mobilisation prototype resources, the patient resource pack, 'Physio in a Box' and the physiotherapist resource pack, 'Evidence in a Box'. The final chapter will now present a summary of the key findings from the primary research and discuss these in relation to other research in this area.

Chapter 10
Discussion and Conclusions

10.1 Chapter Overview

In this final chapter I will:

- Summarise the key findings and unique contributions to knowledge.
- Discuss how these findings and the Co-Designed prototypes fit with other research in this area.
- Reflect on the use of Creative Co-Design, Reflexive Thematic Analysis and the influence of theory.
- Discuss the strengths and weaknesses of the PhD study.
- Discuss implications for future research. Including for physiotherapy policy, practice and education.
- Draw final conclusions.

10.2 Summary of findings and unique contributions

As far as I am aware, this is the first study to explore the concept of Knowledge Mobilisation, using observations, qualitative interviews and Co-Design, from both a MSK physiotherapist and MSK patient perspective, and develop prototype solutions to improve Knowledge Mobilisation in the MSK physiotherapy context.

I generated many interesting findings from the Phase 1 systematic review and Phase 2 and 3 primary research which I briefly summarise below:

In Phase 1 I developed a framework, similar to a logic model, outlining the key aspects, mechanisms of action and potential outcomes of 'Co' approaches for Knowledge Mobilisation in health condition management. This was from a systematic review of 24 papers.

From Phase 2 and 3 I found that: access to and accessibility of evidence and knowledge is still hard for physiotherapists. They are more likely to utilise their peers and the internet and social media than read a research paper or search a research database in their day-to-day practice; A person-centred approach to Knowledge Mobilisation in MSK physiotherapy is required because evidence is

a poor fit for some patients; Relationship building, including managing expectations and clear communication, is important to the MSK physiotherapy Knowledge Mobilisation process.

Finally, I developed prototype solutions to address the issues identified, with members of the Co-Design Participant Group. The prototype solutions included storyboards of a digital evidence and information hub concept and accompanying 'Physio in a Box' and 'Evidence in a Box' resources. Their purpose was to address MSK physiotherapists and patients Knowledge Mobilisation needs as identified in this study.

10.2.1 The findings and previous research

In this next section, I discuss the key findings in relation to the physiotherapy and Knowledge Mobilisation literature, and link these to the Co-Designed prototypes that were developed.

Phase 1

The framework I developed from the systematic review findings, that is similar to a logic model, for using 'Co' approaches to mobilise knowledge in health condition management included:

- o Bringing people together as equal and active partners, valuing all knowledge, using creative approaches and iterative prototyping techniques.
- o Developing a shared understanding, identifying and meeting needs, giving power and voice, a sense of ownership and trust and confidence.

This framework, and the key aspects and mechanisms of action articulated within it, are similar to other published work for using 'Co' approaches, such as the NIHR's (2019) principles for Co-producing a research project and Langley et al's (2018) Collective Making model (Langley *et al.*, 2018; NIHR, 2019). The NIHR (2019) advocate a number of principles similar to those identified in my review for example, sharing power, including all perspectives and skills and respecting and valuing all knowledge. Whilst Langley et al (2018) focus specifically on how creative 'Making' activities influence the participants involved, the knowledge being mobilised, and the implementation of interventions in different ways. The findings from my review adds to these by describing the diverse activities researchers use in 'Co' approaches, in order to achieve the key aspects and mechanisms of action required for Knowledge Mobilisation and articulates the relationships between them.

I used the framework from my systematic review to guide me during the Phase 3 Creative Co-Design process of this study. This framework is published (Grindell *et al.*, 2022) and could be used by other researchers intending to use 'Co' approaches to mobilise knowledge in health condition management to ensure their 'Co' approach of choice is genuinely 'Co' and to increase the likelihood of achieving Knowledge Mobilisation.

Phase 2 and 3

There are some similarities between the findings in my research and the physiotherapy Evidence Based Practice and Knowledge Translation literature. For example, previous studies have already identified that physiotherapists find it hard to access and understand research and often lack the time to do this (Scurlock-Evans, Upton and Upton, 2014; Mota da Silva *et al.*, 2015; Stander, Grimmer and Brink, 2018; Carroll, 2021; Paci *et al.*, 2021). My study however took a broader Knowledge Mobilisation, rather than an Evidence Based Practice, stance and explored patient perspectives as well as physiotherapist perspectives in relation to the whole Knowledge Mobilisation process. This is different to previous physiotherapy research which has tended to focus on the barriers and facilitators to Evidence Based Practice or suggest Knowledge Translation strategies from physiotherapists' perspectives only. Below I discuss some of the key similarities and differences between the current evidence base and my work. I also present the prototypes that are associated with the findings discussed in the next sections. I briefly describe how each prototype addresses the issues highlighted from my PhD after reflecting upon the wider literature.

Peers and opinion leaders

The use of peers or 'opinion leaders', including local training sessions and case study discussions, to help physiotherapists access and understand research evidence has been recommended (Condon *et al.*, 2016; Bérubé *et al.*, 2018; Jones *et al,* 2015; Menon *et al*, 2009; Whiteley *et al.*, 2020). 'Clinical champions' in the form of specialist, senior clinical leads have also been identified as important to facilitate the introduction of Evidence Based Interventions into practice (Walker *et al.*, 2022). My findings suggest that the physiotherapists involved in the primary research phase of this study were much more likely, in their day-to-day practice, to seek out the advice of colleagues, especially their senior colleagues, and look to them to signpost them to evidence that they think they should be reading and using. They also valued training sessions, supervision and clinical case discussions led by their senior colleagues, as they felt they tended to be more relevant to their

practice than reading a research paper. However, the Knowledge Mobilisation literature suggests that a reliance on senior colleagues and a top-down approach to evidence and knowledge access and sharing can have unintended negative consequences (Gabbay and Le May 2023; Martin and Williams, 2019). It has been proposed that a reliance on opinion leaders can sometimes lead to echo chambers and result in practice veering away from what may be more widely acceptable or result in different treatments being advocated by different teams of clinicians (Gabby and Le May 2023).

This, therefore, could be a risk in the teams of physiotherapists I interviewed. There appeared to be a tendency to rely heavily on, place trust and have more confidence in the knowledge of more senior clinical colleagues. In the context of this PhD study, knowledge acquisition and sharing were predominantly a top down, hierarchical process, similar to Evidence Based Practice and the hierarchy of evidence. This could hinder the two-way, non-hierarchical knowledge access and sharing processes favoured in Knowledge Mobilisation.

Associated Co-Designed prototype resources

- The overall digital evidence and information hub – This would store up to date MSK evidence and information including training session slides.
- The evidence appraisal template - This a simplified version of a more formal critical appraisal template, such as CASP checklists. The purpose of it is to empower those therapists who are not confident in appraising the literature to have a go, so not to be so reliant on their peers for this. It is intended to be quick and easy to complete whist encouraging critical thinking around different evidence and knowledge sources, not just research evidence.
- The mentor and supervision discussion template – To allow therapists to record the key take away messages from discussions with their senior colleagues and provide links to supporting evidence or encourage further reading, watching or listening. That is not just from one source or opinion.
- The library information leaflet – to raise the profile of the NHS library and the resources and services they and the librarians can offer the teams.

The use of the internet and social media

The use of digital media for Knowledge 'translation' has been advocated as a way of fostering online collaboration, sharing and communication within physiotherapy (Barton and Merolli, 2019). A recent survey of physiotherapists' use of electronic resources for informal professional education, rather than Knowledge Mobilisation, showed that web searching via online search engines was most frequently used by physiotherapists, and open access research articles were seen as the most valuable resource online rather than social media (Clode *et al.*, 2021). This is in contrast to my findings where there was a sense, from the physiotherapists involved, that evidence and knowledge from digital media sources such as podcasts, webinars, YouTube and Instagram provided quick, easy and succinct alternatives to research papers and were easier to access, understand and often apply to practice. There were trust and credibility issues associated with these media with the default position being to be guided by recommendations by their peers or stick to renowned or respected names.

Associated Co-Designed prototype resources

- The overall digital Evidence and Information hub – quick and easy access to relevant and trustworthy MSK online evidence and information.
- The evidence and knowledge online resources document – this was developed to represent the type of evidence and information sources that would be available on the digital hub and to act as a quick reference guide to allow signposting to relevant sources, for physiotherapists and patients, during time pressured appointments.
- The evidence appraisal template – As described earlier this simplified critical appraisal template aims to be quick and easy to complete whist encouraging critical thinking around different evidence and knowledge sources, such as podcasts, not just research evidence.

Person-centred care

Much has been written in the literature regarding the importance of person-centred care in healthcare (HEE, 2021; WHO, 2015; Ryan, 2022) and within the physiotherapy literature (NIHR, 2018; Morera-Balaguer *et al.*, 2021; CSP, 2022; Naylor, Killingback and Green, 2022). It is the second quality standard in the CSP's recent (2022) MSK physiotherapy service standards document (CSP, 2022). Key constructs of person-centred care across the literature include: seeing people as individuals (Naylor, Killingback and Green, 2022; Ryan, 2022); treating them holistically (CSP, 2022;

Ryan, 2022) and the importance of communication and a trusting therapeutic relationship (Morera-Balaguer *et al.*, 2021; Naylor, Killingback and Green, 2022; Ryan, 2022). Similar factors were identified in relation to Knowledge Mobilisation in the MSK physiotherapy consultation in this PhD. However, in this PhD person-centred care was identified as being particularly important because research evidence and guidelines were not always a 'good fit' for some patients. Therefore, if personalisation did not occur this could negatively impact Knowledge Mobilisation.

Associated Co-Designed prototype resources

- The 'about me' pre appointment questions – Allows patients to lead and tell their story in their own words and convey what is important to them.
- The personal rehab plan – Allows clear two-way communication between patients and physiotherapists so they can decide together what the best course of action will be specific to their individual goals and needs. It provides patients with a clear record of the advice given and agreed treatment plan to refer back to and aims to enable them to act on the advice given.
- The exercise 'recipe' cards- Allows exercises to be selected and adapted to meet individual patient's needs.
- The weekly and monthly diaries – Optional for those patients who like to document and monitor their progress.

Building trusting relationships

An important aspect of person-centred care is the development of good therapeutic, trusting relationships (Søndenå, Dalusio-King and Hebron, 2020; Morera-Balaguer *et al.*, 2021; Naylor, Killingback and Green, 2022; Ryan, 2022). The literature suggests that several factors contribute to building positive relationships between healthcare staff and patients. Many of these factors were also identified as issues that could impact on Knowledge Mobilisation in this study. These include: Good communication skills and the development of rapport (Cosgrove and Hebron, 2021), the environment including time (Morera-Balaguer *et al.*, 2021) and patients preferences and expectations (Cosgrove and Hebron, 2021; Morera-Balaguer *et al.*, 2021). In this PhD patients expectations were often found to have a negative impact on Knowledge Mobilisation. Physiotherapists however would use evidence and knowledge, both formal research as well as their

own and patients experience, to help manage patients' expectations and engage them with their treatment plan.

My findings suggest that trust and trusting relationships were shown to play an important part in this physiotherapist – patient negotiation process. Trusting relationships are acknowledged as essential components for successful Knowledge Mobilisation (Wye *et al.*, 2017; Knowles *et al.*, 2021; Cairney, Boaz and Oliver, 2023). My findings indicate that in order to establish and maintain trusting relationships and effective two way knowledge sharing between physiotherapists and patients, patients need to feel that: 1. They have been listened to; 2. Their experiential knowledge is valued; 3. Decisions made about them are tailored to their individual needs; and 4. Information and advice is communicated to them clearly so they understand what is wrong (or not) and what they need to do.

Associated Co-Designed prototype resources

- The pre appointment information leaflet – so patients know what to expect prior to attending their physiotherapy appointment.
- The 'about me' questions – so physiotherapists know what patients' expectations are from the outset and can adapt their assessment and management accordingly.
- The personal rehab plan – as described earlier, pays particular attention to decision making based on individual goals and needs and clear communication of information and advice.

I suggest that the prototypes developed in this study, by addressing elements of person-centred care and trusting relationships, help to 'create the conditions' needed to enable successful Knowledge Mobilisation in the MSK physiotherapy consultation. The personal rehab plan in particular aligns with the CSP MSK physiotherapy standards, specifically quality standard 2 which states:

> *'Each person with a MSK condition should have a sharable, personalised management plan which records what matters to them, their goals and how they will be achieved'. (CSP, 2021, p.17)*

10.2.2 The Co-Designed prototype solutions compared to other Knowledge Mobilisation products

In this study an overall digital evidence and information hub concept, intending to act as a 'one stop' evidence and information repository, to fulfil both physiotherapists and patients' evidence, knowledge and information needs, was developed through the Creative Co-Design process in Phase 3. It was beyond the time and resource constraints of my study to develop this in digital form. Although there is evidence to suggest that digital evidence repositories can be useful, it has been suggested that alone, they are unlikely to be successful in improving the application and use of evidence and knowledge in practice (Boaz *et al.,* 2019). However, whilst I was undertaking this PhD, a GP in Oxford Co-Designed a GP-facing digital evidence repository, GP Evidence (GP Evidence, 2023). I have already discussed how this does not address MSK physiotherapy knowledge needs in Chapter 2 section 2.5.4. However, its development indicates that there is an appetite for digital resources that give quick and easy access to clear and concise evidence summaries to fulfil clinicians and patients' knowledge needs in busy day to day practice.

The proposed digital resource in this study goes beyond evidence summaries and proposes other Knowledge Mobilisation tools and resources. It could be said that the evidence appraisal template prototype developed in this study is an over simplified version of other critical appraisal tools and checklists and is not as rigorous as Keeles' CATs (Foster *et al.*, 2001, Keele University, 2023a) process. However, its purpose is to allow busy, time-poor clinicians the opportunity to quickly and critically consider the evidence and knowledge they access from a variety of sources, not just formal research evidence. By providing a resource that is less academic in its focus, it may encourage those who do not normally engage in more formal critical appraisal activities to do so and encourage two way, rather than one way, discussion with their senior colleagues.

Finally, there are many MSK disorder specific resources now available to physiotherapists and patients. For example, the Co-Designed resources developed as part of Keeles PEPOA study to mobilise OA knowledge between clinicians and patients (Keele University, 2023c). In this PhD I never intended to develop MSK disorder specific Knowledge Mobilisation tools. This is because most physiotherapists do not specialise and therefore see patients with a multitude of different MSK disorders. There was a clear desire, from patients in this study, for the knowledge and information that is shared and received during the physiotherapy appointment, to meet expectations and be tailored to individual needs, rather than just 'off the shelf' information, such as MSK disorder specific booklets or videos. Dziedzic et al (2018) acknowledge that as yet there is no

evidence to suggest that their Co-Designed OA resources improve patient outcomes (Dziedzic *et al.*, 2018). Perhaps this is because the relational and person-centred aspects of Knowledge Mobilisation, that have been identified as important by patients in this study, are not fully addressed with these types of interventions. Therefore, the Co-Designed resources in 'Physio in a Box' that aim to address these aspects of the Knowledge Mobilisation process could complement these off the shelf resources produced by others and if used together could have the potential to positively influence patient outcomes.

I believe the 'Physio in a Box' and 'Evidence in a Box' prototype resources are the first solutions to be developed, by patients as well as physiotherapists, that address Knowledge Mobilisation as a whole in MSK physiotherapy. That is, not just physiotherapists' access and accessibility to research evidence. The prototype resources include tools and templates that allow a broad spectrum of knowledge and evidence, including patients' experiences and sources frequently accessed via the internet and social media to be considered critically by physiotherapists. They also address expectations and person-centred care to help develop trusting relationships between physiotherapists and patients which is core to successful Knowledge Mobilisation.

10.3 Reflections

10.3.1 The Creative Co-Design process

Remote versus Face To Face Co-Design

The primary research took place during COVID-19 restrictions. This was therefore my first experience of planning, developing and facilitating online Creative Co-Design workshops. I discuss some of my key reflections below.

I found that the hybrid, remote Co-Design format that I chose to use – online group workshops and activity workbooks – more challenging to plan for than face-to-face meetings. The workshops and the activities had to be planned in minute detail and could not be flexible. This was because activities needed to work both on an individual and group level, and clear step by step instructions needed to be provided for those that would be completing the workbooks independently. There was less opportunity for 'in the moment' changes that would often occur when undertaking Co-Design workshops face to face, which meant activities could not be adapted by the facilitator to fit with individual groups dependent on their engagement and interactions.

I found on-line facilitation more challenging because of the inability to observe participants whilst moving between groups. I could not easily see how the Co-Design Participant Groups were engaging with the activities, and each other, and therefore could not pick up on and respond to their verbal and non-verbal cues. Because of this I was unable to see what and how the group were engaging with the activities while they were completing them. I was therefore reliant on what they shared in the discussions alone during the online workshops.

I found developing rapport within the Co-Design Participant Group more challenging online. I felt conversations were more stilted, as only one person was able to speak and be heard at a time. It was also more difficult for group members to interact whilst they were completing the activities. Impromptu conversations that would often occur, in face-to-face workshops, as a result of members of the group seeing how another member has completed a task, did not occur online. I found it was much easier to facilitate and encourage ideas in the online workshop that took place with only four participants than the larger groups. Fewer participants negated the need for the use of breakout rooms and gave more time to hear everyone's thoughts and ideas.

Finally, those people that were unable to attend the online workshop were still able to be involved and express their views by completing an activity pack themselves. I felt this helped maintain participation throughout the Co-Design phase. In my prior experience of face-to-face Co-Design workshops, potential participants were often lost if they couldn't attend on the agreed date and time and therefore were not able to be involved. In addition, I suspect some of the physiotherapists and patients who participated may not have done, had they had to travel to attend a workshop at the end of a busy day.

Creativity

Carrying out the Creative Co-Design in this hybrid way felt more inclusive, as those who could not or did not wish to join the online workshops could still be involved. However, I felt the digital nature meant some of the creativity in the activities was diminished. Not all the creative activities I had hoped to utilise in my research, such as the use of Lego or model building, are easily translatable to paper or digital formats and I did not have the time or resources to explore this further, especially with the added COVID-19 restraints.

The use of role play to test out the 'About me' questions and personal rehab plan were unsuccessful. I felt this was due to a reluctance to engage with this type of activity, particularly from physiotherapists. The use of 'patient scenarios', that I developed instead, seemed more successful. However, I felt the discussions may have been richer had the Co-Design Participant Group had the time to develop the scenarios themselves.

One of the main reasons for choosing a creative approach to Co-Design was because of the perceived benefits of using creative activities with heterogeneous groups of people as discussed in Chapters 2, 3 and 4. The 'thinking while doing' approach can give people time to think and express their thoughts and experiences whilst completing an activity rather than having to give an immediate verbal response (Langley *et al*,2018). In addition, by completing an activity this gives people something tangible to talk about (Webber, Partridge and Grindell, 2022). Overall, I felt the 'do'; and 'share' format of the sessions still worked well online and engaged the groups.

Embedded versus non embedded Design Researcher

At the start of this study, I felt quite strongly that the involvement of a Design Researcher was key to the Creative Co-Design process – see Chapters 1 and 2 - and the plan was to have the same Design Researcher involved in the whole Creative Co-Design process. However, their involvement during the workshops differed significantly online compared to my previous face to face experience. They took much more of a back seat during the workshops allowing me to take the lead. Visualisations of the group's thoughts and ideas in real time during the workshop by the Design Researcher did not occur in the same way online either. This was because 1. It was my PhD study, so it was my role to lead; 2. I decided not to use digital interactive tools such as white boards during the sessions so as not to exclude those with lower digital literacy.

The change in Design Researcher involvement after Creative Co-Design workshop 3 meant that their knowledge and understanding of the project to take forward into prototype development was lost. I feel the prototypes would have evolved and developed differently had the same Design Researcher been embedded throughout the entire process. Almqvist (2017) suggests that the loss of Designer input at the end of a project means outputs can drift away from identified user needs (Almqvist, 2017). I felt that this may have been the case to some degree in my study. However, my years of experience working with Design Researchers on other Co-Design projects along with my in depth knowledge of the study helped to minimise this.

Finally, the software the Design Researcher and Graphic Designer used was a package I was not familiar with and could not access easily. This meant I could not make edits myself to the visualisations and prototypes they made which was frustrating at times.

The Prototypes

Time was limited so the prototype development stage of Phase 3 felt rushed and less 'Co' than I would have liked. The prototype storyboards of the digital evidence and information hub concept, which incorporated many of the group's ideas, were developed by me and the Graphic Designer prior to the first prototype development meeting. On reflection this may have made the group feel that I had already decided what we were going to develop. This, coupled with the fact that the prototype development meetings were short (60 minutes) may have been why the group did not offer much initial feedback on the individual ideas and items to take forward.

In hindsight, I could have carried out a prioritisation exercise such as a cost versus feasibility chart or similar with the group, to encourage more group involvement in decisions so that the specific contextual factors of the three teams were considered more during the development process. However, it has been suggested that not everybody needs to be involved in every decision whilst undertaking 'Co' activities or approaches in projects and that shifts in power can occur depending on the expertise required at different stages of the process (NIHR, 2019).

I developed a number of prototypes rather than focusing on just one of the ideas generated from the Creative Co-Design ideation sessions. I wanted to show how the different elements of the overall concept could work and fit together but also demonstrate that everyone's ideas had been considered and were valued. This meant there were many prototypes that were professional in look but were perhaps overwhelming for the Co-Design Participant Group to engage with and feedback on. This means they still require further iterations of feedback, testing and development.

10.3.2 Using Reflexive Thematic Analysis

This was my first experience of using Reflexive Thematic Analysis and it was important to me that I carried it out as best I could and in the way that Braun and Clarke (2022) intended. I therefore wanted to reflect on my experience of using this approach.
I found that the approach provided a flexible framework to base my analysis on and allowed me to adapt the six steps that Braun and Clarke set out for researchers to follow. It allowed me to use the

steps as a guide rather than a strict set of rules that had to be firmly adhered to (Braun and Clarke, 2022). This helped the process feel more fluid and iterative.

I felt that Reflexive Thematic Analysis fitted with the ethos of the Double Diamond framework that I used in Phase 3 in that it encourages open, divergent thinking in the first instance. This allowed me to ensure I had captured all the detail and nuance in the data I had collected during coding before then distilling it down into themes. This however did make coding at times feel overwhelming because I had a large number of codes.

If I had had more time, I would have enjoyed the creative, messy and iterative nature of the process as it felt akin to the approach used in the Phase 3 Creative Co-Design. However due to the time constraints of my PhD the pressure of trying to complete sometimes inhibited my creativity. Finally, as with all qualitative research, it was time consuming and I would have benefitted from having more time to feel I could do justice to each step of the analysis process.

10.3.3 The use of Knowledge Mobilisation theories and frameworks

I considered several Knowledge Mobilisation theories, models and frameworks during this PhD study (see Chapter 4 Section 7). This was because I did not feel there was a single one alone that was a suitable fit. Some of these theories and frameworks have resonated more than others throughout the primary research in the PhD, for example Gabbay and Le May's body of work (2004, 2011, 2016 and 2023) on clinical mindlines and Langley et al's (2018) collective making model, along with my systematic review framework – see Figure 7 in Chapter 3. These three models and frameworks especially influenced data analysis and the Creative Co-Design process during the primary research phase. For example, clinical mindlines were important because a key part of MSK physiotherapists' Knowledge Mobilisation process is the need to make complicated decisions quickly with patients during consultations (Gabbay and Le May, 2023). The different types of evidence and knowledge they draw upon and what influences their ability to make sense of, and use, the varied sources of knowledge they acquire in their practice are clear themes and subthemes within my study's findings.

Other theories and frameworks described in Chapter 4 have contributed to my thinking at different stages during my PhD study but to a lesser degree. For example, the elements of assessing the

barriers to knowledge use, adapting to local context and tailoring to individual needs in Grahame et al's (2006) KTA framework; the importance of relationships, social networks and leadership in Hitch et al's (2017) TAHK framework; and the similarities between some elements of the iPaHRis framework and clinical mindlines, particularly in relation to the acknowledgement of the diverse forms of knowledge and complex processes that are involved and the importance of both individual and collective knowledge in the process (Gabbay and Le May 2004, 2011, 2016, 2023, Harvey and Kitson 2016, Hitch *et al.*, 2019).

I had anticipated that I was going to use Ward's (2017) 'Why, who, what and how?' framework for knowledge mobilisers throughout my PhD (Ward, 2017). However, as my study developed and it became clear I was not trying to mobilise a specific piece of MSK evidence but develop tangible solutions to improve Knowledge Mobilisation more broadly within MSK physiotherapy practice, I did not use it beyond the planning stages.

Finally, when I started out on this PhD journey, I recognised that behaviour change was going to have to be considered in any solution that I developed. However, in the end I did not use a specific behaviour change theory or framework of theories as I felt that the other frameworks I engaged with encompassed elements of behaviour change and considered implementation within them. For example, the constructs of innovation, recipients, and context in the iPaHRis framework include behaviour change factors (Harvey and Kitson 2016). I will consider specific behaviour change models in any future work I may carry out to further develop, implement and evaluate the prototypes developed in my study.

10.3.4 The research paradigm and my epistemological stance

This research sat within a participatory paradigm, but I never intended it to be a fully participatory or Co-produced study. I took the lead during each phase of the study in my role as a PhD researcher in training. A Patient Advisory Group was involved throughout, albeit in a more consultatory capacity than I had hoped, and the Co-Design Participant Group were integral to Phase 3. On reflection I feel I achieved the levels of participation that I intended during the different phases of my study despite the challenges that COVID- 19 posed, especially not being able to carry out any phase face-to-face. I feel that because the findings from each phase had an influence on each other, and therefore incorporated the participants' perspectives from the preceding phase, this helped make up for the varying degrees of participation throughout the study to some degree.

I took a contextualist stance at the start of this PhD (Braun and Clarke 2022). This was based on the belief that knowledge is always contextually situated and generated based on a mixture of perspectives, that is the perspectives, values and beliefs of the participants in this study as well as my own and my subjectivity (Braun and Clarke 2022). I feel my beliefs and opinions did influence the meaning I derived from the data in this PhD, especially as I am a MSK physiotherapist myself and work in one of the departments involved. I therefore believe that the data may have been interpreted differently by someone who was not as personally close to the context of this research as I was. However, I think this helps reinforce my belief, which is in line with Braun and Clarke's (2022) view, that there is not one simple truth or way of explaining a phenomenon but one open to multiple different interpretations dependent on individual subjectivity and social and cultural contexts (Braun and Clarke 2022). The findings and prototypes developed would most likely have been (slightly) different had I undertaken my research in an NHS Trust that I was not so familiar with, or if the same study had indeed been carried out by someone else.

10.4 Strengths and weakness

There were several strengths and weaknesses to this PhD study.

Firstly, Knowledge Mobilisation is an ambiguous and complex concept that is intangible and therefore difficult to measure. The combination of qualitative and participatory methods I used are therefore a strength of this study. Qualitative and participatory approaches have been advocated for use in research into these types of complex concepts, to provide rich and descriptive, context specific data (Braun and Clarke, 2013, 2022; Brocklehurst, Baker and Langley, 2020). They are also recommended for complex intervention development such as the prototype solutions developed in this study (O'Cathain, Croot and Duncan *et al.*, 2019).

Second, the observations, qualitative interviews and Creative Co-Design, involving both physiotherapists and patients, provided access to different layers of knowledge that one method or approach alone may not have achieved. These layers included what physiotherapists do and use via the observations, and what physiotherapists and patients say, think and feel via the semi - structured interviews and the generative activities in the Creative Co-Design, thus tapping into participants' explicit and tacit knowledge (Sanders and Stappers 2012).

Thirdly, the complexity, messiness and intangibility of Knowledge Mobilisation made it difficult at times to keep the participants and myself focused on the specific topic at hand. I found this especially challenging as the more straightforward, linear, transactional Evidence-Based Practice process is so ingrained in physiotherapy and therefore my own practice. Any perceived loss of focus during the primary research phase at times, due to the 'wobbliness' of the concept of Knowledge Mobilisation, could however be considered a strength rather than a weakness in this study. This is because I was always led by what was important to the participants, especially during the Creative Co-Design.

Fourth, the Creative Co-Design managed to turn the intangible into tangible prototype solutions that represented the ideas and contributions of everyone in the Co-Design Participant Group. However, the prototypes are yet to be tested and evaluated therefore their effectiveness to improve Knowledge Mobilisation has yet to be established.

Finally, I have worked in the participating NHS Trust for a long time and was familiar with some team members and some of the culture and routines within the departments. This was a strength in one respect, as it helped with access to potential participants and developing rapport. However, being aware of some of the deep-seated attitudes and cultures within the teams meant it was challenging at times to not make assumptions about what I was seeing and hearing whilst collecting and analysing the data generated.

10.5 Transferability of this research

Transferability is the ability of research findings and interventions developed in one specific context to be effective in another (Schloemer and Schröder-Bäck, 2018). This research was undertaken in three parts of a single NHS Trust in the north of England. The three participating MSK physiotherapy teams covered the whole spectrum of MSK services with patients being referred from primary care and secondary care, presenting with acute and chronic conditions and serving communities across a large, diverse city population. So, in theory the findings should be transferable to other NHS Trusts in the UK. However, despite this the Co-Design Participant Group were not particularly diverse and there was no representation from black or ethnic minority groups or people for whom English is not their first language. That said, managing expectations and building trusting and person-centred relationships are likely to be a common theme wherever and whoever the interventions are being

used with. Clearly some adaptations are likely to be needed to address the specific needs of different populations including, language, literacy, and cultural sensitivities and preferences.

The fact that similar interventions have already been developed for other settings, for example the 'GP Evidence' digital resource, indicates that the core principles at the heart of the prototype concept is likely to be transferable to other settings.

Finally, I do not believe that any Co-Designed intervention can ever be fully transferable as no context is exactly the same. Refinement, using Co-Design principles and techniques, is always likely to be necessary to ensure they are fit for purpose and usable for any future intended user groups and their unique circumstances.

10.6 Impact

I have already explained that the prototypes were not tested in the clinical setting as part of this study and likely will need some further development. Despite this they have already had an impact within the participating physiotherapy teams.

I liaised with the Trust's new Knowledge and Library Services Manager during prototyping, to seek their views and advice regarding some of the physiotherapist facing prototypes that were developed, specifically the library information and evidence appraisal template. They have since presented to the teams participating in my PhD to highlight the services they can offer and provide some basic literature search training. I have also had requests from one of the MSK physiotherapy clinical leads to use the library information and online resources document as part of an induction pack for new starters.

The NHS Trust involved in my PhD are taking two actions based on my research. First, they are planning for the pre appointment information booklet to be implemented into the current electronic booking system that patients use. Second, an existing local MSK website is currently being updated by the NHS Trust. I have been asked to be involved in a working group to try and incorporate some of the findings from my PhD Co-Design work into the system update.

10.7 Implications for MSK physiotherapy

This research focusing on Knowledge Mobilisation in the MSK physiotherapy outpatient setting, and using Creative Co-Design with MSK physiotherapists and patients, has highlighted a number of

issues that have implications for MSK physiotherapy research, policy, practice and higher education to explore.

MSK physiotherapy policy and practice

In this study the data generated suggests that research and guidelines alone, although important, are not enough for knowledge to be successfully mobilised between patients and physiotherapists. Other factors, such as managing and setting expectations, personalising care and building trusting relationships with patients impact on the Knowledge Mobilisation process and therefore should be considered as important as the evidence base. Based on these findings I suggest a number of recommendations for MSK policy and practice below.

1. *The CSP to advocate a shift from an Evidence Based Practice to a Knowledge Mobilisation discourse*

There has been much deliberation and argument over the past ten years within the physiotherapy profession about what Evidence Based Practice is and whether the traditional model needs updating (CSP 2023c). It was a topic of debate at the Physiotherapy UK conference in 2015 (CSP, 2023c). During this debate what constitutes the 'best evidence' to inform physiotherapists' decision making was questioned. One argument was that the concept of evidence should be broadened to encompass much more than results from clinical research. Sackett et al's (1996) original definition does encompass more than this. Yet as a physiotherapy profession we still continue to think of Evidence Based Practice as being predominantly research evidence informed, perhaps because the name implies it. It continues to remain a contentious area of discussion within the physiotherapy community.

The CSP's code of professional values and behaviour (2019), the CSP's MSK physiotherapy standards and the Health and Care Professions Council (HCPC) standards of proficiency for physiotherapists (2023) are all beginning to take a more holistic view (CSP, 2019a, 2021; HCPC, 2023). These professional bodies are recognising the need for more Co-produced research and service redesign and are advocating placing the patient at the centre of decision making (CSP 2019a & 2021; HCPC, 2023). However, the information available to physiotherapists on the CSP webpages still favours an Evidence Based Practice discourse and provides advice on the use of tools and techniques that have a predominantly research evidence focus (CSP, 2014, 2023c). There is clearly a need for a change in thinking and in the language used in the best practice discourse within

physiotherapy policy and practice. This needs to reflect the more holistic, interactional nature of Knowledge Mobilisation as opposed to the more transactional Evidence Based Practice.

2.*CSP to provide guidance on how to use the internet and social media as evidence and knowledge sources*

Within this proposed broader concept of 'evidence' and knowledge is the internet and social media. In this PhD thesis these mediums, along with other digital media such as podcasts, were identified as important sources of 'evidence on demand' for MSK physiotherapists. The use of social media and interactive webinars are recommended by the CSP as a way of social networking with expert peers CSP, 2021). However, the CSP are yet to provide clear advice to their members on how to navigate this popular but ever expanding and somewhat overwhelming landscape.

3.*CSP to encourage Knowledge Mobilisation across all levels of MSK physiotherapy*

The experience and knowledge of senior specialist or 'expert' colleagues, that is 'peers as human databases' were shown to play a huge role in Knowledge Mobilisation in MSK physiotherapy in this study. The expertise and knowledge of senior, clinical specialist physiotherapists could be considered another layer of 'evidence' for Evidence Based Practice to encompass. In the context of the teams who participated in this study this was predominantly a top down, one way knowledge sharing process similar to the traditional Evidence Based Practice model and the hierarchy of evidence in MSK physiotherapy. That is, knowledge and expertise from more senior, specialist physiotherapists to more junior, non specialist physiotherapists in this local context. The HCPC standards propose leadership at all levels of physiotherapy practice (HCPC, 2023). Similarly, Knowledge Mobilisation within MSK physiotherapy would benefit from leadership at all levels, not just from senior to junior physiotherapists as was mostly the case in this study.

4.*CSP to forge stronger links with other MSK specialist clinical interest groups*

Often clinical specialist physiotherapists are members of specific clinical interest groups nationally that go beyond the physiotherapy profession. For example, the British Association of Spine Surgeons and the British shoulder and Elbow Society. The lead clinical specialist physiotherapists in this study seemed to favour being members of these types of groups. These clinical interest groups, such as the British Association of Spine Surgeons, as their name suggests, are often led by medical

professionals such as orthopaedic consultants. It was the clinical specialist physiotherapists rather than the non-specialist physiotherapists in this study who attended and presented at these national groups' conferences. That is, they favoured these groups and their conferences over the CSP Physiotherapy UK conference which tends to have a broader clinical scope. It is therefore recommended that the CSP considers forging stronger links and collaborations with these wider specialist clinical groups, as well as those MSK clinical specialists that are active online. This could help the CSP make their annual conference more appealing to a broader range of physiotherapists. Although not reported in this thesis the CSP and their website was one of the least used sources of evidence and knowledge as identified by the physiotherapists involved in the Creative Co-Design workshops in this study.

Higher Education

The findings from this PhD study highlight how a change in the way the MSK physiotherapy profession thinks about best practice is still needed. That is, a shift in thinking away from the traditional, linear Evidence Based Practice model to the more pragmatic Knowledge Mobilisation stance that better represents the complex realities of MSK physiotherapy practice. I suggest that this shift needs to be fostered from the ground up and that the Evidence Based Practice discourse needs to change at an undergraduate level. I suggest the following recommendations for those providing undergraduate (and post graduate) physiotherapy training and education.

1.*Train physiotherapy students to search and critique broader sources of evidence and knowledge*
Academic institutions need to recognise and place equal importance on all the types of evidence and knowledge that really influence MSK physiotherapists' decision making. This includes more modern ways of accessing evidence such as the internet and social media. Universities need to equip students with the skills to search and critique these broader sources of evidence, not just traditional academic database searches, and commit to nurturing these skills beyond their training.

2.*Focus on person centred care and two way communication skills*
Relationship building and person-centred care were important themes generated in this research. Universities need to incorporate into their curriculum training to help build students' two way communication skills with patients as well as with physiotherapy peers. Establishing a good therapeutic relationship was found to be as important as the evidence itself, in order to achieve

Knowledge Mobilisation, from a patient's perspective in this study. The realities of modern MSK practice often means people do not present or fit within a clear MSK diagnosis when they attend for physiotherapy. The focus of physiotherapy therefore should be on treating the person not the MSK condition. Other factors, knowledge and experience often play a huge part in someone's clinical presentation. A broader set of skills are required to manage and mobilise knowledge appropriately in these circumstances.

3.*Challenge the hierarchy of evidence*

I suggest that the uncertain and unpredictable nature of MSK physiotherapy clinical practice needs to be understood and embraced at an undergraduate level. In order to reflect this reality universities need to acknowledge and teach students that other forms of research are as important as the gold standard Randomised Controlled Trial and meta-analyses for assessing the effectiveness of MSK physiotherapy interventions. That is research that explores the perspectives and needs of patients such as, qualitative, case study and participatory methods.

Future research

Based on the findings I have presented in this thesis, I recommend that future MSK physiotherapy Knowledge Mobilisation research should focus on:

1.*The internet and social media as legitimate sources of MSK evidence and knowledge*

This study has shown how the Evidence Based Practice landscape is changing in MSK physiotherapy. Physiotherapists are using the internet and social media more than ever to satisfy their 'evidence on demand' needs. These digital sources are a contentious addition to the MSK physiotherapy evidence and knowledge base. They are welcomed on one hand and mistrusted on the other. Future research should focus on the role these digital sources play in Knowledge Mobilisation in MSK physiotherapy. A particular emphasis should be placed on how to effectively search for and assess the credibility and trustworthiness of evidence and knowledge available from the wealth of digital media now available to MSK physiotherapists.

2.*Non hierarchical, multi directional knowledge sharing between MSK physiotherapists*

The evidence and knowledge of senior physiotherapy colleagues, that is 'peers as human databases', were seen as important, if not more so than traditional academic database searches, for the physiotherapists in this study. Leadership from senior peers has been shown to be important to mobilise knowledge successfully. However, this does not mean that this should always be a top down, hierarchical process. The knowledge and experience of MSK physiotherapists from all levels, junior and senior, specialist and non specialist, should be valued and shared. I recommend that future research should explore how evidence and knowledge can be shared in less hierarchical and more multi-directional ways within MSK physiotherapy.

4.*More collaborative MSK physiotherapy research*

Finally involving patients in this research highlighted aspects of Knowledge Mobilisation that I feel would not have been considered had this work involved physiotherapists alone. Future research needs to reflect the messy realities of evidence use in MSK physiotherapy, that is Knowledge Mobilisation, and the important role patients play in the process. There is a clear need for more research and funding for studies that use qualitative and participatory approaches, such as the Creative Co-Design used in this study. This is so future MSK physiotherapy research explores the interactional and relational aspects of Knowledge Mobilisation from both a physiotherapist and patient perspective. This will help to ensure that solutions are developed that will benefit both patients and physiotherapists.

10.8 Conclusions

This is the first qualitative and participatory study to use Creative Co-Design to develop prototype solutions to improve Knowledge Mobilisation in MSK physiotherapy as far as I am aware. Prototypes were successfully developed that address access and accessibility, the patient-therapist relationship - specifically managing and setting expectations- and clear two-way communication. Further testing, development and evaluation is required to assess whether they improve Knowledge Mobilisation in MSK physiotherapy.

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Appendices

Appendix 1 Physiotherapy Research Funds funding approval letter

The CSP Charitable Trust
Registered Charity No. 279882

Mrs Cheryl Grindell
Sheffield Teaching Hospitals NHSFT

08.04.21

Dear Cheryl,

PRF Reference Number: PRF/20/B05

Investigators: Cheryl Grindell, Alicia O'Cathain, Liz Croot and Joe Langley

Project Title: Exploring the role of creative co-design as a knowledge mobilisation strategy for musculoskeletal physiotherapy.

I am pleased to enclose the grant award letter for your research project which was approved for funding by the Chartered Society of Physiotherapy Charitable Trust (CSPCT) after consideration by its Scientific Panel. The award must be applied exclusively for the research project defined in your application. The allocation of this award between various cost headings is given in the enclosed **Appendix I: Award Information**.

A copy of this letter should be sent to your administrative and/or your financial department. Please check the details of the grant award and contact the Charitable Trust and Awards Officer at prfaward@csp.org.uk, if there are any discrepancies.

This award is subject to the standard **CSPCT Terms and Conditions for Research Awards** and annual reporting requirements. A copy of the terms and conditions document is included. Please read this and retain for your records.

Also included with this letter is **Appendix II: CSPCT PRF Award Undertakings Form**. In order to accept an award it is necessary for you to confirm that you have read and agree to abide by the terms and conditions. The form should be signed by the required parties as soon as possible and returned to the Charitable Trust and Awards Officer. Your grant cannot be activated until this has been received.

The CSPCT is a member of the Association of Medical Research Charities (AMRC) - www.amrc.org.uk. As well as benefiting from AMRC's standard setting and influencing work, our membership of AMRC also allows us to use the

Researchfish tool at no additional cost. AMRC produces sector-wide analysis reports with data from all medical research charities and uses these to demonstrate the impact of research funded by medical research charities, showing just how important support and investment in this sector is. In order for AMRC to do this, we need to ask your permission for the CSPCT to share the data you have entered into Researchfish, with AMRC. Data will only be used to produce aggregate sectorial analyses in accordance with their data sharing policy - http://www.amrc.org.uk/publications/amrc-data-policy. The Trust would be grateful if you would give consideration to sharing your data with AMRC and let us know if you are happy for your data to be shared.

Yours sincerely,

Chair of Trustees

Trustee

Chartered Society of Physiotherapy Charitable Trust

Appendix 2 Physiotherapy Research Funds award financial summary

Appendix I

Award Information

PRF Reference Number: PRF/20/B05

Investigators: Cheryl Grindell, Alicia O'Cathain, Liz Croot and Joe Langley

Project Title: Exploring the role of creative co-design as a knowledge mobilisation strategy for musculoskeletal physiotherapy.

Total Duration of Agreed Support: 27 months

Date of Commencement: 10.05.21

Financial Summary

Category (include breakdown within sub-categories)	Year 1 costs	Year 2 costs (if applicable)	Year 3 costs (if applicable)	TOTAL
Staff salaries • *Lead researcher no costs.* • *Co-researchers no costs/in kind.* *Staff participants:* • *Physiotherapy staff time* • *Design researcher*	£0 £4,857 £4,948	£0 £1,619 £4,948		 £16,372
Travel and subsistence • *Patient travel* *(Should workshops happen virtually then travel and time reimbursement would become data reimbursement or postage costs.)*	£900	£300		 £1,200
Equipment • *Audio recorder and transcription*	£0	£0		

provide by university of Sheffield free of charge. • Materials for workshops (E.g.: paper, card,printing, modelling materials etc.	£200	£0		
• Prototype development may be paper, card, electronic	£0	£1,800		£2,000
Consumables • Refreshments: tea coffee (£300),lunch (£700)	£1,000	£0		
• Venue for workshops in kind from NCSEM MoveMore Centres	£0	£0		£1,000
Other • Advisory group x4 meetings (12 x £25)	£150	£150		
• Interview time reimbursement (patient) (£25 x 40)	£500	£500		
• Patient participant time reimbursement workshops (£35) x 80	£2,100	£700		£4,100
Project Total				**£24,672**
Physiotherapy UK				£600
Open Access				£2,000
TOTAL				**£27,272.00**

Appendix 3a Example database search terms

Database: Embase <1988 to April 30 2021

Search Strategy:

----

1   co-production.mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword heading word, floating subheading word, candidate term word]

2   coproduction.mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword heading word, floating subheading word, candidate term word]

3   co production.mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword heading word, floating subheading word, candidate term word]

4   co-produc*.mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword heading word, floating subheading word, candidate term word]

5   coproduc*.mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword heading word, floating subheading word, candidate term word]

6   co produc*.mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword heading word, floating subheading word, candidate term word]

7   co-design.mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword heading word, floating subheading word, candidate term word]

8   codesign.mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword heading word, floating subheading word, candidate term word]

9   co design.mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword heading word, floating subheading word, candidate term word]

10   co-creat*.mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword heading word, floating subheading word, candidate term word]

11   cocreat*.mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword heading word, floating subheading word, candidate term word]

12   co creat*.mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword heading word, floating subheading word, candidate term word]

13   1 or 2 or 3 or 4 or 5 or 6 or 7 or 8 or 9 or 10 or 11 or 12 (233)

14   knowledge mobili*.mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword heading word, floating subheading word, candidate term word]

15   knowledge transl*.mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword heading word, floating subheading word, candidate term word]

16   knowledge utili*.mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword heading word, floating subheading word, candidate term word]

17   knowledge exchange.mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword heading word, floating subheading word, candidate term word]

18   knowledge uptake.mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword heading word, floating subheading word, candidate term word]

19   knowledge to action.mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword heading word, floating subheading word, candidate term word]

20   knowledge to practice.mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword heading word, floating subheading word, candidate term word]

21   evidence based practice.mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword heading word, floating subheading word, candidate term word]

22   14 or 15 or 16 or 17 or 18 or 19 or 20 or 21

23   13 and 22

Appendix 3b Researcher profiles searched

Joe Langley, Sheffield Hallam University, UK

Vicky Ward, University of St Andrews, UK

Sarah Knowles, University of York, UK

Annette Boaz, London School of Hygiene and Tropical Medicine, UK

Sandra Nutley, University of St Andrews, UK

Krysia Diedzdzic, Keele University, UK

Nicola Walsh, Bristol University, UK

Glen Robert, Kings College London, UK

Trisha Greenhalgh, Oxford University, UK

Fiona Cowdell, Birmingham University, UK

Peter Van Der Graff, Middlesborough University, UK

Kate Beckett, Bristol University, UK

Kay Stevenson, Keele University, UK

Helen Baxter, Bristol University, UK

Anita Kothari, University of Western Ontario, Canada

Ian Graham, University of Ottawa, Canada

Bev Holmes, Michael Smith Foundation for Health Research. Canada

Jo Rycroft Malone, Lancaster University, UK

Sharon Strauss, Unity Health Toronto, Canada

Huw Davies, St Andrews University, UK

John Gabbay, Cambridge University, UK

Andree Le May, Cambridge University, UK

Appendix 3c Table of quality of included studies

Is there congruity between the stated philosophical perspective and the research methodology?	Is there congruity between the research methodology and the research question or objectives?	Is there congruity between the research methodology and the methods used to collect the data?	Is there congruity between the research methodology and the representation and analysis of the data?	Is there congruity between the research methodology and the interpretation of the results?	Is there a statement locating the researcher culturally or theoretically?	Is the influence of the researcher on the research, and vice-versa, addressed?	Are the participants, and their voices, adequately represented?	Is the research conducted according to current criteria or, for recent studies, and is there evidence of ethical approval by an appropriate body?	Do the conclusions drawn in the research report flow from the analysis, or interpretation, of the data?	Score (%)	High/Medium /Low quality
Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	100	High
Yes	Yes	unclear	Yes	Yes	No	No	Yes	No	Yes	60	Medium
Unclear	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Yes	70	High
Yes	Yes	Unclear	Yes	Yes	No	No	Yes	No	Yes	60	Medium
Unclear	Yes	Yes	Yes	Unclear	No	Unclear	Yes	Yes	Yes	60	Medium
Unclear	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Yes	70	High
Yes	Yes	Yes	Unclear	Unclear	No	No	Yes	Unclear	Yes	50	Medium
Unclear	Yes	Yes	NA	Unclear	No	No	Unclear	Unclear	Unclear	20	Low
Unclear	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Yes	70	High
Yes	Yes	Yes	NA	NA	No	NA?	Yes	Yes	NA	50	Medium
Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Yes	80	High
Unclear	Yes	Yes	NA	NA	No	No	Yes	Yes	NA	40	Low
Unclear	Yes	Yes	Unclear	Yes	No	Unclear	Yes	No	Yes	50	Medium
Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Yes	80	High
Unclear	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Yes	70	High
Unclear	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Yes	70	High
Unclear	Yes	Yes	Yes	Yes	Unclear	Unclear	Yes	Yes	Yes	70	High
Unclear	Yes	Yes	Yes	Yes	No	No	Unclear	Yes	Yes	60	Medium
Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Yes	80	High
Unclear	Yes	Yes	NA	NA	No	No	Yes	Yes	NA	40	Low
Unclear	Yes	Yes	Yes	NA	Yes	Yes	No	Unclear	Unclear	40	Low
Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Yes	80	High
Unclear	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Yes	70	High
Unclear	Yes	Yes	Yes	Yes	No	No	Yes	Unclear	Yes	70	High

Appendix 4a Patient Advisory Group meetings

Date of meeting	Number of attendees	Purpose of meeting	Outcome of meeting
6th January 2020	20	To introduce myself and my project and invite members of the group to be an advisory group for the duration of my PhD	Five women agreed to be part of the PhD advisory group.
July 2020	Email correspondence with 5 members of the group	To provide support and feedback writing the Plain English summary for funding application	Amendments to plain English summary made for funding application
October- December 2020	Email correspondence With 5 members of the group	To provide support in developing provisional interview topic guides, participant information sheets etc	Amendments made to interview guides
8th February 2021	Online meeting with 5 members of the group	Update on project progress and provide their thoughts on future plans and involvement	Agreed involvement going forward
19th April 2021	Online meeting with 4 members of the group	To gain feedback on initial systematic review findings. Update on ethics application and project timelines	No suggestions for changes to systematic review findings made Next meeting after interviews completed before co-design
19th July 2021	Online meeting with 4 members of the group	Update on project progress. Terms of reference for the group presented & discussed	Terms of reference for the group updated
11th November 2021	Online meeting with 4 members of the group	To discuss and agree upon the format of the co-design process options: Online group Online 1:1 Self-complete Self-complete with assistance. Timing of sessions Length of sessions	Agreed type of participation (online group/1:1/self complete) to be based on each individuals preference to ascertained by lead researcher prior to sessions. Agreed evenings and possibly weekends to maximise participation for those working. But not too late in the evening to maximise concentration.

			Choice of dates and times to be offered to all participants. Keep sessions up to 2 hours max to prevent fatigue.
31st January 2022	Online meeting with 4 members of the group	To discuss and agree upon the questions to be explored in the co-design sessions.	Co-design workshop aims agreed upon.
25th April 2022	Online meeting with 4 members of the group	To present and discuss Workshop 1 reflections and preliminary findings. Workshop 2 plan including thoughts on potential activities. What else to include in the pack eg tea bag, origami.	Group happy with plan. No suggestions to add to it. To consider timing. Evening meetings tiring for some. Consider type of activities eg. The small cards were difficult to handle for people with hand dexterity problems. The group liked receiving the tea bag and origami but no further suggestions made for alternatives for next pack.
20th July 2022	Online meeting with 4 members of the group	To present and discuss Workshop 2 reflections and preliminary findings. To discuss and agree upon workshop 3 plan.	No changes suggested. Be mindful of activities again.
10th October 2022	Online meeting with 4 members of the group	To discuss prototype planning and format meetings could take.	Agreed mixture of online group and smaller individual FTF or online development meetings. Feedback via email also an option. Ie. Can be involved as much or as little as is personal preference in the development process.
5th June 2023	Face to face meeting with approx. 20 members of the Sheffield VersusArthritis support group.	Present findings to wider SVA group	

Appendix 4b HRA Ethics approval letter

Ymchwil Iechyd
a Gofal Cymru
Health and Care
Research Wales

NHS
Health Research
Authority

Email: approvals@hra.nhs.uk
HCRW.approvals@wales.nhs.uk

Mrs Cheryl Grindell
69 Rundle Road
Sheffield
S7 1NW

31 March 2021 (revised 06 May 2021)

Dear Mrs Grindell

HRA and Health and Care Research Wales (HCRW) Approval Letter

Study title:	**Exploring the role of creative co-design as a knowledge mobilisation strategy for musculoskeletal physiotherapy.**
IRAS project ID:	**290081**
Protocol number:	▮▮▮▮▮▮▮
REC reference:	**21/WM/0029**
Sponsor	▮▮▮▮ ▮▮▮▮ ▮▮▮▮ ▮▮▮▮ ▮▮▮▮ ▮▮▮▮

I am pleased to confirm that **HRA and Health and Care Research Wales (HCRW) Approval** has been given for the above referenced study, on the basis described in the application form, protocol, supporting documentation and any clarifications received. You should not expect to receive anything further relating to this application.

Please now work with participating NHS organisations to confirm capacity and capability, in line with the instructions provided in the "Information to support study set up" section towards the end of this letter.

How should I work with participating NHS/HSC organisations in Northern Ireland and Scotland?
HRA and HCRW Approval does not apply to NHS/HSC organisations within Northern Ireland and Scotland.

If you indicated in your IRAS form that you do have participating organisations in either of these devolved administrations, the final document set and the study wide governance report (including this letter) have been sent to the coordinating centre of each participating nation. The relevant national coordinating function/s will contact you as appropriate.

Please see IRAS Help for information on working with NHS/HSC organisations in Northern Ireland and Scotland.

How should I work with participating non-NHS organisations?
HRA and HCRW Approval does not apply to non-NHS organisations. You should work with your non-NHS organisations to obtain local agreement in accordance with their procedures.

What are my notification responsibilities during the study?

The standard conditions document "*After Ethical Review – guidance for sponsors and investigators*", issued with your REC favourable opinion, gives detailed guidance on reporting expectations for studies, including:
- Registration of research
- Notifying amendments
- Notifying the end of the study

The HRA website also provides guidance on these topics, and is updated in the light of changes in reporting expectations or procedures.

Who should I contact for further information?
Please do not hesitate to contact me for assistance with this application. My contact details are below.

Your IRAS project ID is **290081**. Please quote this on all correspondence.

Yours sincerely,

███████████████

Approvals Manager

Email: approvals@hra.nhs.uk

Copy to: ██ ████ ███ █████ ████ ████ ███ ███

305

Appendix 4c Data management plan

Exploring the role of (creative) co-design as a knowledge mobilisation strategy for musculoskeletal physiotherapy.

Defining your data

- Where does your data come from?
- How often do you get new data?
- How much data do you generate?
- What format(s) are your data in?
- If pre-existing datasets are being used, where will these come from? How will they be used? Who owns them?

Types of data:

Data will come from a number of sources and will include NIIS staff and NIIS patient data.

Field notes (hand written) will be collected during the non-participant observations in the clinical setting.

Audio recordings and transcripts (in Microsoft word format) will be generated from the interview data.

Visual data in the form of drawings, posters, artefacts (in paper form), photographs and short video recordings will be generated from the co-design workshops.

Visual data in the form of animations (digital).

Some basic demographic data will be collected from all participants eg: Name , grade (if clinical staff) and contact details (email/telephone/address depending on participant preference).

Frequency of data collection:

Observation field notes and interview audios and transcripts will be generated during phase 2 and 4 of the project. Field notes will also be collected during phase 3.

Visual data in the form of drawings, posters, artefacts during phase 3

A reflective diary (hand written) will be kept throughout the project.

Quantity and format of data:

Field notes from 3 sites over a 3 month period will generate a large amount of hand written data.

20+ interview audio recordings and (Microsoft word) transcripts during phase 2.

20+ interview audio recordings and (Microsoft word) transcripts during phase 4.

Large numbers of photographs (digital) and large amounts of drawings (paper and digital), posters, and artefacts during phase 3.

No pre-existing data sets will be used.

It is expected that data will not exceed 10Tb and therefore will remain within the limits of University of Sheffield data storage.

Looking after your data

- What different versions of each data file do you create?
- What additional information is required to understand each data file?
- Where do you store your data?
- How do you structure and name your folders/files?
- How is your data backed up?
- How will you test whether you can restore from your backups?
- What safeguards will you put into practice?

1. Hand written note books will be used for field notes. Key findings will be transferred to electronic Microsoft word document files but original note books will be retained.
2. Audio files (originals), once transferred from encrypted audio recorder to UoS secure x drive, will be transcribed (by an internal UoS transcriber) into Microsoft word documents.
3. All original drawings/artefacts from workshops will be photographed. The photographs will be transferred to UoS computer secure drive where they will be stored digitally.

Created using DMPonline. Last modified 23 October 2020

1 of 3

All paper documents will be stored in a locked filing cabinet in West Court at UoS. I will also work from home therefore only anonymised data will be taken home where they will also be stored in a lockable filing cabinet also. In light of the COVID-19 situation it is likely that all paper documents may need to be stored at home. Any identifiable/personal data will be scanned and saved digitally on the UoS x drive (which I will access direct from my personal laptop via the UoS VPN) and paper copies destroyed.

I will gain permission form a ScHARR IG lead to store study data at home/on a personal laptop*

Audio recordings will be on an UoS encrypted audio recorder and will be transferred to the secure UoS X drive as soon as possible and original recordings deleted. A personal laptop will be used when working remotely. This will be password protected and all electronic files will be immediately uploaded to the UoS secure X drive , either directly using UoS VPN or via MOLE, and backed up in the UoS google drive (if non -senstive data eg. if there is no personal or identifiable data or mention of specific MSK conditions related to individual participants)*

All photographs taken on a secure university digital camera or phone will be transferred as soon as possible onto my personal password protected laptop and saved to UoS secure X drive. All photos will be deleted from the device (either phone or digital camera) as soon as transferred onto the UoS secure computer drive. If the university are unable to provide me with an encrypted device I will arrange to have a personal device encrypted by the university.

Sheffield Hallam University (SHU) design researcher may develop visuals. These visuals will be anonymised and stored electronically by the SHU researcher on a secure SHU drive/laptop and will be transferred to the PhD researcher via university to university email or shared via google drive - it is anticipated that visuals will contain no identifiable /sensitive data.

All electronic files will be labelled with date/title and version number.

All data will be stored according to the ScHARR Information Governance committee policies.

All staff who have access to the data will have completed data security and information governance training in order to access university network data.

Data is automatically backed up by the University of Sheffield data server.

All non sensitive anonymised/pseudonymised data will be also stored on the UoS google drive also.

I will keep an up to date plan, in the form of table, of data to be collected, in what form, where from and where it will be stored. This will be kept as a read.me text file and named and dated (YYYY-MM-DD) appropriately.

*I do not intend to store any study data on my personal laptop it will all be saved to directly the UoS x drive. However in the event that I have problems accessing the UoS X drive direct I will arrange for my personal laptop to be encrypted.

Archiving your data

- What should be archived beyond the end of the project?
- For how long should it be stored?
- When will files be moved into the archive?
- Where will the archive be stored?
- Who is responsible for moving data to the archive and maintaining it?
- Who should have access and under what conditions?

Any versions of the collected data that are superseded during the course of the project will be placed in a folder called "Analysis and data archived files" on the secure UoS drive.

All pseudononymised raw and analysed data will be kept and archived, for up to 10 years after the project has finished, on the UoS secure x drive. The PhD supervisors will continue to have access to this should the data be requested for publication purposes or reused for future projects if this has been consented to by participants. An open repository such as ORDA, that is recommended by the University and hosted via figshare, will also be used to store anonymised and analysed data so I will be able to continue to access it, for example for publication/dissemination purposes, should I leave UoS after completion of my PhD. No identifiable data such as participants names, will be stored in an open repository.

The project lead will be responsible for moving all data to be archived whilst they remain a student at UoS. After the end of the project, if they are no longer studying or working at UoS, the PhD supervisors will be responsible for this data held on the University secure drive.

Any original physical data, such as drawings, story boards etc from the co-design phase, paper versions of interview transcripts and observation notes, will be digitised and stored on the UoS x drive and paper copies destroyed at the end of the project.

Created using DMPonline. Last modified 23 October 2020

2 of 3

Sharing your data

- Could any of your data be considered sensitive personal data under the GDPR?
- Does permission need to be obtained for future re-use and sharing?
- Have participants transferred copyright (if necessary)?
- Who else has a right to see or use this data?
- Who else should reasonably have access?
- What should/shouldn't be shared and why?

The project is not covering a sensitive topic and only participant demographic data, such as name, clinical grade and contact details will be collected which is not classed as sensitive under GDPR. However it may be that patient participants talk about their musculoskeletal health conditions during interviews and within the workshops and this data could be linked back to participant personal details/demographic data. In these circumstances this will be classed as sensitive /'special category data' under GDPR. The UREC has agreed that the legal basis that applies in this situation for GDPR is: 9(2)(j) processing is necessary for archiving purposes in the public interest, scientific or historical research purposes or statistical purposes. In addition the legal basis in law which is being applied in order to use the data based on GDPR is: 6(e) Public interest: the processing is necessary for you to perform a task in the public interest or for your official functions). The study's participant information will inform participants that the University will be responsible for looking after the data , and will give details on how they can raise a concern about how their data is being used if needed.

All anonymised data will be shared with the PhD supervisors (Alicia O'Cathain and Liz Croot) so they are able to do peer reviewing of the data during/after analysis as required. They will be given access to the secure x drive that the data will be stored in.

All anonymised data may be placed in an open discipline specific repository such as ORDA(as described in the previous section) so it is accessible, as is requested by most peer reviewed journals, should any part of the project be published and so any of the participants can see it if they wish. Demographic data such as names and contact details will not be placed in the open repository.

It is planned during phase 3 of the project that some of the data from phase 2 will be shared with phase 3 participants during the workshops. This data will be in the form of anonymised quotes.

Implementing your plan

- Who is responsible for making sure this plan is followed?
- How often will this plan be reviewed and updated?
- What actions have you identified from the rest of this plan?
- What further information do you need to carry out these actions?

I am responsible for implementing this plan once it has been agreed with my supervisors. My supervisors will provide back up responsibility for the plan as appropriate.

It will be reviewed prior to stage 2 of the project and then at the beginning and end of each subsequent stage and updated as necessary.

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3 of 3

Appendix 5a example email invitation to participants

Dear

You are invited to be a participant in the following PhD research project:

Exploring the role of creative co-design as a knowledge mobilisation strategy for musculoskeletal physiotherapy.

The purpose of this project is to understand how physiotherapists use 'evidence' in practice, for example research and guidelines and what helps and hinders this from a physiotherapist and patient perspective. Then using co-design workshops, with physiotherapists and patients, we will co-create an new prototype product to help improve physiotherapists evidence use in practice. We will test out the new prototype in the clinical environment and see whether it is helpful or not. We will also explore whether the co-design workshops were a good way of achieving this or not.

The project will be carried out over 3 phases:

1. Observations in the clinical environment and interviews with physiotherapist and patients.
2. Co-design workshops with physiotherapists and patients and prototype development
3. Testing in the clinical environment and interviews with physiotherapists and patients.

You have been invited as you are a physiotherapist that works within ██ MSK therapy department (either at the ███████████ Hospital, ████████████ Hospital or ██████████).

At this point we are looking for volunteers to agree to be observed whilst they are working in their normal clinical environment. We would like to observe 1 physiotherapist from each department (ideally one from each grade- band 5, 6, 7 or 8a). If you are interested in being part of the observation phase of this study, or any other phase, please contact the lead researcher for more information:

Cheryl Grindell physiotherapist and PhD student
Email:c.grindell@nhs.net
Tel: **07783 767817**

Attached is a participant information sheet for the observation phase of the project for you to read.

We look forward to hearing from you.

IRAS 290081 Version 1.1 04032021

Participant Information Sheet (Patient interviews)

Research Project Title: Exploring the role of creative co-design to improve knowledge and evidence use in musculoskeletal physiotherapy.

You are being invited to take part in a research project. Before you decide it is important for you to understand why the research is being done and what it will involve. Please take time to read the following information carefully and discuss it with others if you wish. Contact the research team (details at the end of this sheet) if there is anything that is not clear or if you would like more information. Take time to decide whether or not you wish to take part. Thank you for reading this.

What is the project's purpose?
This is a PhD study that will be completed by the end of 2023. The project aims to understand whether creative co-design, where physiotherapists and patients work together to design new solutions to problems, can be used to improve physiotherapists' use of knowledge and evidence (research and guidelines) to treat musculoskeletal problems. It will explore how physiotherapists currently use knowledge and evidence in their practice and what helps and hinders this. It will also seek to understand how physiotherapists use of evidence helps patients understand and manage their musculoskeletal (muscle, ligament, bone or joint) condition. It will co-design a new product(s) that can be used by physiotherapists to improve the way they use knowledge and evidence in the clinical consultation to improve patient care.

Why have I been chosen?
You have been invited to take part in an interview because you have been identified as someone who has experience of receiving physiotherapy for a musculoskeletal problem. We would like to hear your views and experiences of how physiotherapists provided you with information when they were treating you and how it helped you (or not) to understand and manage your musculoskeletal condition. I plan to interview up to 20 people with musculoskeletal problems. I will also be interviewing up to 20 physiotherapists.

Do I have to take part?
No. It is up to you to decide whether or not to take part. If you do decide to take part you will be given this information sheet to keep (and be asked to sign a consent form) and you can still withdraw at any time. You do not have to give a reason. However, if you withdraw from the study, we will keep the information about you that we have already obtained.

What will happen to me if I take part?
The interview will last up to 60 minutes, but it is expected that most interviews will be about 30-45 minutes long. The questions will be open ended, for example: 'what type of information did the physiotherapist give you?' The interview will take the form of a two - way discussion, with the interviewer asking or probing you to clarify or expand on your answers. In this study there are no right or wrong answers, and you will be encouraged to focus on those aspects of your experience which are most relevant to you. The researcher will have a topic guide with several questions to conduct the interview. The interview will take place at a convenient location of your choice, such as in an office at the hospital or university or in your own home. Alternatively you will be given the option of a telephone or video interview if you prefer or if COVID -19 restrictions are still in place.

Will I be recorded and how will the recorded media be used?

The interview discussion will be audio recorded and the recordings will be typed up, by a university transcriber. The typed up data will be anonymised so you can not be identified. They will then be analysed by the lead researcher. The audio recording of your interview made during this research will be transferred onto and stored on the University of Sheffield secure computer drive. The original recording will then be deleted from the audio recorder. The typed up and anonymised data will also be stored on the secure University of Sheffield computer drive. The typed up and anonymised data will be used only for analysis, publication in academic journals, in the PhD thesis and in conference presentations and lectures. No other use will be made of them without your written permission, and no one outside the project will be allowed access to the original recordings. The audio recordings will be destroyed following transcription.

What are the possible disadvantages and risks of taking part?
We expect that there are minimal risks to you as a result of your involvement in this research. However we do recognise that talking about your musculoskeletal problem may be emotional or upsetting. We hope you will feel comfortable to share your experiences with us in a safe, empathic and confidential environment. However should you become upset we can pause or even stop the interview.

What are the possible benefits of taking part?
Whilst there are no immediate benefits for those people participating in the project, it is hoped that the findings from the interviews will help the research team better understand the extent to which knowledge and evidence, for example from research findings, are currently used in clinical practice for musculoskeletal conditions. These findings will then inform the next stage of the project where physiotherapists and patients will work together to co-design new product(s) to improve the way knowledge and evidence is used in the physiotherapy consultation. As compensation for your time you will receive a £25 shopping voucher for participating in the interview.

Will my GP be informed of my participation in the study?

As this is not an interventional study we will not inform your GP of your participation in the study

Will my taking part in this project be kept confidential?
Yes. All the information that we collect about you during the course of the research will be kept strictly confidential and will only be accessible to members of the research team. All identifiable data will be stored on a secure departmental server, which has been approved by Sheffield Teaching Hospitals Information Governance. Any paper data stored in relation to this study will only contain your study number and will therefore be pseudo anonymised. They will be kept in a secure filing cabinet in a locked room which only the research team have access to. Pseudo-anonymised data will then be transferred to a password-protected encrypted secure University of Sheffield server for this PhD's analysis. You will not be able to identified form this data.

You will not be able to be identified in any reports or publications. If you agree to us sharing the information you provide with other researchers (e.g. by making it available in a data archive such as ORDA hosted by the University of Sheffield) then your personal details will not be included.

What is the legal basis for processing my personal data?
According to data protection legislation, we are required to inform you that the legal basis we are applying in order to process your personal data is that 'processing is necessary for the performance of a task carried out in the public interest' (Article 6(1)(e)). Further information can be found in the University's Privacy Notice https://www.sheffield.ac.uk/govern/data-protection/privacy/general. As

we will be collecting some data that is defined in the legislation as more sensitive (information about your musculoskeletal health condition) we also need to let you know that we are applying the following condition in law: that the use of your data is 'necessary for scientific or historical research purposes'

What type of information will be sought from me and why is the collection of this information relevant for achieving the research project's objectives?

We will only ask your view about what you think about how physiotherapists have provided you with information and used knowledge and evidence to help you understand and manage your condition. Your views will help us build an understanding about how knowledge and evidence is used by physiotherapists, what helps and hinders this and whether it is helpful or not. We are interested in your personal experience and will encourage you to provide your opinion on this. We will not share personal information that you provide us to anyone outside of the immediate research team, as all information will be treated confidentially and anonymously.

What will happen to the results of the research project?

The results will be written up and presented to the patient and professional advisory groups of the study after they have been analysed by the lead researcher. The results will be discussed with the research team to highlight the key findings and identify key questions to explore in the next co-design stage of the study. Also, the results are likely to be published in academic journals or reports, and you can obtain a copy of the published results by contacting the lead researcher. You, the study participants and the study location (hence your place of residence) will not be identified in any report or publication.

The data collected during the course of the project might be used for additional or subsequent research. For instance as part of a possible future research project which seeks to analyse the data in relation to new or novel questions about musculoskeletal physiotherapy services. You will have the opportunity to agree or decline to this data being used in this way when you complete the consent form before the interview.

All identifiable data will be destroyed at the end of the project. Anonymised, typed up and analysed data will be stored on the University secure computer drive for up to 10 years. After which it will be destroyed. Anonymised, analysed data will also be stored in a data archive such as ORDA an online research repository (hosted by figshare) that is supported by the University of Sheffield.

Who is organising and funding the research?

This project is part of a PhD. The lead researcher is funded by a University of Sheffield PhD scholarship.

Who is the data controller?

███ is the sponsor for this study based in the United Kingdom. We will be using information from you in order to undertake this study and will act as the data controller for this study. This means that we are responsible for looking after your information and using it properly. ██ NHS FT will keep identifiable information throughout the study. ██ NHSFT will keep identifiable information about you until the study finishes and then it will be destroyed. ██ NHS FT will archive the study anonymously for up to 10 years.

Your rights to access, change or move your information are limited, as we need to manage your information in specific ways in order for the research to be reliable and accurate. If you withdraw from the study, we will keep the information about you that we have already

obtained. To safeguard your rights, we will use the minimum personally-identifiable information possible.

You can find out more about how we use your information at:
 https://www.XXX.nhs.uk/about-us/general-data-protection-regulations.

All information collected during this study will be kept confidential. However, authorised representatives from the hospital research office or UK regulatory authorities might perform an audit of the study and review the study data. ▮ NHS FT will use your name, NHS number and contact details to contact you about the research study, and make sure that relevant information about the study is recorded to oversee the quality of the study. Individuals from ▮ NHSFT and regulatory organisations may look at your research records to check the accuracy of the research study. The only people in ▮ NHS FT who will have access to information that identifies you will be people who need to contact you for the study or audit the data collection process. The people who analyse the information will not be able to identify you and will not be able to find out your name, NHS number or contact details.

Who has ethically reviewed the project?
The study has been reviewed and approved by the NHS/HRA Ethics committee.

 What if something goes wrong and I wish to complain about the research?
If you wish to complain about *any* aspect of the way in which you have been approached or treated during the course of this study, the normal National Health Service complaints mechanisms are available to you and are not compromised in any way because you have taken part in a research study. You can contact the ▮ NHSFT by completing an anonymous feedback form at https://www.XXX.nhs.uk/patients/patient-experience/feedback/leave-feedback or write to the trust regarding your concerns:
▮,
Chief Executive,
▮ NHS Foundation Trust,
▮
▮.

If you would prefer to speak to someone outside of the trust, you can contact the *Patient Services Team on* ▮ *or email:* PALS@nhs.net. They will be able to offer further advice on how to make a complaint or send on your message to the correct department.

Contact for further information
Below are contact details of the lead researcher and their PhD supervisor should you want further information about the project.

Cheryl Grindell. email: cheryl.grindell@sheffield.ac.uk. Telephone: TBC
Professor Alicia O'Cathain. Email: a.ocathain@sheffield.ac.uk
Telephone: 0114 222 0770
University of Sheffield
School of Health and Related Research (ScHARR)
Medical Care and Research Unit
Regent Court
30 Regent Street

Sheffield
S1 4DA

If you would like to participate in the interview, or would like more information before you decide, please contact me via email or telephone providing me with the details below.

Name: _____

Contact telephone number: _____

Email address: _____

Thank you for taking the time to read this information sheet and for considering this invitation to participate in the research.

Using creative co-design to improve knowledge and evidence use in musculoskeletal physiotherapy

Study Number: ▮▮▮21230

Participant Identification Number for this study:

Please initial the appropriate boxes	Yes	No
Taking Part in the Project		
I have read and understood the project information sheet dated DD/MM/YYYY version (....) or the project has been fully explained to me. (If you answer No to this question please do not proceed with this consent form until you are fully aware of what your participation in the project will mean.)	☐	☐
I have been given the opportunity to ask questions about the project.	☐	☐
I agree to take part in the project. I understand that taking part in the project will in mean: Participating in co-design workshops which may be photographed or video recorded. I agree to be contacted by the researcher with regards to taking part in other parts of this study.	☐ ☐	☐ ☐
I understand that by choosing to participate as a volunteer in this research, this does not create a legally binding agreement nor is it intended to create an employment relationship with the University of Sheffield.	☐	☐
I understand that my taking part is voluntary and that I can withdraw from the study at any time; I do not have to give any reasons for why I no longer want to take part and there will be no adverse consequences if I choose to withdraw.	☐	☐
How my information will be used during and after the project		
I understand that relevant sections of my medical notes and my personal details such as name, phone number, address and email address may be looked at by individuals from regulatory authorities, University of Sheffield and ▮▮▮▮▮▮▮▮ Hospital NHS Foundation Trust, where it is relevant to my taking part in this research. I give permission for these individuals to have access to my records.	☐	☐
I understand and agree that my words and images (photographs) may be quoted in publications, reports, web pages, and other research outputs. I understand that I will not be named in these outputs.	☐	☐
I understand and agree that other authorised researchers, as part of future ethically approved research, may use my data in publications, reports, web pages, and other research outputs, only if they agree to preserve the confidentiality of the information as requested in this form.	☐	☐
I give permission for the: Observation data/interview data/co-design workshop data that I provide to be deposited in ORDA, an online repository recommended by University of Sheffield, so it can be used for future research and learning.	☐	☐
So that the information you provide can be used legally by the researchers		
I agree to assign the copyright I hold in any materials generated as part of this project to The University of Sheffield.	☐	☐

Name of participant [printed]   Signature   Date

Name of Researcher [printed]   Signature   Date

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Appendix 5e Examples of hand written field notes
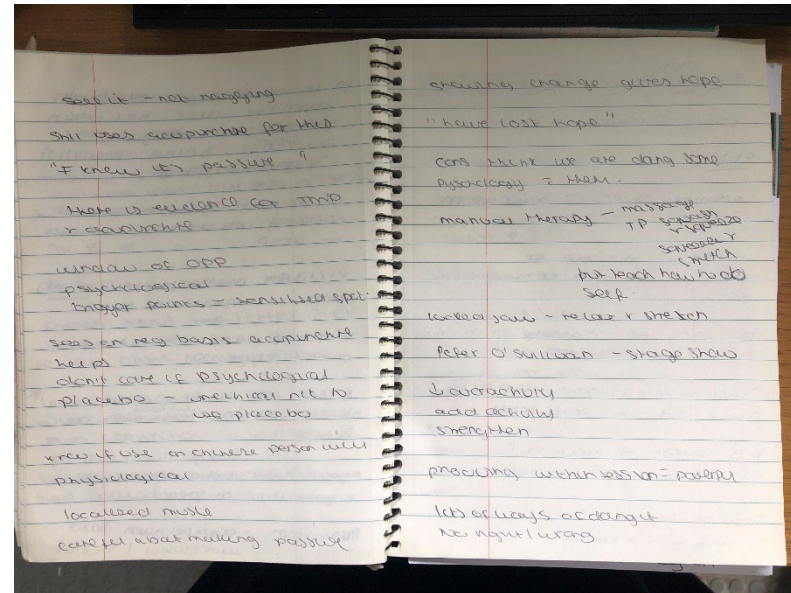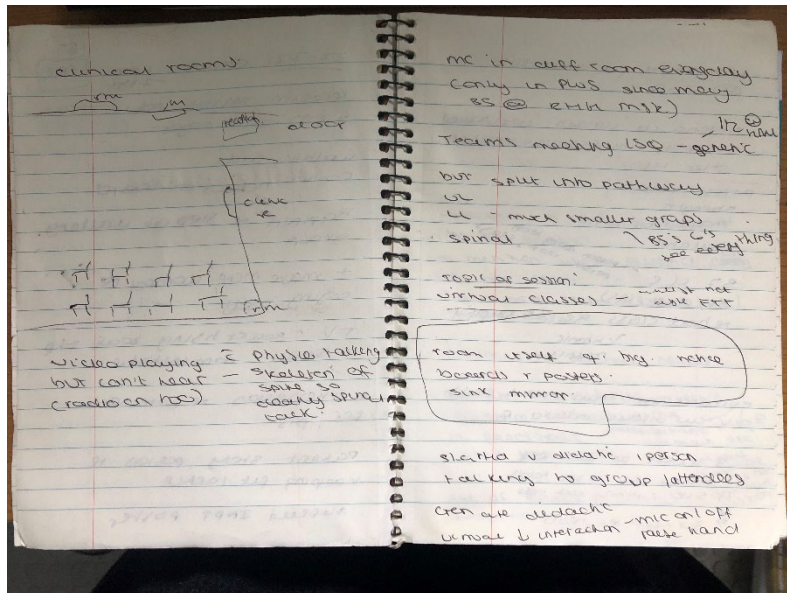
Appendix 5f Interview guides

<u>Physiotherapist interview guide</u>

Welcome and introduction

- Provide an overview of purpose, format and length of in-depth interview - topics to discuss, audio-recording, note taking where appropriate.
- Ground rules of interview - e.g. if you say any names we'll anonymise, if you need to we can stop/pause the interview.
- Reinforce steps to preserve anonymity/confidentiality.
- Confirmation of consent. Emphasise that if they have any concerns with participation to let us know.
- Request to tape discussion.

Topic guide:
Questions: 7 core questions with prompts/sub questions.

1. What do you consider the term evidence based practice to mean?
   - Prompt if necessary: for example putting guidelines into practice

2. What do you consider to be evidence?

- Probe if necessary re: evidence for practice v evidence from practice

3. How do you access this evidence?

- Probe further if needed: Do you access any other forms of evidence? Give examples if really need to probe.

4. How does evidence influence your practice?
   - How does it influence your decision making? Can you give examples?
   - What influences how you use it? Can you give examples?

5. How do you use evidence in your clinical consultations?

- what helps or hinders you with this?

- Can you give examples (positive or negative) to demonstrate this?

6. Why do you use evidence?

7. Do you ever/ are there situations where you do not use evidence in practice? Why?

ie: what if there isn't any research evidence to support treatment?

Is there anything else you would like to add about how you use evidence in practice?
Thank you for your participation.

Patient interview guide

Welcome and introduction

- Provide an overview of purpose, format and length of in-depth interview - topics to discuss, audio-recording, note taking where appropriate.
- Ground rules of interview - e.g. if you say any names we'll anonymise, if you need to we can stop/pause the interview.
- Reinforce steps to preserve anonymity/confidentiality.
- Confirmation of consent. Emphasise that if they have any concerns with participation to let us know.
- Request to tape discussion.

So today I want to ask you about your experience of having physiotherapy (for your knee, back shoulder…). I am particularly interested in your experience of how the physiotherapists shared information with you about your problem and how it could be managed.

Topic guide:
Questions: 6 core questions with prompts/sub questions.

1. When you have had physiotherapy treatment for your (knee, back, shoulder…) what information did the physiotherapists give you?

- What information did they give you about what might be causing your problem?
- What information did they give you about what could be done to help? such as: what the physio could do to help, what you could do to help , whether there was anything else that could be done to help?

2. How do/did you feel about the information they gave you?

- How confident did it make you feel about how your problem could be managed?
- Was it what you were expecting?
- What about the level of detail? eg: too much too little
- What about the way it was given to you? (verbal, written, printed leaflet)?
- *(Probe when appropriate) Can you explain why you think that?*

3. How far/how much do you think the physiotherapist considered your personal situation and experience when making decisions about your care?
   - Such as whether you had received treatment for this problem before and your experiences of that?
   - Your experience of living with your problem and how it impacts on your life?
   - What is important to you?
   - How you might prefer your problem to be managed?
   - *(Probe when appropriate) Can you explain why you think that?*

Finally physiotherapists use lots of different sources of evidence and knowledge when making decisions about the best way to treat peoples muscle and joint problems. This may include research and guidelines. They may follow a protocol if you have had surgery. They may attend courses and read books to keep up to date. They will also learn on the job by watching and listening to colleagues and asking for advice from their peers such as other physios or Drs. They also learn through their own experience of treating people with similar problems to you.

4. With this in mind what types of 'evidence'/knowledge or information do you think physiotherapists should use to help them make decisions about how to help you with your problem?

   - How much do you feel they should use the latest research evidence or not?
   - How far should they follow guidelines and protocols or not?
   - How much should be based on their experience of treating people with similar problems to you?
   - How much should they consider what is important to you, what you need to be able to do to get on with normal life, how you like to do things?
   - Anything else?
   - *(Probe when appropriate) Can you explain why you think that?*

5. From your experience how far do you feel your physiotherapist used the most current, up to date or best information/medical evidence available to them when they treated you?

- For example did you notice if they spoke to or received guidance from colleagues or not?
- How far did they appear to be following a protocol or guideline or not?
- What else do you think may have influenced how they decided to treat you?
- *(Probe when appropriate) Can you explain why you think that?*

6. How do you think people would like to receive this information/evidence from physiotherapists?

- How would you prefer to receive this information?
(if this isn't discussed in question 2)
- *(Probe when appropriate) Can you explain why you think that?*

Is there anything else you would like to add about the information and advice you received during your physiotherapy treatment?

Thank you for your participation.

Influences on kmb

- Deal/bargaining
- clear plan → goal ↓ unclear plan → structure
- prev experiences
- Can be pleasant be still come across not knowledgeable, not listened to + vice versa
- 'cattle market' - 'table number' - 'table' generic ↓ individual
- I some hypos sheet
- explicit ↓ implicit research knowledge
- trust ↓ confidence (in physio in knowledge in pt ability)
- time (waiting length appt) between appts
- unspecific ↓ specific
- facilities environment
- listened to (2 way)
- acknowledged
- crom ↓ knowledge/pain
- value (person/knowledge)
- empathy
- left in limbo
- tailored
- Continuity (PT + appt)
- rapport
- relationship
- understanding
- uncertainty (about what's wrong what to do what's the plan what next (options)
- (ms) Communication
- diff personalities
- primary ↓ 2ndary care (part of chronic)
- whose agenda
- expectations
- Generalise vs because see me not specific
- DIAGRAM EVIDENCE RELATIONSHIP

325

Appendix 5h Example of physiotherapist codes

Name	Description	Files	References
accessibility of physio		4	6
accessible information		2	3
adapt to person		7	16
based on patients circumstances and goals		3	7
individualised v individualised assess and treatment		13	52
importance of being seen as an individual		7	11
attitude of therapist		6	17
being curious and interested in patient		2	5
lack of interest - in patient		4	16
lack of empathy		2	8
lack of understanding - patient issues		3	4
physio going through the motions		1	4
So all singing from the same hymn sheet			

Name	Description	Files	References
ensure consistency of treatment			
clinical hierarchy			
professional hierarchy			
any colleague versus specialsed colleague as evidence source			
hierarchical evidence sharing			
consultant led evidence			
decision to use evidence led by ESPs			
led by ESP's			
social hierarchy			
applied to the person			
adapt to presentation			
depends on the person in front of you			

Appendix 5i Jamboards – candidate theme development

diagnosis confirmed (Dr or scan)

previous positive experience of physio

got what was expecting/hoping for eg physio who could do injections

Setting expectations – by clear explanation

'no cartilage', 'crumbling bones',

surgery v no surgery, learning to live with it

exceeded expectations (set by surgeon), made quicker progress

what you want and what you get – want to try even if not evidence based

false expectations – will make pain go away – learning to live with it

trust and confidence

private v NHS physio

give and take – 'it's the NHS'

mismatch expectations (physio and patient)

'hoping for a 'magic wand' to make it go away, but arthritis won't go away will it, have to learn to live with it'

magic wand, miracle cure

Patient expectations

High v low expectations

readiness to engage and influence on expectations- depends on stage and type of condition

'Dr doesn't know what's wrong so send to physio'

repeated failed physio, 'GP not going to do anything try physio again', jumping through hoops for scan'

'it may have well been done via zoom and exs emailed, there was no touching'

'less chat, more manipulation of the body'

'waiting and waiting' for it through the appointment and then 'he hasn't even touched me how can he know'

told won't get better by Dr/other HCP

giving hope – making a start, doing something positive, even if poor progress

expectations v engagement eg surgery v not surgery, scan v no scan

no diagnosis, no scans

no clear timescales for improvement, not knowing what will happen next

DIY physio, not hands on, could have just got it off the internet ie. expecting more

expected and wanted more – willing to do more/anything to get rid of the pain

expectations? Uncertainty

'more thorough exam and earlier scans' – 'I don't feel they really know what they are treating'

too much talking not enough doing – lack of physical examination

a bit of a let down

not what wanted

Expecting more, 'just exercises', 'too simple', 'is that all'

Not sure what to expect, but wasn't what expected ie wasn't helpful

'come away feeling what was the point in that'

328

professional in manner and appearance

good interpersonal skills, bedside manner

'good cop bad cop'

confident (therapist) knew all answers

thorough - explanation and showing what to do

linked to confidence and trust

is this linked to communication (skills too)?

Attitude of therapist

'I don't remember my private physio ever talking about evidence but she was lovely'

encouragement and support from therapist led to confidence and 'faith' in info

empathy, understanding, compassion (some more than others)

they listened, showed interest, (eye contact, body language), paid attention

friendly, helpful, encouraging, attentive, accessible

asking/checking understand/can do exs, opportunity to ask questions

gave me time to talk, listened

unrushed, given opportunity to ask questions

'the physio was very helpful and chatty but I don't get much help from it'

'doing a job' - going through motions, 'tick boxy', 'standard response'

knows what he's talking about, got all the jargon and stuff' but poor bedside manner

'No, it's just always been, you need to do this, and go away and do that for six weeks and then we'll review you'.

not 'digging deeper'

pain hard to articulate - physio didn't help tease it out

'feeling stumped for words'

don't invite feedback

patient made to feel 'lost' 'dismissed', 'closed down', given a 'label'

not taken seriously, made to feel like an idiot

it's like they hear you but then they're like noted lot's move on', 'thank you next'

disinterested, rushed, 'unless your legs hanging off they just want you in and out'

lack of sympathy/empathy

impersonal, rushed, 'physio conveyed belt, t... goodby... 'just a n... 'cattle ...

'listen to the specialist in the field' - 'do as you are told'

implicitly

'they say what they have to say and you have no idea where that info's come from you just trust in their knowledge'

signposted by physio - to website, youtube video - even video by physio

evidence acknowledged - - I think it would fill me with confidence, I'll give it a go it might work, I might do the exs more'

'she has an answer for everything, she knows'

continuity - seeing same physio

professionalism

'you don't question professionals' - 'just take their word for it'

if makes sense

in advice and info

'they didn't have to tell me they had been reading the latest research' - 'they made me feel confident in what they were telling me to do' 'they took interest in me' 'it gelled together'

'his confidence gave me confidence'

in the physio and their skills

less experienced

'I just believe everything they say because their the professional'

trust in professional / people in uniforms

'I'm not a dr or a physio'

consistency - continuity of therapist

assume their are guidelines that are followed

'in safe hands' because of the research they'd done' - 'he knows what he's doing'

clear explanation- expectations dealt with

top down - assume they is a hierarchy - seniors over seeing juniors

uncertainty of diagnosis - no scan - 'go away and do exs'

certainty of diagnosis - 'the physios were better than the Drs, sent me for blood tests'

Trust and confidence

'Double confidence' - recommended - positively reviewed

'knowing the research behind it is important not to everyone but to some people'

influence of positive outcome - eg post op- 'they knew what they were dealing with because I'd had the op'

if making progress (or not)

Hospital v community based

lone working v team working

linked to attitude of therapist, communication and use of evidence

giving confidence to act

gym with equipment v shabby little room

the environment

'when it's literally half an hour one on one session in the actual sports gym, it's like, right, okay, I need to react to this, this is brilliant'

charisma

'make sure confident what doing before walk out door'

bias – 'just the ones authors want to share with you'

to access courses/info via professional websites

'I probably wouldn't pay to access information. Kind of want stuff that's free and easy to read and have a look at'

short chunks rather than all day course or long paper

need 'pocket books' for NICE guidance etc

'rather than travel and spend all day you get the recording and watch when you want'

'its ease of access, digestable and doesn' take 4 hour to read'

easy to access on phone, anytime

podcasts, webinars, websites, youtube

social media – twitter and IG

But I suppose it still provided me with a more accessible route into things than the articles.

google before patient comes in

'I'm not prepared to pay out of my own money, left, right and centre for articles, then I just don't access them'

open access papers

cost

'Or you do these sites that you're not really meant to use where you type in the DOI number or whatever it's called and, yes, you can find your article'

post grad study - opportunity - cost - time - grade

'it seems like it's confined to a select exclusive group of people who can access the papers who happen to be involved with the university '

'it just shows you a bit of what's available but sorry you can't have it unless you pay for it. And I think that should be much more accessible for NHS if they want best practice.'

'it would be interesting to poll staff and see how many actually access an actual reserach paper'

alternative ways to access and engage with reserach –

'in terms of my keeping current with the evidence, podcasts, webinars, they're part of it now, as much, if not more so, than reading paper journals'

Alerts - publications - websites-blogs-newsl etters

'paying for access when don't know if it's going to be any good '

folders within folders - 'you can get lost in it'

'number of clicks'

need quick links

'an element of finding the shortest path'

NHS athens v uni access to databases

' and if you are doing a Masters but then its taken away just when you should be trying to develop it.'

'then I have to use Sci-Hub or, M the Greek consultant told me I will get any paper I want. So I don't have to hunt for it, he said' I have my sources".

'again I feel like I read a research paper and it confuses me more than sets me on the right...or increases my knowledge'

I often really struggle with the terminology in research papers. So, that to me makes it a little bit inaccessible and harder to make sense of'

skills and confidence a barrier to access reserach - rather than it being hard to acces

'We'll often invite an expert in a certain field, to come and talk to us about a topic that would take us an eternity to delve into ourselves'

training sessions and resources

shared drives

overwhelming amount to sift through

electronic lit search databases

'Most people share it with you and email it around and share it. I think our access to research at work is really, really difficult.'

Access and accessibility (of evidence)

think bizarrely, you know, when we weren't face-to-face and we were just on telephones with patients, we had a lot more time for each other as professionals

use of ms teams etc to communicate and share evi

'it's hard to sit down and read a paper and understand what's going on'

IST /mentor/supervision - frq varies

Access local resources

recommended and pooled by others

databases

guidelines eg NICE easier to access online than reserach papers

search skills

NICE - easy to access not to use

google scholar and reserach gate v formal research databases

The library - not accessed rather than not accessible

You know, and actually as time has gone on and we're back patient facing, we have had less. We're back on that treadmill again of patient, patient, patient

depends on supervisor - how accessible they are

local protocols

more likely to ask a colleague than look at research if unsure what to do with a patient

peers - especially ESP's

the human data base

second opinions

'there is this enough of a 'database' within the sort of close proximity, in terms of people that i can talk to'

being sign posted (or recommended) to evidence via specialist peers

Cause it's not that I don't read research and I don't find it but I tend to go for more bite size stuff that's easier to process'

it's quite difficult to process all the really long articles especially when they've found non-significant findings, that haven't told me anything I didn't know'

impact of covid

collecting own resources - own database

checklists on systmone - cranial nerves

FTF, adhoc, scheduled, email, ms teams, tasks on systmone

'So, I guess it is a way of acquiring knowledge and evidence without directly seeking it out yourself'

actively asking questions

'as a Band 5 you're always placed in the kind of bigger hubs, so I'm never out in a location where I'm on my own.'

environment curtailed cubicle v private room communal spaces

"oh I don't know what's going on with them then you can easily run it past someone because you're all just writing notes up together'

'I think, working in the NHS just makes that massively easier, you know, we're all on site, it easy to get that information'

'I mean I would do if I needed to, you know, but I just go to P and say, P what are we doing Achilles tendinopathy at the minute?' '

. And that meeting really, is a who's who of who is who in AS really, both within research and within clinical practice - BRITSPA

everyone behind closed doors - no communal spaces

accessing more online

google and then look for reputab

The majority of its all internet based, but you can get publications on the internet now, so...

I probably would struggle but a lot of it is getting more heavily social media reliant, which I'm finding quite useful

podcasts tend to be more clinically focused/relevant/easier to apply than research papers

good for broad overview – research papers more focused

But in terms of my keeping current with the evidence, podcasts, webinars, whatever you want to call it, they're part of it now, as much, if not more so, than reading paper journals.

The British Association of Spinal Surgeon website is where we use a lot of the information for patients with surgery or nerve root injections and they have really nice info

, M and I both said this to band 5's, don't just go on what someone said on Twitter. You've no idea who they are. It's not necessarily backed up

, you're always mindful that it's then got a bias of the individual that's presenting it or the people that are discussing it on a podcast

bias/unregulated

sometimes, they go, well I saw this and this podcast on Twitter that's this, and you think, what are you listening to that for?

practical tips – youtube - exercise S&C - peter o'sullivan

But I suppose it still provided me with a more accessible route into things than the articles.

podcasts real eye opener – engaged those who aren't interested in a reserach paper

It kind of fits in quite well with busy life and you can listen to it on the way to work and it might be quite easy to access on your phone

podcasts

. It's the ease of access, it's easily digestible, it doesn't take four hours to read.

I think, from a patient's point of view, there's so much out there that's not safe. And it's not disciplined, and it's not regulated

anytime, anyplace , anywhere

I don't really like to just go on the top thing or on the first when you type something into Google because it could have been, often it can be written anywhere by anyone

we've got a local website that we try and encourage people to access, 'cause it's trustworthy

twitter- mine field – need to keep an open mind - differing opinions/bias - arguments

steer clear of SM only so many hours in the day

people post good stuff on there, so I do get the occasional stuff off there. Well, I follow, but I probably don't read it all.

social media - love/hate

easy access to article

A little bit of Twitter, a little bit of Instagram. They're the main two in terms of research and following different videos.

It's really touch - wouldn't know where to start – who to follow - so ask colleagues

But in terms of busy clinicians, massive caseloads, then podcasts, I think they're a really good way to try and put it in.

but more recently online courses, podcasts are incredibly popular at the moment. There's pros and cons there that both need weighing up

Clinical edge – They've got quite kind of shorter, punchier podcasts kind of, you know, between 20 and 30 minutes that I can...you know, that I find quite helpful

I used to walk roughly half an hour to and from work and that fitted a podcast each way, which was great.

And to be hone there's never er time to sit and watch Facebook or watch webinars (laughing). I find it hard enough to catch up with my friends sometimes out of work

the last thing I sometimes want to do is sit and watch a webinar of somebody else on Facebook talking about some pathology.

maybe if you were quite earlier on in the stage of your career, you could get bogged down with I'm a little bit long in the tooth for doing that now.

some of the stuff that people say about, ditch the medicine, just take...just do this diet, do this. And I just think, oh, my God, you know. It's just...there's some unsafe stuff out there.

social media, podcasts, webinars, websites

really health evidence sharing culture - if you know who to follow

I follow quite a few people on Twitter, who are specifically relevant to me. I'm not very active on Twitter myself

twitter - But there's also a lot of availability you can get hold of experts in a way that you never used to be able to and you can learn and be linked in to articles

evidence often goes in more when there's a story and a person leading that, and a guru that's at the figurehead, and that they're articulate and they're engaging

It's very much front end initial principle evidence, this theory, there's some evidence that grows a theory, and before we know it we're at a treatment and everybody's doing it

I'm being quite cynical, but it can be to peddle their own niche, and their own career trajectory, rather than purely altruistic guidance of the clinician.

that brings its own dangers though, because the person submitting it, is ultimately the generator of the evidence and they've not had a SR so it's a biased recap

the podcasts, the stuff on social media, it's all, it's not vetted particularly,

evidence has become more readily available through the social media, but also it's become, I suppose, more difficult to filter and more difficult to keep up with.

I'm on a couple or forums on Facebook I never, ever post anything on it. I only ever read what people have said. It's just out of interest really,

opinion based . biased

online discussions - physio matters - seniors/leaders

YouTube is a bit older and appeals more to an older generation than the new Instagram and what have you.

So, as valuable as it is, I think there's too much out there

, 'cause anybody can go on the internet and say that they are a guru and suggest that they can offer advice to people.

I feel that we're almost going back to being gurus. With the new gurus, those who are best at getting their face forward, through the new media

an online conference, like Therapy Live you can watch a 45-minute talk, watch a couple of them a week and it probably sinks in.

online repositories, physiopedia and there's a lot of YouTube videos out there

talks, YouTube video clips and things like Again, you can get access to some really high powered people and some very interesting novel ideas

Use IG outside of work - should I be using for work to stay current?

IG - FB

I do actually count people's experience, as well and I guess, things that people have discussed on Twitter, or, you know, in Facebook groups

So I'm not adverse at all, to using anything that's not been published or anything like that.

that the podcast age /webinars - certain people have got to the forfrnt and made a name for themselves as being a guru in a certain area - or at least just made a name for themeselves

guru culture

don't follow it, but those who are prolific tweeters, those are the ones who get followed by the likes of our ESPs and that just forms the tree, the chain of dissemination.

With the new gurus, those who are best at getting their face forward, through the new media

A lot of it is opinion based and open to the biases and prejudices that we bring to our work and our understanding

pros and cons – potentially purely for profess use later on in career

Actually there was a really good thing that I saw, it was actually on Twitter , nice examples of functional rehab

with a more elderly lady picking up weight and next to it picking up her shopping, that that to me is what we do do in the gym . but it's not aiming at your 90 kilo valve stuff

and hopefully go into it with a very open mind because it's a bit of a minefield there.

I suppose I do my own form of research and evidence based, I use a lot of social media. I try and find an awful lot I can out on Twitter and places like that

331

Appendix 6 Preliminary interview findings that informed Phase 3

The physiotherapists' perspectives

Accessing evidence is hard

Accessing and making sense of 'evidence' was difficult. There were lots of different resources available to the physiotherapists for example, on their shared computer drive at work, the internet, webinars and podcasts. But there was so much it could be like *'finding a needle in a haystack'*. Research papers were not easy for all physiotherapists to access without affiliation to a university and access to their databases.

Research is hard to make sense of

There was a general feeling that formal research papers were heavy going and not easy to read or make sense of. There appeared to be a feeling that research findings could sometimes be contradictory or did not give definitive answers. This could be a reason why it isn't always used or considered.

Assessing the quality of the evidence is challenging

It was hard to discern the quality of the many different sources of evidence now available online and therefore difficult to know whether to trust and use it.

There seemed to be a re-emergence of 'guru' culture that had been seen in the past related to specific, often non-evidence based, treatment trends. Certain renowned or respected physiotherapists, especially those with a presence online, appeared to influence physiotherapists with regards to the evidence and knowledge they use in their practice. But there was an uncertainty amongst some physiotherapists about whether these 'guru's' opinions and views were biased or trustworthy.

Reliance on peers

The physiotherapists within the three teams involved in this project appeared to rely heavily on more senior, specialist physiotherapy colleagues to:

- Provide training.
- Signpost to relevant evidence.

- Find, appraise and supply with key messages to use in practice.

Applying the evidence in practice

There was a general feeling from the data that evidence and knowledge was easier to apply in practice and was more likely to be used if:

- It fits with what the physiotherapist 'believes in'.
- Is similar to what they are used to doing, that is it is in their comfort zone.
- If they have the confidence and skills to use something new or different.
- If it is from a trusted and respected source.

Sharing evidence and knowledge with patients

Most physiotherapists shared evidence, knowledge and information with their patients verbally. Leaflets were not used very much because they were not always easily available to them or of good quality. On occasion some physiotherapists used images and models to aid explanations, but this was rare.

It was recognised by some physiotherapists that the consultation should be a negotiation process between therapist and patient not a transactional one. That is, it should not be a one way street where the physiotherapist imparts their knowledge onto the patient and expects them to accept it and act on it.

The physiotherapist's role

The ability to access, share and use evidence varied depending on a physiotherapist's role. There was a sense that it was easier for physiotherapists who specialise in a certain body area or service, compared to a physiotherapist who has a general and varied, mixed MSK caseload.

The patients' perspective

Personalised care

The patients wanted to feel like they had been listened to and acknowledged by their physiotherapist. They wanted to feel that the information they shared with their physiotherapist felt valued and was not dismissed. They wanted to be treated like an

individual and feel that their treatment was personalised to them rather than being made to feel like *'a number'*, *'on a conveyer belt'*, *'in a cattle market'.*

Relationship building

The relationship that is formed between the patient and their physiotherapist appeared to be a key factor in the Knowledge Mobilisation process. Patients felt that developing a good rapport and trust and confidence in their therapist contributed to the development of a good patient -therapist relationship. Some patients expressed that if they liked and trusted their therapist, they were more likely to trust and have confidence in the information and advice they received.

Confidence and trust in their therapist

Some patients seemed to place a huge amount of trust in their physiotherapist as a professional to know and do the right or best thing for the person in front of them. Several factors were acknowledged as influencing the trust and confidence patients have in their physiotherapists and the information and advice they receive. These factors included: Time, such as the amount of time spent waiting for an appointment, time spent in the appointment, the length of time between appointments; The environment in which the appointment took place, for example in a fully equipped gym compared to a shabby room, or a hospital compared to a community setting; Communication skills and ultimately the relationship that is formed.

There was an overall sense from the data that *'it's not what they (the physios) do, it's the way that they do it.'*

Feeling equipped with sufficient knowledge to act

In order for patients to feel confident to act on the information and advice they received the data suggests that each patient needed to feel equipped with sufficient knowledge so that they understood:

- What their problem or diagnosis was.
- What could be done to help it or not.
- Why a certain treatment option had been chosen (or not).
- What the treatment plan was, immediate and in future.

The amount of knowledge, evidence or information a patient would like however was dependent on each individual.

The type of MSK problem and knowledge needs

It appeared from the data that the type of MSK disorder a patient presented with influenced the amount of knowledge or evidence that a patient needed or would like. For example, an acute condition with a clear diagnosis such as a sprained ankle, broken bone or post-surgery compared to a chronic condition or uncertain diagnosis. That is the level of certainty or uncertainty (about the MSK condition) appeared to affect the amount of evidence and knowledge each individual patient required.

Research is important

Overall, patients felt that using research evidence was important but that physiotherapists should consider each patient individually first and foremost. Most patients expressed that evidence was not explicitly mentioned to them during their appointment but they assumed that their physiotherapist would be basing their decision and treatment choices on the best evidence.

How is evidence and information shared

The data suggests that most information sharing between the physiotherapist to the patient occurred verbally, which could be hard for some patients to remember. This was sometimes backed up with exercise sheets and occasionally website links. Varied forms of information sharing were preferable, for example verbal, physical leaflets or electronic.

Appendix 7a Creative Co-Design workshop 1 pack

Appendix 7b On the wall analysis - examples of 'post it wall'
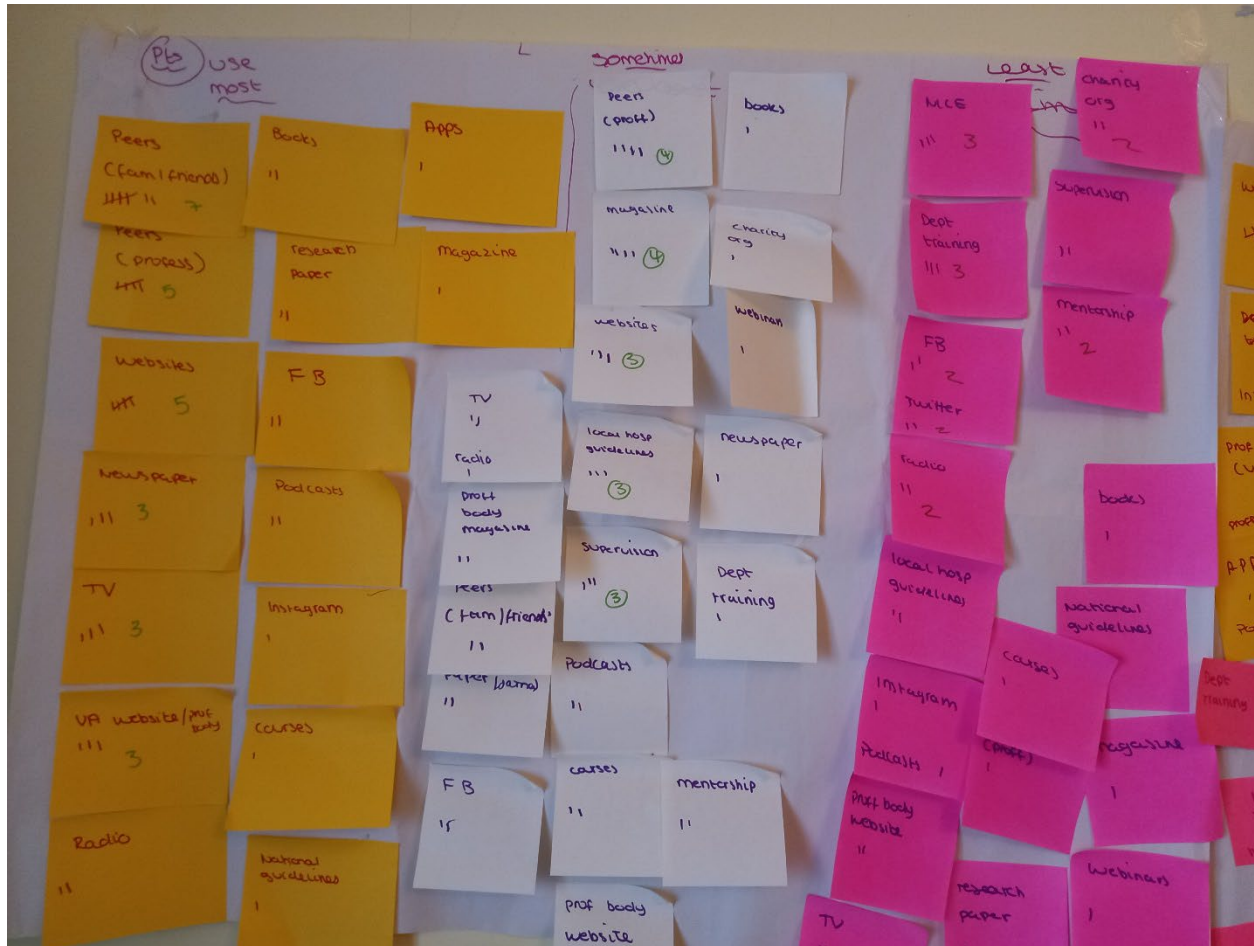
Use most (Physio's)

Peers * process 15	Dept * training 11	Websites * 11
Local guidelines 10	Supervision * 9	Research 9
twitter * 8	Podcasts * 7	national guidelines 7 NICE 5

Least

TV 8	Conferences * + courses 6 + 3	books * 6
*Csp magazine website + ●6 10	Instagram 5 * FB 5	newspaper * 5 magazine * 5

* research

Access

Websites 9	Peers (process) 8
Twitter 7	

Understand

Peers (process) 9	Dept training 7
Supervision 6	Podcasts 5
Mentership 4	websites 4

Apply

Dept training 7	Supervision 6 mentership 4
Peers (process) 6	hosp guidelines 5
websites 5	NICE 4

hard

Research 8 books 3	Conferences courses 8	Research 12

research 8
National guidelines 5
books 4

Appendix 7c On the wall analysis – example Miro boards
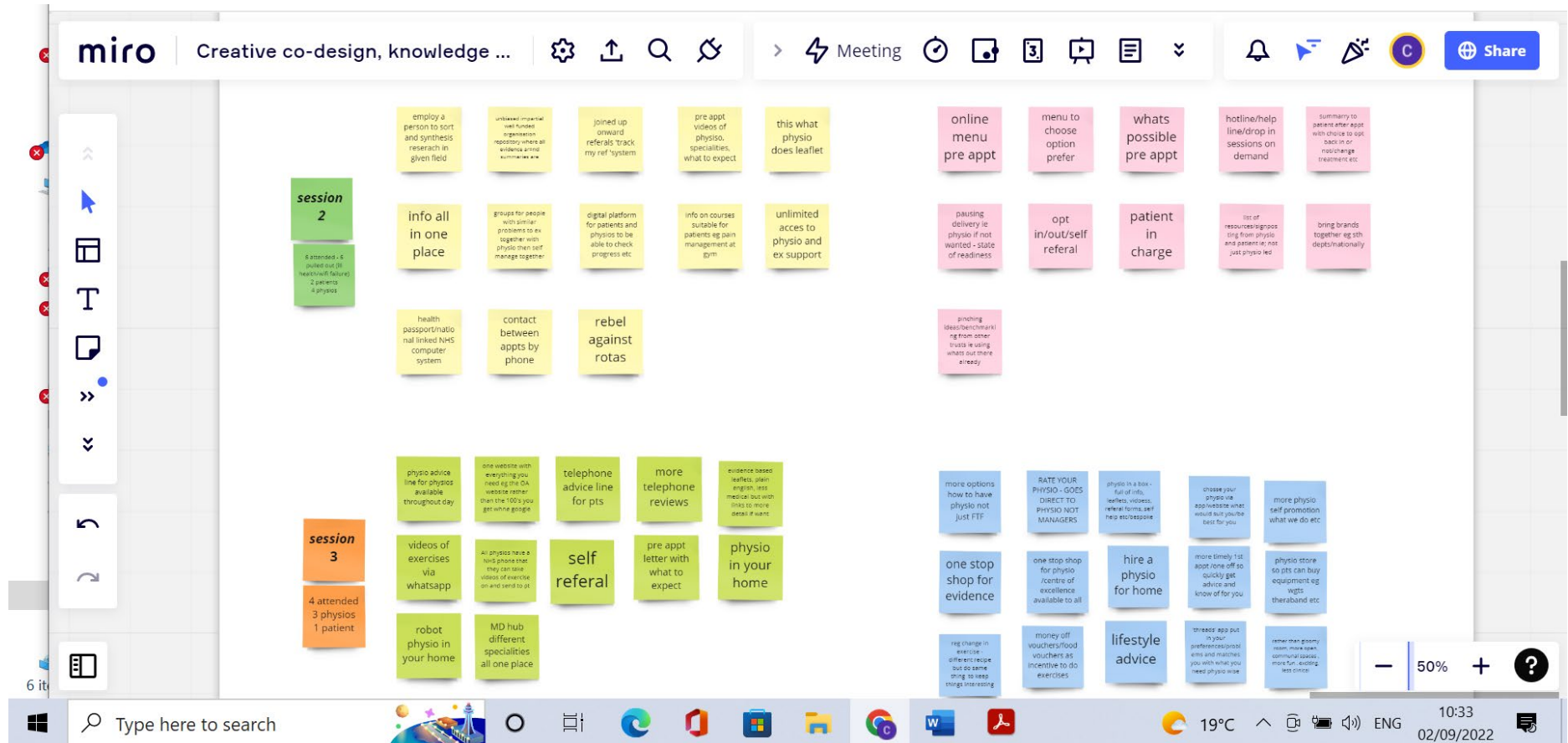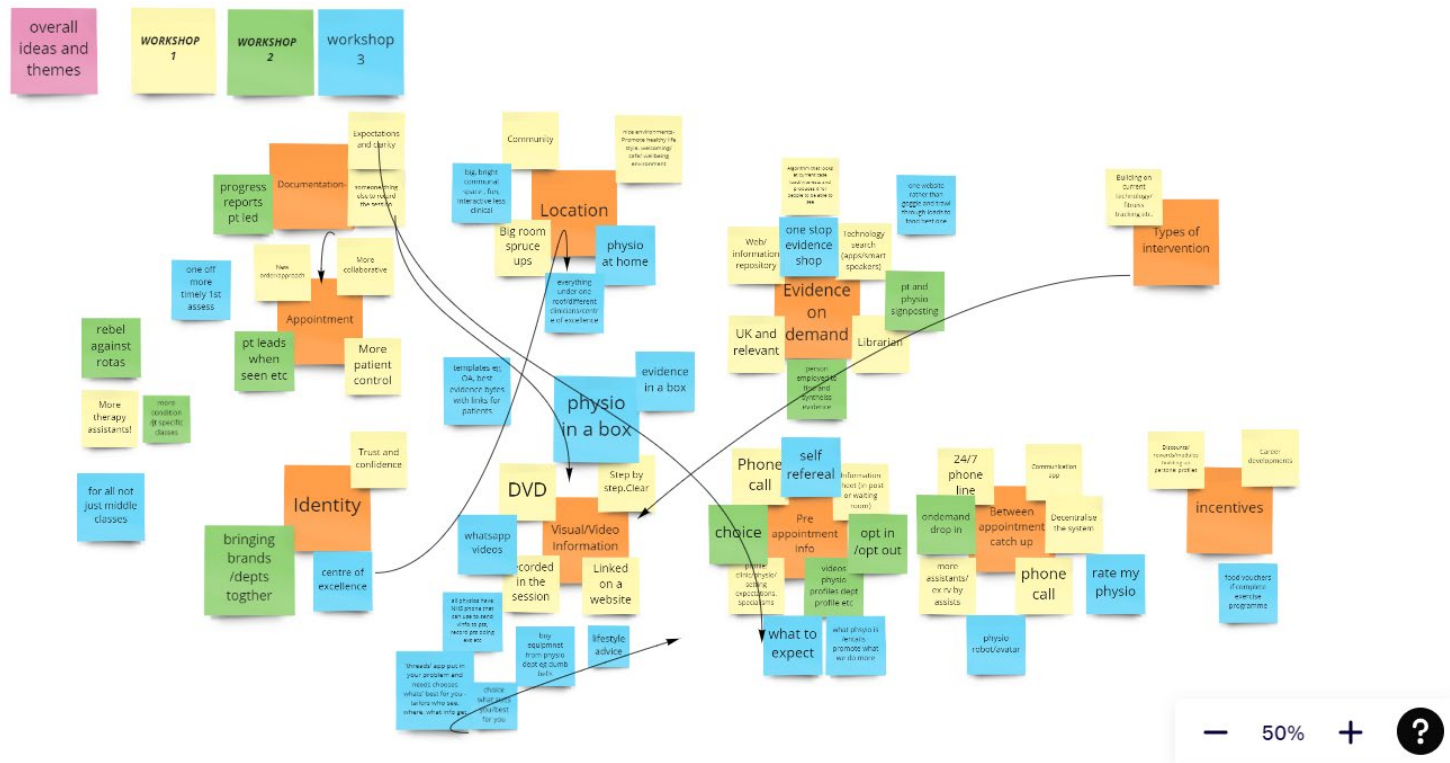
Welcome!

To the co-design phase of my research project; **exploring knowledge mobilisation* for musculoskeletal physiotherapy,** or the Co-KaMP study for short.

I'm Cheryl, the project lead. I'm a physiotherapist at ████████████ ████████ and a PhD student at the University of Sheffield.

If you would like a member of the team to help you read or complete this document, or to answer any questions, please get in touch using the following details:

cheryl.grindell@sheffield.ac.uk

07783767817

Receiving this pack marks the beginning of the co-design stage of the project. Please keep this booklet safe, it contains important information about the project, co-design sessions and what to expect. You can come back to it at anytime.

Thank you for joining us, we know how precious your time is and it's great to have you on board.

* Knowledge mobilisation is the term for using evidence and information in practice

All the best things start with a hot drink. You'll find a teabag included in your box, so take a moment to put the kettle on, find a comfy seat and have a brew while we tell you a bit more about the project.

Why have I received this pack?

This pack has been sent to everyone who is taking part in the co-design part of this project. We've invited Physiotherapists and people with experience of physiotherapy to take part.

Inside you'll find everything you need to take part in the first co-design interaction. **For most of you this will be an online workshop, however some of you will be completing the activities on your own.** For more information on this see page X.

What's in the box?
1. This booklet
2. Origami kit
3. Teabag
4. Activity instructions and materials
5. Prepaid return envelope
6. Glue stick!
7. Pen and paper

Project Information.

Using evidence, such as research and guidelines, in physiotherapy practice is **important to make sure the right decisions are made** on how to best manage an individuals muscle, ligament, bone or joint problem.

It isn't always easy to access, make sense of, and use evidence and information in the best way so that people feel that their problem can be managed successfully.

This project aims to **understand what helps and hinders the use of evidence and information** from the perspective of physiotherapists and the people they treat. From this understanding we will develop a prototype solution together that helps evidence and information be used more easily.

Who is involved?
There will be up to 20 physiotherapists and up to 20 people who have had physiotherapy involved. Some will join the online workshops some will complete the activity packs individually.

There will be a mixture of physiotherapists and people who have had physiotherapy at each workshop (approximately 12 – 16 people at each of the sessions).

Lab4Living & Co-design.

Co-design describes a process where **designers and those with experience or knowledge of the thing to be designed work together.**

Rebecca and Joe will be assisting me with the co-design and prototype development. They are design researchers and work in Lab4Living at Sheffield Hallam University.

Their expertise is in designing things with end users like yourselves. It's important to know that they're experts in co-design but not in the treatment or experience of receiving musculoskeletal physiotherapy. **As far as we're concerned, if you are reading this then you are the expert.**

Something to get you started...

One of the key aspects of co-design is creative activities and learning through doing or making.

Throughout this process you'll be involved in a range of creative activities. Through these we'll invite you to 'do' something, to make, create or respond to something through more than just words. We find this helps people to access a deeper level of thoughts, feelings, information and ideas.

To get you started on this journey we'd like to invite you to take part in a small making activity. In this pack you'll find a simple origami kit and instructions.
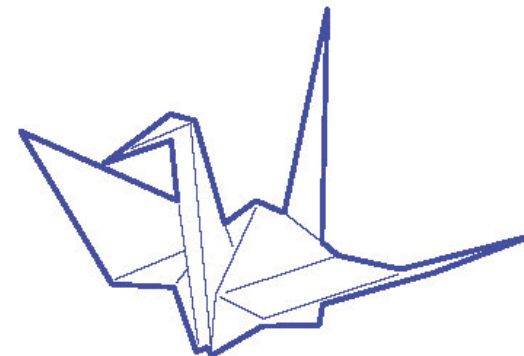
Key Information.

This project spans three and a half years. And has a four different phases. We are now in the third phase;**co-design.**

We plan to run three co-design sessions. There will be a number of co-design workshops/activity packs and prototype development opportunities during the next 9 months. We'd like you to be involved in the entire process if you can and we can work flexibly with you to allow you to be involved as much as you are able.

At the end of the project we'd like to invite you back to an event to celebrate everyone's contributions and share the outcomes of the project. We'll be in touch with a date closer to the time

These are planned for Monday 28th & Thursday 31st March.

We hope to run the second and third sessions between the end of April and June.

Workshop One
To understand peoples use of information

Workshop Two
To understand information sharing and use in the consultation

Workshop Three
Ideation, Solution development

Prototype Development

Next Steps.

If you are attending an **online workshop:**

All workshops will be held virtually on the University of Sheffield's online platform, Blackboard Collaborate. **You'll be emailed a link and instructions on how to use it before the first session.** I will be in the 'room' from 6.40 so do sign in early if you have any questions or anticipate any problems.

Everything you need for this session is in this pack. No need to do anything else beforehand. Just keep this safe and make sure you have it with you when you log in to the workshop.

> On the night just make sure you have the Blackboard Collaborate link, a nice drink and some space around you to complete the activities. See you soon!

If your completing the activities **on your own:**

Everything you need to complete the activities is in this pack. **You'll find a separate instruction booklet alongside all the materials in this pack.**

We imagine it will take around 30-40 minutes to complete the activities. Make sure you've got a comfy seat, some space to complete the activities and a nice drink.

If you have any questions or anything is unclear please do get in touch.

Origami.

[ori'ga:mi] **noun**

The Japanese art of folding paper into decorative shapes and figures

Throughout this process you'll be involved in a range of creative activities. To get you started on this journey we'd like to invite you to take part in a small making activity, some beginner origami shapes.
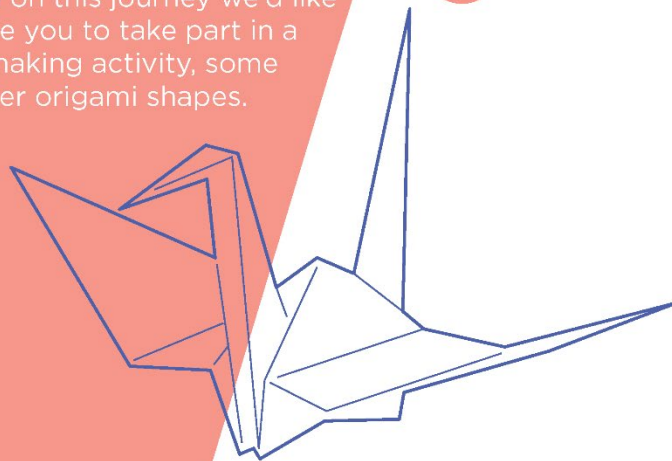
During this process, the invitation to 'do' something, to make and create encourages us to respond to something through more than just words. In co-design we find this helps people to access a deeper level of thoughts, feelings, information and ideas.

We recognise that making things with your hands is out of many people's comfort zone. This discomfort is something we want to gently encourage throughout this co-design process. With co-design, it is important that we create safe and respectful spaces for us to work together. At the same time, our experiences have shown that if we collectively push ourselves out of our comfort zones, we are more likely to develop innovative solutions that address complex problems and different needs.

Cup

1 Fold paper in half-bottom corner to top corner

2 Fold bottom corner to opposite side

3 Repeat on the other side

4 Fold top flap down

5 Turn over and repeat on the other side

6 Turn over and open up the pocket!

Envelope

1 Fold paper in half-bottom corner to top corner

2 Fold top point down to meet bottom edge

3 Fold the right side in by 1/3 and then the left

4 Fold the left flap corner back

5 Open the little flap and squash to make a diamond pocket

6 Fold the top down

7 Tuck the top point into the diamond pocket to seal the envelope!

As with all our making activities, there are no prizes for the outcome. We hope you enjoy it and end up with something your proud of, but if it's challenging for you that's okay too. What's important to us is that you give yourself the time and space to engage and give it a go.

Bird

1 Fold and unfold in half top to bottom

2 Fold paper in half right to left

3 Fold the left corners back over to the right

4 Create a small crease about 2/3 and fold top layer back

5 Fold the whole figure in half along central crease line

6 Create a crease at a slight angle and fold back one side

7 Turn over and repeat

8 Make a small crease and then push in the centre back in on itself to make a the head

9 Open up the body and voila!

Activity Instructions

Hold on!

If you are taking part in an online session then please do not look ahead, just keep this safe and bring it to the workshop.

If you are completing this on your own then go ahead. There are two activities to complete. Find yourself a comfy seat with some space to spread out the activities and let's get started!

Activity One:
Information Ranking

In this activity we're trying to understand what information people use to gain information about conditions and how to manage them.

It's really important that you tell us what you actually use and not what you think you should use.

For this activity you will need the following resources from your pack.

Ranking sheet   Evidence cards & Glue   Sticker Sheet

We anticipate this activity will take about 30 minutes but please take as long as you need.

Step One: Card sorting

Sort the evidence cards into two piles. One pile is for the information you use or have used. The other is for information that you have never or would never use.
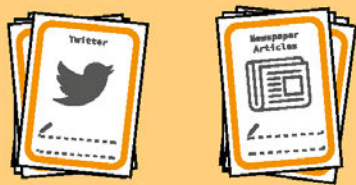
Take your time to consider the different types of information the cards represent. As you go through the cards please add any detail e.g. the name of the book or website.

You'll notice there are some blank cards at the end- have we missed any? Are there other sources you use? Create the card an add it to the appropriate pile.

Step Two: Ranking

Open up the ranking sheet. Place the cards from your 'information I use' pile on this sheet in the appropriate place.

Your sheet could look quite crowded but don't worry! Once you are happy with the cards placement- stick them down using the glue stick provided.

Step Three: Reflection

Take time to look back over your sheet and reflect on your card placement. Use the space below to share your thoughts and tell us...

Have you found anything interesting or surprising about your responses so far?

Step Four: Stickers

Use the sticker sets to tell us more information. There are six sets of stickers to work through. Stick the stickers on top of the cards (you can put multiple stickers per card).

Your sheet might be looking really crowded but that's okay! You can add hand written notes to share additional information if you want to.

Step Five: Reflection

Take time to look back over the placement of these stickers, and any thoughts or reflections you had whilst placing them. Use the space below to share your thoughts.

If your in an online workshop use this space to record thoughts during the breakout rooms.

Your halfway through! One more activity to go. Make sure everything is stuck down and in place from activity one and place it to one side.

Activity Two:
Information Ranking

In this second activity we will be going into more depth about how where and why (or why not) you use information.

For this activity you will need the following resources from your pack.
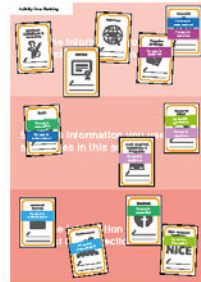
Completed sheet from activity one
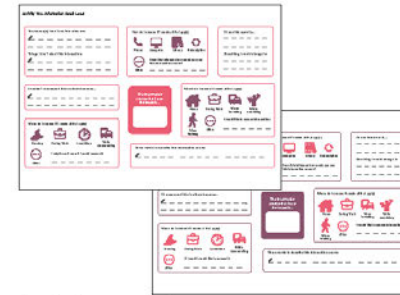
Activity two sheets

We anticipate this activity will take about 20 minutes but please take as long as you need.

Step One: Selection

Looking back over the first activity. Choose the type of information that you use the most and the one that you use the least.

Step Two: Most used

Find the activity sheet with the purple square in the middle. Write the name of the information **you use the most in** the centre.
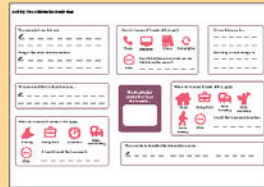
Complete the sheet by finishing the statements and circling the icons. Add any additional comments you would like to share or feel important to the page.

Step Three: Least used

Repeat the activity using the sheet with the pink square in the middle. This page will be used to record detail about the information **you use least.**
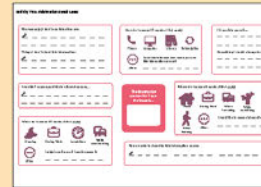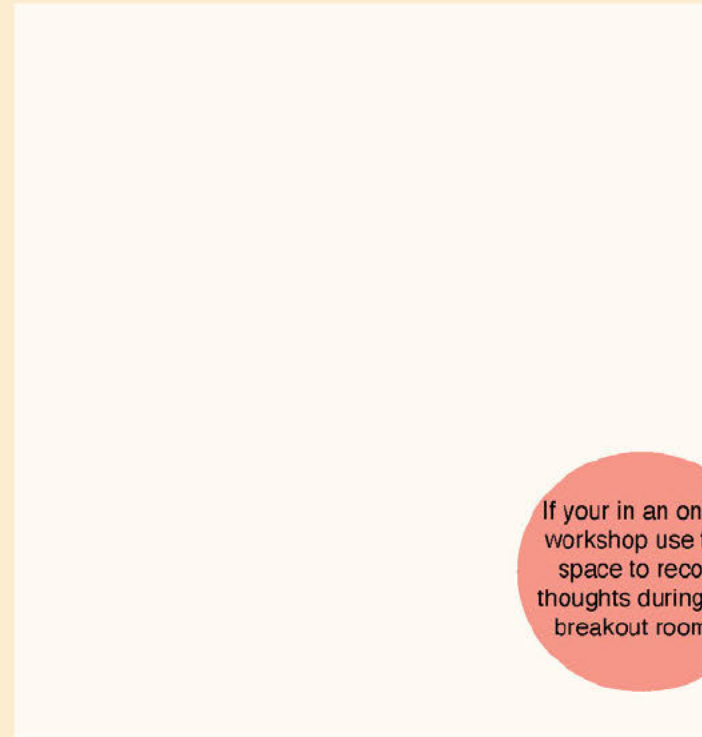
Thank you for taking the time to read and complete this activity pack. If you have any questions, please get in touch.

One last thing to do!
Please write your name on the front of this booklet, then put it along with the completed activity sheets inside the prepaid envelope (its okay to fold them!).

Pop this in the post, we can't wait to see what you've done.

Step Four: Reflection

Take time to look back over the completed sheets. Use this space to record any thoughts or reflections you had whilst you completed this activity. Have your responses surprised you in anyway?

If your in an online workshop use this space to record thoughts during the breakout rooms.

Example activity cards and sheets

Example activity sheet

Activity Two: Information Detail Most

The reason(s) I use this are:
_____   _____   _____
_____   _____   _____

Things I like about this information:
_____   _____   _____
_____   _____   _____

How do I access it? (circle all that apply)

Phone   Computer   Library   Subscription

Other   Does this influence how much you use this information source?
_____

I'd use this more if....
_____
_____

One thing I would change is
_____
_____

I'd recommend this to others because...
_____
_____

The information source that I use the most is...

Where do I access it (circle all that apply)

Home   During Work   When Travelling   While Exercising

When Walking   Other

I would like to access information:
_____

When do I access it? (circle all that apply)

Evening   During Work   Lunchtime   While Commuting

Other   If I could I would like to access it:
_____

Three words to describe this information source
_____   _____   _____

Appendix 8b Workshop 2 schedule

Aim to understand how information is gathered, shared and used during the physiotherapy appointment.

1. What information does the physio need to make a safe and informed decision on how best to manage someone's problem?
2. What information do patients feel is important to share with the physio about their problem?
3. What information do patients feel is important to receive from the physio about their problem?
4. How do physios use research and guidelines during the appointment?
5. What will influence whether information is acted on by the patient?

Need to consider information:

Gathering   -   Sharing   -   Use

Before   -   During   -   at the end   -   and after the appointment

Time	Activity	Purpose of activity	Notes about activity, what is needed - before session
19.00-19.05	Welcome and presentation - Brief recap of study and where at - Aim of co-design sessions and aim of this session - Reminder re ground rules for co-design sessions	Briefly refresh purpose of study , key quests, different stages and where at so far Explain purpose of co-design sessions aim of each one Aim of this session Set ground rules for sessions	Ppt slides (Cheryl) This workshop focus is information sharing and use in the appointment
19.05-19.15	Warm up activity Go around the group start with me and Becca Something you dislike but can't live without	Warm up'/ice breaker activity Introduce one another get used to type of activities do—share format Get used to short and succinct feedback ready for breakout rooms	

19.15-19.25	**Activity 1** Pie chart (individually) **Step 1: actual experience** Pie chart 1 what you do (physio)/what actually happened (patient) Proportion of time spent Information/evidence gathering and sharing during the appointment **Step 2: ideal** Pie chart 2 what ideally should/you would like to happen (1st appt)	Find out what proportion of time is spent gathering information by physio to inform safe decision making Patient information they want to share and receive so they feel informed about what the main issue/problem is and what to do about it So patients can see what physios need to know to be safe and make informed decisions So physios can see what pts want us to know and want to know to feel informed about their condition	A3 sheet blank pie charts x 2 (or both on 1?) Provide with list: Referral card/letter Appointment letter Xrays/scans/blood tests Medical notes/clinic letters Research/guidelines Greetings/introductions History taking/giving Physical examination/hands on asssessment Explanation of whats wrong Explanation of what will help/not help Demonstration of what to do Practice what to do Other Add ideal appointment length would be…
19.25-19.35	Break out rooms	Compare charts and discuss similarities and differences and surprises	Reflection space in booklet and pen
19.35-19.40	Share	Each group to share back key differences, similarities and surprises	
19.40 - 19.50	**Activity 2** step 1 **Timeline (ideal scenario):** When gather /share what info **Before appointment – during appointment – end of appt – next appt ie. what do physios need to know and what do patients need to know when**	To understand **when** different information is gathered , shared and used.ie. what need to know when Consider what happens when/ what happens before or between different stages Annotate what actually happens/happened if different to ideal or ideal above line actual experience below?	A3 timeline sheet

19.50-20.00	**Activity 2** step 2: **Stickers** to indicate/annotate what patients and physios consider the **most important** info they need to know so fully informed. What do they consider the **least important to know ?** **Physios t**o flag at what points they use research and guidelines How they access them **Patients** to indicate what they need to know by the end of the appointment so they feel able to act on it after the appointment/between appointments.	Add stickers /flags/symbol To understand which info patients and physios deem most and least important to know so fully informed. To understand at which points physios drawing on research and guidelines to inform what they ask/do How do they do this during the appointment– from memory/asking peers/looking up … To understand what patients need so they can act on advice and information given once left the appointment. Ie on their own at home.	A3 timeline and (most/least important) (research guidelines) sticker sheets Research/guideline stickers Memory/ask a colleague/look it up stickers Patient question – what need to know at end of appointment
20.00-20.05	Break		
20.05- 20-15	Breakout rooms Discussion in small groups to compare between physios and patients	To compare and contrast between physio and patients 1. What happens/need to know when? 2. What's most important to know? 3. What's least important to know? 4. When research and guidelines used and how 5. What patients need to know to act on	Reflection section in booklet and pen
20.15-20.25	Share back to whole group	Share each groups similarities and differences between physios and patients with regards to the above 4 questions	Miro board slide or jam board Complete/visualise with post its while feeding back
20.25 – 20.35	**Activity 3**: Quote sheets To consider what other factors impact on the knowledge	To understand what success is from a physio and patient perspective Ie; pt feels informed and goes away feeling equipped to act on information, physio confident	Quote sheets 1 quote per sheet plus questions to consider What can we learn from this quote?

|	sharing and use process during the appointment	in decision making and advice given. Consider ; hard knowledge – eg; giving patients exs, reps, plan etc Soft knowledge- eg. Motivation, achievabilility, engagement (of patient) – end of physio session what needs activating within patient.	What does it tell us about whether this was a successful appointment or not? Do we think the person is likely to act on what they have been given?
20.35- 45	Share	Each person gives their quote and key points from the questions they answered **(60 secs each)**	Miro board slide to complete whilst sharing
20.45-20.50.	Round up of todays session	Joe to share key/interesting findings from ja board	jamboard
20.50-21.00	Next steps and and introduction to personas	1 physio 1 patient More to be developed and used in next workshop	1 physio persona 1 patient persona (power point slide)

Instruction booklets

To sow
[soh/sou] **verb**

To put seeds in or on the ground so that plants will grow

As part of us working together, learning from eachother and growing the project together. We'd like to invite you to take part in a small growing activity. Please plant these seeds, water them and watch them grow.

Prepare

1 Use the origami instructions from your first pack to make a paper cup. If you no longer have these instructions you can recycle a yoghurt pot or plastic fruit or veg container such as an empty grape or tomato container.
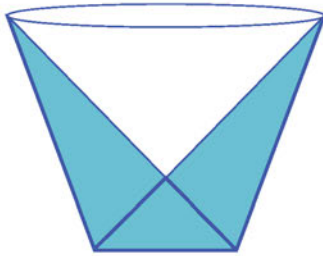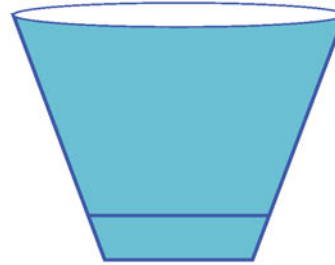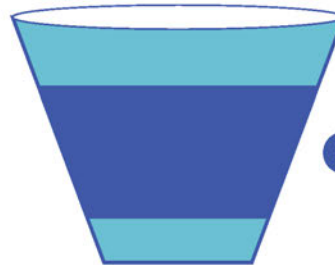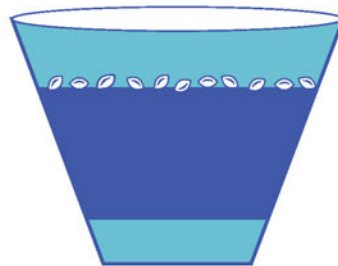
2 Have a cup of tea!

Sow

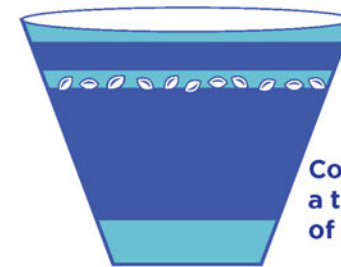**3** Place your used damp tea bag in the bottom of the cup

4 Top up the cup with compost (there is some provided in your pack).
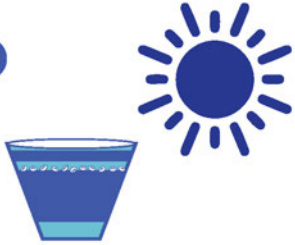
5 Scatter the seeds

6 Cover with a thin layer of compost

Grow

7

Put your pot in a warm room.

8

Keep moist.

9

Once your seeds have germinated, move them into a larger container or individual pots.

10

Watch them grow and enjoy a healthy, crisp lettuce later this summer!

Activity Instructions
Workshop Two

Hold on!

If you are taking part in an online session then please do not look ahead, just keep this safe and bring it to the workshop.

If you are completing this on your own then go ahead. There are three activities to complete. Find yourself a comfy seat with some space to spread out the activities and let's get started!
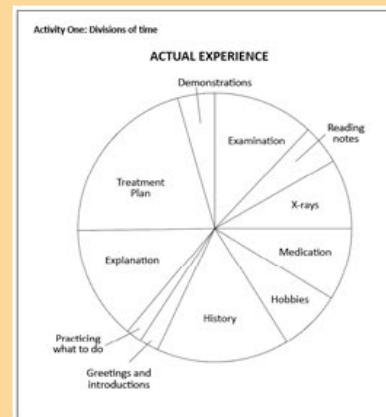
Step One: Information

Start with the pie chart titled 'actual experience'. Take a moment to bring to mind a first therapy consultation. Then read through the prompt list of potential types of information gathered, shared or used.

If you think there are any other types of information missed then jot it down on the page

Step Two: Pie chart

Complete the pie chart. If you imagine the whole circle represents an appointment, divide it into segments that visualise the proportion of the appointment that is given to certain types of information.

You do not have to use all the information types, just the ones that are relevant to you. Don't worry about the actual minutes spent. Make sure you label each segment as you go.

Step Three: Repeat

Now pick up the sheet titled 'ideal experience'. Divide this up in the same way as before but this time think about what you think ideally should happen.

Again don't think about minutes instead think about proportion of time. e.g. Is there one type of information that you think a quarter of the appointment should be dedicated to?

You might find that this chart has different information from the previous.

368

Activity Two:
Information Timeline

In this second activity the we will move to think about information over time. We are trying to understand peoples views on when we should gather, use and share different types of information before, during and after the appointment.

For this activity you will need the following resources from your pack.
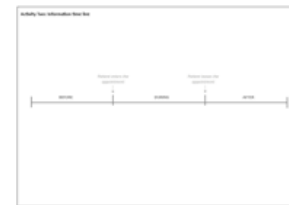
Blank timeline sheet   Red Pen   Sticker Sheet

We anticipate this activity will take about 30 minutes but please take as long as you need.

Step One: Complete

Annotate along the different points of the timeline when you would ideally gather, share and use information around the first physiotherapy appointment. It is useful to think chronologically about this- what is the first piece of information you need in this process.

This is not about the importance but the order of information. You can use the pie charts to support you but there may also be other types of information you use.

As you complete this you might find that some information happens multiple times, thats great- Just make sure you record it!

Step Two: Annotate

Now you've completed the timeline, take a look at it. If this is the ideal scenario of information, how does this differ from your actual experience?
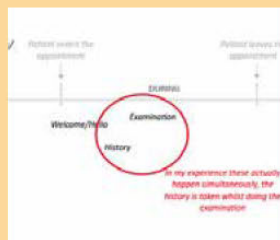
Using your red biro, circle any areas and annotate where things in reality were different from the ideal.

Step Three: Stickers

Take the most/least important stickers and stick them on the sheet to indicate what is the most or least important to know, share or use in order for you to fully understand the problem and how to deal with it.

Most Important

Least Important

Staff

There are a few additional stickers for staff participants to place on thier timeline.

Patients

Please answer the question on the next page.
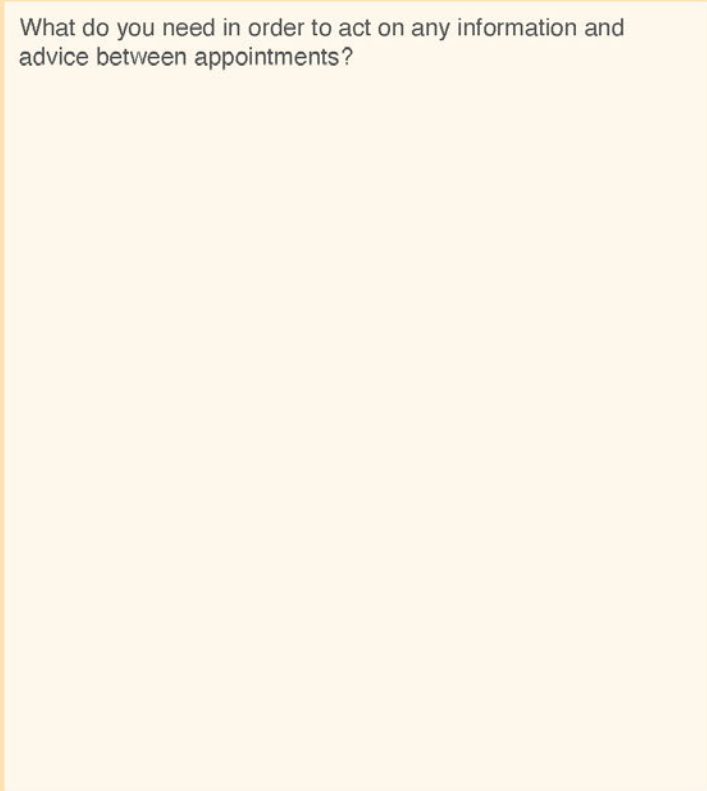
Use the stickers to indicate when you use research and guidelines during the assessment, treatment and decision making process. e.g. If you use them whilst reading patient notes stick a sticker next to there. In the white box note how this happens (e.g. from memory, talking to peers, using the intranet.

Research & Guidelines

Discussion with peers

370
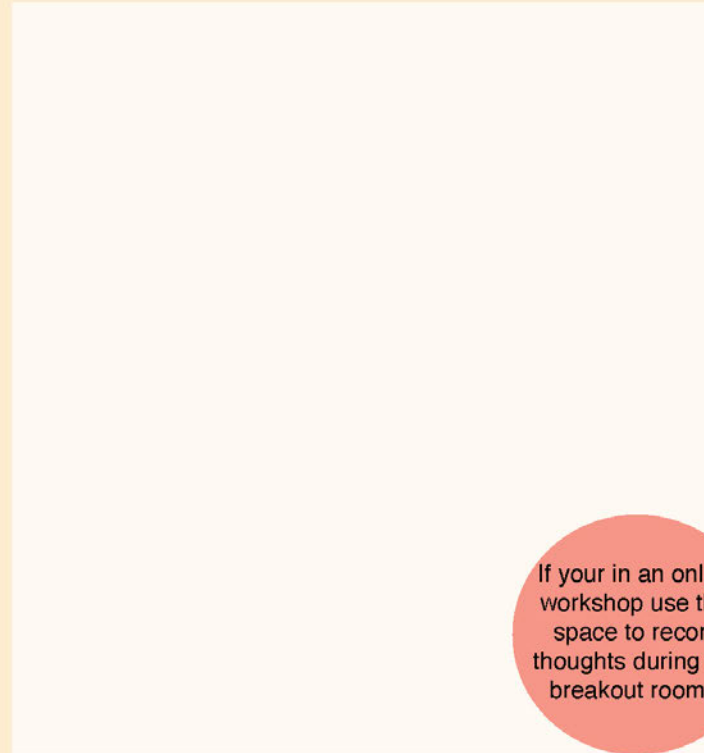
Step Three: Question

What do you need in order to act on any information and advice between appointments?

Step Four: Reflection

Take time to look back over timeline. Use this space to record thoughts and reflections you had whilst you completed this activity. Use this space to go into more detail about what is most/least important to you.

If your in an online workshop use this space to record thoughts during the breakout rooms.

Just one more activity to go. Place these to one side and open activity pack 3.

Activity Three:
Interview Quotes

In this third and final activity we want you to consider, using the quote provided, what else influences whether information is actually successfully gathered, shared and used during and after the physiotherapy appointment.

The quotes provided in this activity are anonymised quotes from patients interviewed in phase one of the study.

For this activity you will need the following resources from your pack.

Quote Sheet

We anticipate this activity will take about 15 minutes but please take as long as you need.

Step One: Read

Read and have a think about the quote on your sheet- what is it saying or telling you?

> " I had a friendly relationship with the physio to start with, and they were very encouraging, and I probably saw them once a month or once every fortnight. It was quite a lot. Anyway, they were encouraging. So, they would say things like, you know, actually you're now able to do that and you couldn't when I last saw you. So, there was a lot of feedback which obviously you don't get if you just have a one-off session. So, that was really helpful, really helpful. I don't remember them ever talking about evidence though, but anyway, they were lovely. "
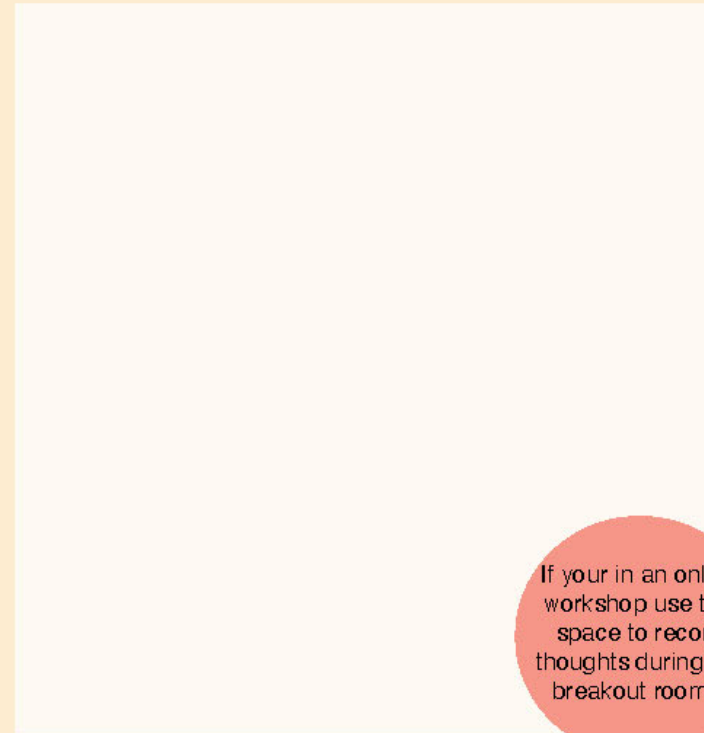
Step Two: Questions

Based on your thoughts about the quote, answer the questions on the sheet.

What can we learn about what influences the knowledge sharing process from this quote?

What does it tell us about whether this was a successful appointment or not?

Do we think the person is likely to act on what they have been given? Why?

Step Four: Reflection

Take time to reflect on the questions. Has this quote made you think of any other things that might influence whether information is successfully gathered, shared and used?

If your in an online workshop use this space to record thoughts during the breakout rooms.

373

Workshop 2 example activity sheets

Activity One: Divisions of time

ACTUAL EXPERIENCE
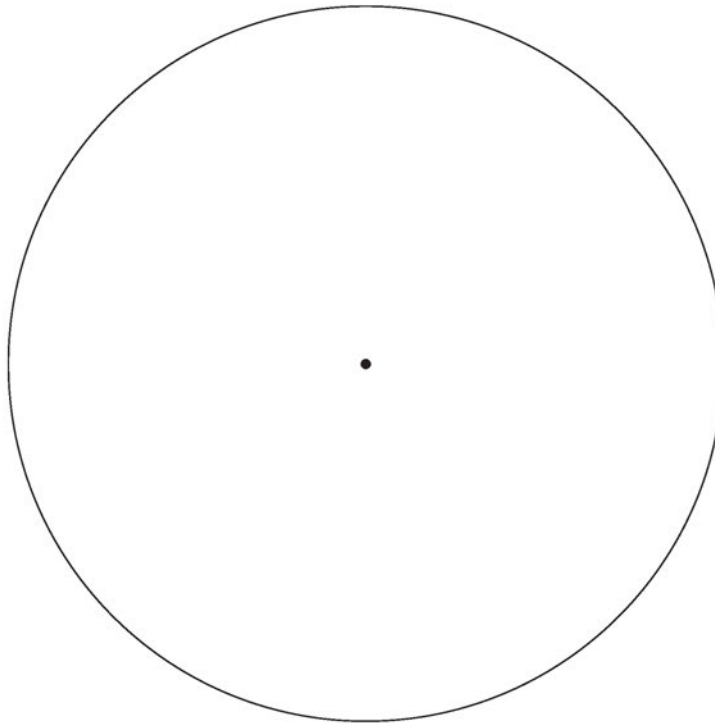
Prompts to help you divide your chart

Reading patients medical notes
Looking at patients x-rays and scans
Greetings and introductions
Explaining what is going to happen
Asking about the problem/taking a history
Asking about general health
Asking about medication
Asking about work, family, home life, hobbies
Looking at /examining the problem e.g.
Looking at and examining the knee
Explaining what is wrong
Explaining what isn't wrong
Explaining what can help
Explaining what is unlikely to help
Agreeing what to do
Doing treatment (provide an example?)
Demonstrating what to do
Practicing what to do
Discussing a treatment plan

Please tell us how long the appointment was here:

Activity Two: Information time line

Patient enters the appointment

Patient leaves the appointment

| BEFORE | DURING | AFTER |

| Least Important | Least Important | Least Important |
| Most Important | Most Important | Most Important |

Additional Stickers for Staff

| Research & Guidelines | Research & Guidelines | Research & Guidelines |

Exploring knowledge mobilisation for musculoskeletal physiotherapy

Sources of information and Evidence

The aim of this activity was to understand what information sources people use generally and also about specific health conditions and how to manage them. What was clear from this activity is that everyone uses a huge variety of sources. Here are some more detailed insights about the most popular types of evidence and information:

Research and Guidelines

It is widely agreed that Research and guidelines are important and should be used but research in particular is hard to access, understand and use. Therapists do not have ring fenced time in their job role to look for and digest research evidence.

Pro's	Con's
They are considered to be: • Gold standard • Best evidence • Reliable & Trusted	• There's lots of it which can be overwhelming • Hidden in databases or behind pay walls • Lack of skills to search and critique • Long and time consuming to read • No protected time to read • Guideline summaries are not explicit.

Social Media

People either love or hate social media, it is easy to access and the information is presented in an easy to digest way. However the legitimacy of the information can be questioned and it can confirm peoples own biases.

Pro's	Con's
• Quick and easy to access • Short, concise and in a range of formats e.g. digital • Able to filter by interest • 24/7 access • Offers 2 way debate	• Unregulated, biased and untrustworthy • Can confirm own biases and preferences • Addictive • Should be for leisure and not work • Bias towards younger generation • Can be influenced by big personalities, own self interest and opinions. • Echo chamber (tendency to stick with what's familiar) • Digital exclusion

Websites

Most people use websites to varying degrees, those with a specific focus such as condition specific are most liked and used. However many others are too general to be helpful.

Pro's	Con's
• Condition specific information • Quick and easy to access • Visual, clear and concise	• Large amount of options • Quality can be unclear • Information can be too general • Echo chamber • Digital exclusion

Peers

Peer to peer support, and its ability for two way discussion, is highly valued, particularly learning from more senior or experienced specialists.

Pro's	Con's
• Face to face • Immediate feedback • Practical and relevant • Trustworthy • Interactive	• Danger of personal preferences, opinions and biases • A hierarchical model/approach • Not available 24/7

Podcasts

People liked the flexibility of podcasts. You can listen to them any time, any place, anywhere. But they can be long and don't allow any right to reply.

Pro's	Con's
• Varied topics and presenters • Can listen to them anywhere you have access to a device • Relaxing but interesting • Spark food for thought	• Choice overload • Long/information overload • No two way discussion • Data allowance restrictions • Echo chamber • Digital exclusion

Exploring knowledge mobilisation for musculoskeletal physiotherapy

Appointment break down and pie charts

This activity provided data on the breakdown of the therapy appointment through time and activity. From this data we can see the difference between the current and ideal appointments from both the service user and the physiotherapist perspective. It also allows us to see what the differences in these perspectives are. **The next few pages will go into detail about how the wants and needs differ across the various activities. Key insights are shared at the top of the page with further detail in the table below.**

Actual appointment breakdown

Physio

Service User

Asking/Listening

Physical Examination

Diagnosis and plan

Treatment

Waiting

Notes, X-rays, Scans
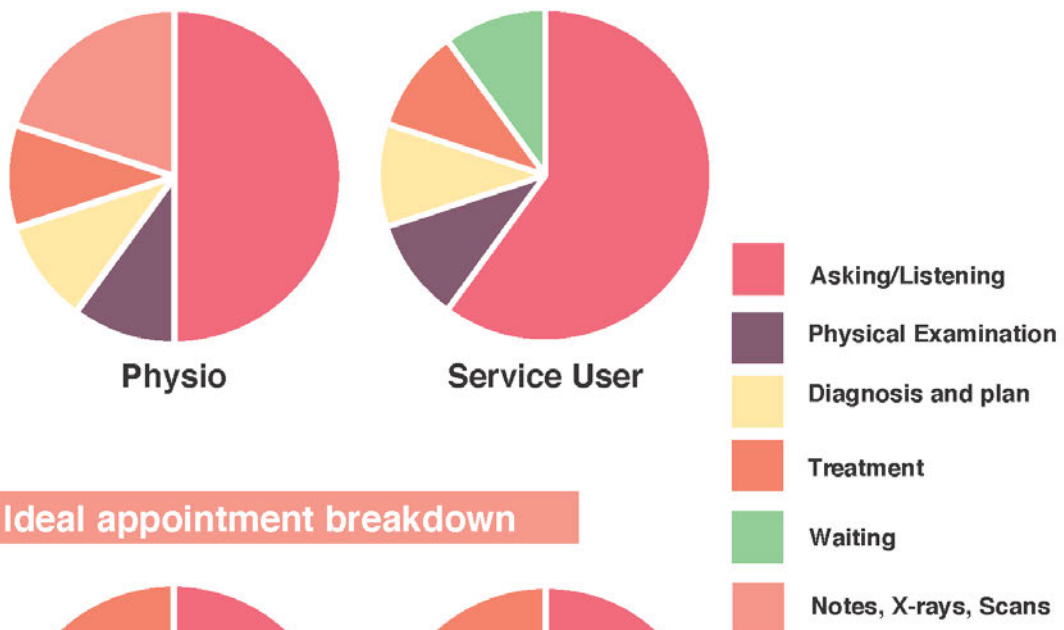
Ideal appointment breakdown

Physio
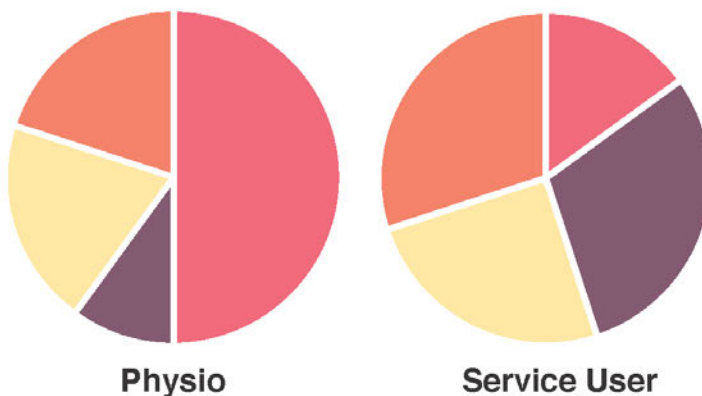
Service User

Asking/Listening

The crucial thing to notice about this activity across this data is that service users feel there is far too much time spent talking and would like this to become a much smaller part of the appointment. Interestingly, the physiotherapists feel that the amount of time spent asking questions and listening, is about right and should take around half the appointment.

Actual: Physio	Ideal: Physio	Actual: Service user	Ideal: Service user
Asking questions: Predominantly physio led. Based on their agenda/'tick list in their head'. But to ensure safe and appropriate decisions are made. **Current problem:** When and how the problem started. How it behaves. **Other health problems:** Including medication. **Screen:** Ask screening questions to rule out anything serious that may warrant further investigations and to make safe decisions. **Life factors:** How it impacts on life. E.g. Home, work, family, hobbies/ lifestyle	**Introduce:** Physio introduces self and what will happen in the session. **Listen:** To the service users 'story' (patient led). What their main problems are, how they are impacting on their life, their hopes fears and expectations. **Clarify:** Physio led. To clarify how the problem behaves. To identify possible causes and potential structures at fault. To check for any underlying health problems and current medication that may impact the problem and how it is treated. **Screen:** Ask screening questions to rule out anything serious that may warrant further investigation/ to make safe decisions.	**Too much talking and repetition** The physio spends too much time asking questions about the problem, general health and medication. They should have this information already.	**Introduce:** Physio introduces themselves and explains what it is going to happen. **Listen:** Physio listens to service user explain their current problem and how it is effecting them.

379

This timeline shows a summary of the evidence and information that both groups need and when, over the course of an appointment, they would like to have this evidence and information.

SERVICE USERS		
Require pre-appointment information. This should include: • How long they will be waiting for an appointment • What the format will be • How long it will be • Who it will be with • What will happen at the appointment • What to wear	Clear two-way communication that includes: • What is and isn't wrong • What can and can't help • What the treatment options are • Agree a treatment plan and goal	• Have a point of contact if they have questions or queries in between • Have access to high quality info/ advice/ exercises in preferred format. • Have quick progress checks between appointments to provide encouragement and motivation • A reminder system for exercises and next appointments
Before	**During**	**After**
• Quick and easy access to research/ guidelines/ protocols • All the medical information that they need • To understand patients expectations • Time to look through this all before patient arrives	• Ability to incorporate evidence into a conversation format that the patient will understand and engage with • Provide clear advice/ information and exercises in the preferred format	• Time to write notes and reflect • Quick and easy access to research guidelines and protocols • Quick and easy access to colleagues.
PHYSIOS		

380

Exploring knowledge mobilisation for musculoskeletal physiotherapy

The association between evidence and the therapeutic relationship

'it's not just the information it's the way that it's given'
(PwECo10)

Throughout this co-design process it has become evident that there is an association between knowledge mobilisation, that is the evidence and information use, and the therapeutic relationship. Whilst there is a need for evidence to be obtained, understood and shared, there are multiple factors that impact how this information is acted upon by the service user. It is clear that the therapeutic relationship is really important in this. In this final section we will go into some detail about what the various elements that make up this therapeutic relationship are and how they maximise the potential for evidence and information to be utilised in practice.

Appendix 8e Key insights and needs infographics

Exploring knowledge mobilisation for musculoskeletal physiotherapy

Key Insights from co-design workshops

The purpose of the final co-design workshop is to come together to generate ideas for potential solutions for the challenges and insights that we have uncovered in the earlier workshops. To remind you of all that we have learned and heard from each other over the last few months we have prepared the following short insight summary.

If you want more information about these key insights there is a longer in depth summary you can also have a copy of.

Evidence Insights

- Research and guidelines are hard to access, understand and use.
- It is hard to ring fence time to look at evidence.
- Timetabled 'In-service Training' frequency and utilisation varies.
- Departmental resources are not easy to find.
- People prefer specific condition focused resources.
- Peers are extremely valued and act as important 'forms' of evidence.
- New mediums such as podcasts and social media provide information in an accessible form.
- Individual preferences are affected by many things including personality and age.

Appointment Insights

- The 'before' the appointment starts much earlier for patients than staff (often from point of referral).
- Staff and patients have differing wants and expectations from an appointment. Patients value a 'hands on' approach to understand what is wrong and for treatment and staff want more time to ask questions.
- Most physio's use evidence from memory during an appointment
- Relationship building and rapport is key.

382

Exploring knowledge mobilisation for musculoskeletal physiotherapy

Needs identified through co-design workshops

Through the co-design workshops we also learned a lot about what is needed for better knowledge mobilisation in musculoskeletal physiotherapy. To support idea generation in the next workshop we have summarised these needs here. **If you want more information about these needs you can find out more in the longer in-depth summary.**

Evidence Needs

For evidence to be used in practice it needs to be:
- Clear, concise, visual and easy to find.
- From various sources to avoid echo chambers and bias.
- Credible (and easy to tell its credibility).
- Specific rather than generic.
- Available within work hours (for physio's).

Patient Needs

- 24/7 access to information.
- Good quality evidence informed information, e.g. individualised exercise sheets.
- Clear communication that removes uncertainty and provides information on what to expect and why questions are being asked.
- Information on what is wrong, what the plan is, what to do and time to practice.
- Suitable follow up through support, encouragement and reminders.

Staff Needs

- Support to share and contribute evidence at all levels/grades.
- Time between appointments to read notes, look at scans etc. before and to write up notes after.
- Time to gather and reflect on evidence.
- To understand a patients expectations of a session.
- To be able to 'switch off' after working hours.

Apendix 8f Example posters and postcards of findings

True or False: Research and guidelines are really easy for physiotherapists to access and use?

False. Although there is lots of research and guidelines to support physiotherapists in their MSK practice they're not always easy to find. Physios also don't always have time to read them all and sometimes they even have to pay for them.

Evidence and information use in MSK physiotherapy: Information sources

Interested in finding out more about this project? Contact Cheryl Grindell project lead cheryl.grindell@sheffield.ac.uk Tel: 07783767817

True or False: You can access lots of useful MSK evidence and information via social media and podcasts.

True. There is lots up to date and succinct MSK information/ evidence on social media platforms and podcasts if you know the right people/accounts to follow and have access to a phone or digital device.

Evidence and information use in MSK physiotherapy: Information sources

Interested in finding out more about this project? Contact Cheryl Grindell project lead cheryl.grindell@sheffield.ac.uk Tel: 07783767817

True or False: Patients and physios expect the same thing from the appointment?

False. Patients feel they are often asked questions about their MSK problem and their health that they expect the physio should already know. Often patients are expecting that more time will be spent examining and treating them with a more 'hands on' approach

Evidence and information use in MSK physiotherapy:
The appointment

Interested in finding out more about this project?
Contact Cheryl Grindell project lead
cheryl.grindell@sheffield.ac.uk Tel: 07783767817

True or False: Physios and patients consider their peers to be important sources of information and evidence.

True. Both physios and patients value expert professionals support and advice. Family and friends are important sources of information too for patients

Evidence and information use in MSK physiotherapy:
Information sources

Interested in finding out more about this project?
Contact Cheryl Grindell project lead
cheryl.grindell@sheffield.ac.uk Tel: 07783767817

Appendix 8g Workshop 3 schedule

Workshop 3 about gathering lots of ideas – quantity not quality

Time: 2 Hours

Aim:

- Share back key insights (Review if any extra)
- Summarise key areas for idea/change
- Generate ideas
- Prioritise ideas

What do we want to know?

What ideas do the group have for solutions or ways to overcome the issues/themes etc. established in the earlier workshops?

What do the group prioritise?

Time	Activity	Purpose of activity	Notes about activity, what is needed - before session
19.00-19.15	Welcome and presentation of findings and agree on key issues to address in this workshop	To recap on what we have learnt so far. Review key insights, agree on issue list to address.	Summary infographics (email prior to workshop) Issue list (in pack)
19.15-19.35	Warm up activity Circles Warm up – How many uses In break out rooms 3 groups – paper clip, straw, fork Then add how you would use in the garden, the bathroom, the beach, astronaut?	Warm up To reiterate quantity not quality Rough and ready nature of ideation How constraints can help not necessarily hinder	Blank circle sheet Paper clip, straw, fork in packs Instructions in booklet
19.35- 45	Activity 1- Explanation and do Initial ideas with prompt sheet (individual)	To draw out any ideas that people may have already from earlier workshops 5 mins and then check how getting on	Visual- sheet Service/ Product Leaflet/ Phone call Digital /Physical Sent in the post/ app based On site/ Virtual Gym based/ Hospital based
19.45 – 19.55	Share and group ideas	Round robin Share 2 ideas favorite or most interesting	Miro board/jam board

19.55-20.00	Break		
20.00-20-15	Idea generation individual (new or build on ideas from activity 1) using service prompts (lets pinch ideas)	7 mins per sheet	Service prompt sheets Ikea Scouts John Lewis Post office Uber Hello fresh food/recipe delivery service With good and bad points of each service on them
20.15-20.30	Service prompts – group Share everyones different ideas using different services and build on them	To share and build on ideas together	Break out rooms 2x 4 1x 3
2030 – 20.40	Share and group	Group idaes into themes	Miro board /jam board
20.40-45	Check issues have we missed anything?		
20.45-20.55	Pick top 3 idea themes		Share verbally or in the chat or do a poll?
20.50-21.00	Round up and next steps		

Salad

[*sa·luhd*] **noun**

A dish of raw vegetables, such as lettuce, tomatoes, cucumber etc., served as a separate course with cold meat, eggs, etc., or as part of a main course.

We hope your lettuce seeds are growing nicely and are nearly ready to eat. We are offering you a creative challenge to add your own twist to a classic salad recipe. Over the page is a classic Caesar salad recipe and we want you to make your own unique version of this. We have added some ideas for additional or alternative ingredients. Feel free to use these as inspiration for your salad or go off piste and make up your own! Don't forget to share your triumphs (or failures) with us. We look forward to seeing what you came up with.

Ingredients

- 1 medium ciabatta loaf (or 4 thick slices crusty white bread)
- 3 tbsp. Olive oil
- 1 large cos, romaine or little gem lettuce, leaves separated

For the dressing

- 1 garlic clove
- 2 anchovies from a tin
- medium block of parmesan or Grand Padano cheese for grating and shaving (you won't use it all)
- 5 tbsp. mayonnaise
- 1 tbsp. white wine vinegar

Method

1 Heat oven to 200C/fan 180C/gas 6. Tear 1 medium ciabatta into big, ragged croutons Place on a large baking sheet or tray and sprinkle over 2 tbsp. olive oil.

2 Rub the oil into the bread and season with a little salt (if you like). Bake for 8-10 mins, turning the croutons a few times during cooking so they brown evenly.

3 Bash, peel and crush 1 garlic clove. Mash 2 anchovies with a fork against the side of a small bowl.

4 Grate a handful of parmesan cheese and mix with the garlic, anchovies, 5 tbsp. mayonnaise and 1 tbsp. white wine vinegar. Season to taste. It should be the consistency of yoghurt – if yours is thicker, stir in a few tsps water to thin it.

389

5

Shave the cheese with a peeler. Tear your lettuce into large pieces and put in a large bowl. Scatter over the croutons, drizzle with the dressing and top with grated parmesan.

Additional Ingredients Ideas:

- Chicken
- Bacon
- Avocado
- Tuna
- Green Beans
- Asparagus
- Prawns
Or anything else of your choice!

6 Enjoy!

**Activity Instructions
Workshop Three**

Hold on!

If you are taking part in an online session then please do not look ahead, just keep this safe and bring it to the workshop.

If you are completing this on your own then go ahead. There are two warm ups and two activities to complete. Find yourself a comfy seat with some space to spread out and let's get started!

Warm up's: Circles & How many uses.

The purpose of this workshop is to work together to generate ideas for potential solutions for the challenges and insights that we have uncovered in the earlier workshops.

We know that coming up with new ideas might feel daunting, these warm ups are designed to get you comfortable and show you just how creative you are!

There are two warm ups to complete, you'll need the following resources to complete them.

Circles:

This booklet   Pen or Pencil   Clock or timer

How many uses:

Object from your pack   Pen or Pencil   Clock or timer

392
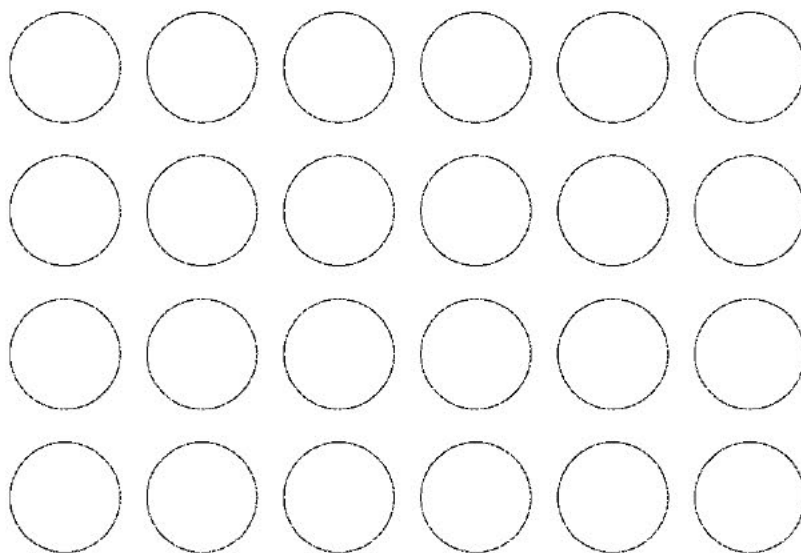
Circles:

This activity is designed to enhance your creative confidence. On the next page you will find lots of circles laid out. Your task is to set your timer for two minutes and then during that two minutes turn as many of the circles as possible into recognisable objects, transforming them through drawing. For example you might draw a flower or a sunshine.

Set your timer...

Get ready....

Now turn the page and go!

Circles: Reflection

How was that? Did you manage to fill the whole sheet? Did you do any patterns (i.e. lots of different faces or sports balls)? Did you combine any of the circles?

Whilst we hope you enjoyed this activity, it's not really the outcome that matters. What's important is that you gave it a go, that you put pen (or pencil) to paper and you turned some of the circles into things.

We did ask you to turn as many as possible in the time frame, sometimes it is important to focus on quantity over quality (did you spend ages perfecting your drawing on one circle?). This allows us to put many ideas down without self-editing our ideas. Self editing is something we often see in idea generation, where people have an idea but don't put it down perhaps because they think it is silly or maybe it feels too similar to something they've already drawn.

Tips for idea generation:
Try not to self edit your ideas, it doesn't matter what your drawing looks like, go for quantity over quality.

Turn over for your next warm up: How many uses?

Introduction

In your pack you will find an object (a paper clip, paper straw or a wooden fork). Take it out of your pack and have a good look and feel of it.

Now set your timer for 2 minutes. During these two minutes we want you to write down as many uses as you could possibly think of for your object (remember quantity over quality!).

Top tips: Think creatively, feel free to think up new ideas, allow yourself to think of silly ideas!

How many uses?

Record your ideas here:

Prompts:

Getting stuck? Reset your timer for 2 minutes and use the following prompts to help spark new ideas:

How would an astronaut use this?

How could it be used in a bathroom?

How would you use this in your garden?

Reflections

How did you find this activity? Did the prompts help you to come up with more ideas or did you find them a constraint?

How easy was it for you to think of creative, silly or even impossible ideas? We call these blue sky ideas, these are ideas that are considered despite of constraints. We encourage you to think of as many of these as possible. Try not to think about the constraints or why an idea wouldn't be possible. For idea generation we take on the mindsets of 'every idea is a good idea' and 'everything is possible'.

Later when we move to idea development we can think about what we might need to do in order to overcome potential constraints or understand the important elements of seemingly impossible ideas.

Activity One:
Idea Generation

It's time to start coming up with ideas! We've created a sheet to help you come up with and record ideas that you might have.

Remember that we are going for quantity over quality, and that all ideas are good ideas!

For this activity you will need the following resources from your pack.

Issues sheet | Idea generation sheet | Pen or Pencil

We anticipate this activity will take about 15 minutes but please take as long as you need.

Step One: Issues

Take a moment to read through the key issues and insights that have been uncovered in the earlier workshops.

If there are any that you think are missing, make a note of them on this page.

Step Two: Ideas

Using the activity sheet record any ideas that you have for how we might overcome the issues. You do not need to focus on a single issue on this sheet, just record all the ideas that you have across the issues.

You can write ideas anywhere on the sheet. There are prompts on the sheet to help you think of ideas, however you do not need to be constrained by these. If you run out of room (just use the back of the sheet).

Try and add a little bit of detail if possible. For example if you think a leaflet needs developing could you let us know what you think should be on that leaflet? Perhaps you could do a little drawing...!

Feeling stuck? Try using these missing sentences to help:
If only...
I think it should...
It needs to...
I want to be able to...
It would be useful if...
I wish...

I want...someone to check my technique between appointments.

A 'what to expect' leaflet

What if the solution was...

I wish...I could phone the evidence hotline.

physios based in universities not hospitals

a pre appointment telephone call. Like a triage

a leaflet
a product
face to face
digital
a service
phone based
gym-based
postal
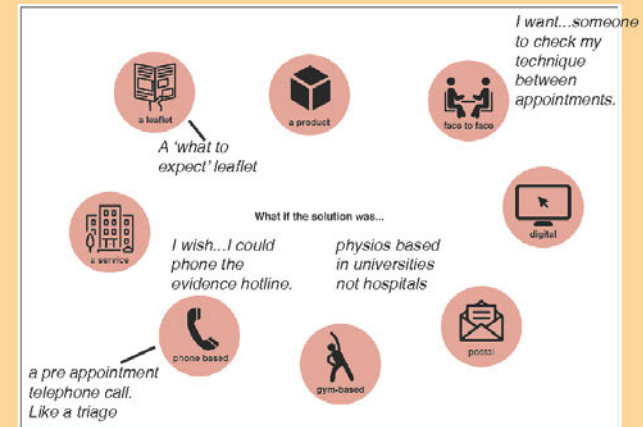
Step Two: Reflect

Look back over your ideas, circle your favourite or most interesting ideas.

Time for a cup of tea and a biscuit!

Activity Two:
Idea Generation

This is your second idea generation activity. For this activity we are going to use different services to help us generate and spark new ideas.

For this activity you will need the following resources from your pack.

Service
prompt sheets

Pen or Pencil

We anticipate this activity will take about 20 minutes but please take as long as you need.

Step One: Choose your service

In your pack there are a range of services. We would like you to select two services to work on for this activity. One of these should be one that you are familiar with or like and the other should be one you are less familiar with.

Step Two: Idea generation

Start with the service you are most familiar with. Look at the service features on the sheet. Use these features to spark ideas for solutions to the issues uncovered.

For example if you chose Hello Fresh you might think about the following:

How could discounts or rewards be used? Perhaps physio's could be rewarded with health spa vouchers for engaging in evidence?

Could 'treatments' be broken down into clear, colourful step by step cards with photographs for clarity?

A hello fresh box is delivered to your door- what environments support the best learning for physios and evidence?

Step Three: Repeat

Repeat the activity with the service you are less familiar with.

When you are finished, look back over both sheets and circle those which you feel are your best or favourite ideas.

Activity Two Sheet

Exercise sheets with clear instructions- can we have people on them? Could there be videos to follow?

Delivered to your door implies convenience, could physios get a daily or weekly newsletter with a brief round up of evidence?

Range of recipies- I wonder if a new search engine could be developed that makes it easy to filter evidence by type/age etc.

Hello Fresh: Recipe box delivery service

- Range of recipes change each week
- Choose and tailor meals to personal preference
- Pre-prepared and portioned ingredients
- Delivered to your door
- Clear step by step instructions
- Ability to pause delivery when not wanted
- Regular discounts and incentives

tailoring and personal preferences: pre-appointment questionnaire with preferences and abilities to send beforehand.

399

Appendix 8i Excerpts of more detailed ideas and related issues and needs

Exploring knowledge mobilisation for musculoskeletal physiotherapy

Ideas from the latest co-design workshops and activity books

1. Evidence on demand

Votes: 15

This theme relates to the need to find, make sense of and use evidence and information more easily to inform physiotherapy practice.

Issue	Needs
Making evidence accessible Making communication of evidence clear Adapting to changing and varied needs	Clear, concise, visual and easy to find
	From varied sources to avoid echo chambers
	Credible
	Condition specific
	Support to share and contribute evidence at all levels/grades
	Time to gather and reflect on evidence
	Available within work hours (physio) – so can switch off after work
	24 hour access to info (patients)

Ideas

A one stop evidence shop/repository (online), which provides unbiased, reliable clinically relevant summaries and infographics that are regularly and automatically updated.

An App or portable pocket book of reliable up to date evidence summaries.

A telephone evidence hotline/amazon echo/Alexa.

Evidence summary templates ie. Article critical appraisal templates with relevance to clinical practice focus.

A designated person to find, summarise and present clinically relevant evidence eg; an MSK librarian, an MSK knowledge broker ie: a physio who's job or part of their job is to do this ie; designated protected time..

Building on existing resources such as the Sheffield aches and pains website, the STH website, in house training sessions/supervision (frequency, format, who is led by), 'tweet of week', journal clubs, better shared drive storage.

'Evidence in a box' which could include a number of different resources from the ideas above.

2. Information in different formats

Votes:9

This theme relates to the need for patients to receive all the information they need during the appointment so they can understand their problem and how to manage it. Any information should be available in a format that is suitable for them.

Issue	Need
Making communication of evidence clear	Information on what is wrong , what the plan is, what to do and time to practice
	Good quality evidence informed information eg individualised exercises
Having confidence and capability to act Building relationships	Clear concise, visual
Adapting to changing and varied needs	Specific

Ideas

A reliable and respected online patient information repository eg. An STH MSK therapy website or accessed via MyPathway when booking appointments. This would include exercise videos.

A library/catalogue of clear, concise evidence based leaflets that are injury/condition specific and include lifestyle factors, available online and in waiting rooms and clinical areas.

Step by step 'recipe' cards with photos/video links, pre-prepared and portioned, individualised info /infographics – eg recipes for success for each individual patient – list of ingredients eg exercises, equipment needed, time/reps, ability to progress/regress, anticipated time scales.

An App to access exercises, diary/progress function, set reminders, have a chat function with your physio. That provides personalised information and exercises based on personal circumstances and preferences eg. Similar to 'thread.com'/'Stitchfix' online styling/clothes delivery services.

A virtual physiotherapy service that could include pre-recorded information and video's with a choice of options suitable for your personal circumstances as well as live chats, one to one or group sessions.

Touch screen information tablets in waiting areas/clinical rooms.

'Physio in a box' bespoke information delivered to your door, eg. An OA knee box with information leaflets, exercises, equipment such as theraband etc.

3. Pre appointment information

Votes:8

This themes relates to the information patients require prior to the physiotherapy appointment so they (and their physio) know what to expect.

1.Sheffield Teaching Hospitals MSK physiotherapy website with accompanying App

To include:
Info re: the different teams and locations
Info re facilities available at the different locations
Staff profiles
Physiotherapist resource area to include:
Local protocols and guidelines
Links to research and national guidelines -NICE, BESS, Cochrane, NIHR etc
Links to Sheffield aches and pains website and resources
Links to other useful websites/podcasts/twitter/Instagram/FB
All housed area specific eg UL, LL, spinal, Rheum, TMJ, Audiovestib
Patient resource area to include:
Condition specific leaflets
Exercise videos
Links to Sheffield aches and pains website and resources
Links to other useful websites/podcasts/twitter/Instagram/FB
Service/physio reviews

2.Evidence in a 'box'

To include:
Evidence road map/summary templates
Mentoring/supervision/IST templates
Assessment templates
Common condition templates/recipe cards- could be packs of cards with different exercises for different body areas/problems that the physio and patient choose from based on individual circumstances etc. eg. choose 2 or 3 to start with but can mix and match dependent on progress, motivation etc.
Shared decision making/action plan/summary templates
Posters/postcards for clinical rooms and waiting areas eg; true false format – smoking, weight, sleep ie; general health v MSK health facts and figures

3.Physio in a 'box'

To include:
Pre appointment information
Pre appointment questionnaire/workbook
Individualised recipe/advice/exercise cards – see recipe cards above
Action plan cards – see shared decision making/action plan/summary templates above
Progress diary with targets/goals/contingency plan
Postcards eg; true false format – smoking, alcohol, weight, sleep, exercise etc ie; more general health v MSK health facts and figures
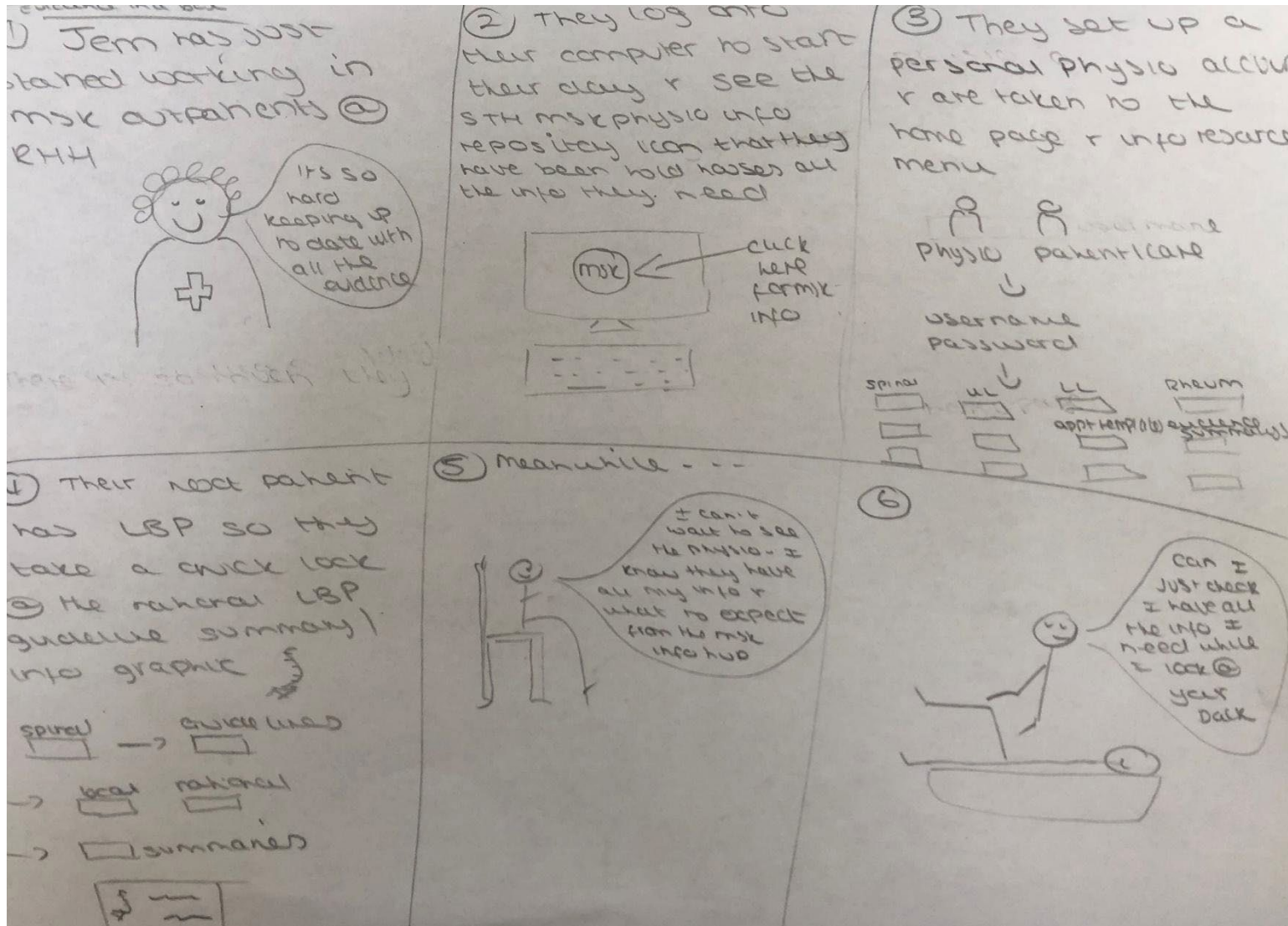
① This is Lesley.
They've been referred to
physio for their knees

② Here's the 5th
MSK physio info hub
as there might be a
6 week wait to see a
physio

③ Create a patient
or carer account r
login into the pt r
carer portal

physio   patient/carer
             |
          username . . . .
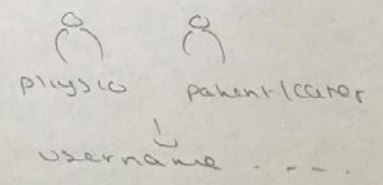
④ Pre appt info r
questionnaire

RHH   NGH   PWS
☐   ☐   ☐
to call on   maps
Finding us,
who we are
what we do
what to expect

Fill in this questionnaire!

⑤ Thanks for submitting
your pre appt
questionnaire
below is a link
to information
specific to you

info
library → knee
             pain

→ easy
    ...

⑥ 6 weeks later,
physio appt, recieved

the info
was
useful r I have
tried the OS
but my knee
still hurts
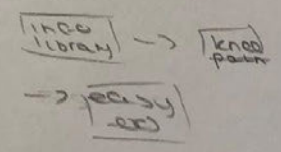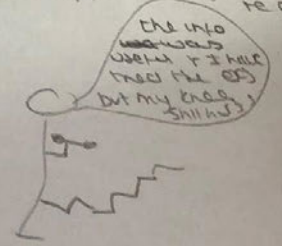
Appendix 9b Prototype Development meeting 1 schedule

Prototype development meeting 1

Time: 1 Hour

Aim:

- Present concept visualisations and gain feedback from group
- Present items to potentially prototype
- Agree on 2-3 items to fully develop – the rest rough drafts
- Ask for small group of volunteers to help with content development
- Agree on future feedback, correspondence, presentation of prototypes.

What do we want to know?

Are the group happy with the evidence and physio in a box concepts?

Which items would they like to develop?

Who would like to be involved in content development

Time	Activity	Purpose of activity	Notes about activity, what is needed - before session
19.00-19. 05	Welcome, plan for today	What's happened since last codesign workshop	Everyone has idea themes and initial concept docs
19.05- 10 19.10 - 19.25	Story boards 5 minutes looking individually then into 3 break out rooms	Go through story boards and get feedback from group Initial thoughts? Anything you would add? Anything you would amend?	Story board sheets
19.25- 35	Feedback from visuals	To get groups thoughts on concept what needs adding or changing	
19.35 – 19.45	Present items for inclusion in each box. Anything to add? Anything to remove?		PowerPoint of list of items for evidence and physio in a box
19.45-19.50	Choose items to develop fully	Explain short time frames. Present items I think we should work on. Get agreement from the group	PowerPoint a/a
19.50 -19.55	Volunteers to help develop content	Explain need small group of people to work with me to develop content Once have volunteers will email separately	
19.55- 20.00	Present project time line and expectations from group	Timeline from now to xmas. Key points for review of items and then full mock up prototype	PowerPoint with time line with prototype plan on

Thank you for continuing to be involved in my project

Enclosed are 3 documents:

The 2 visualisations 'evidence in a box' and physio in a box' represent a prototype concept of an MSK physio information hub that I hope you feel incorporates many of the most popular ideas generated in the last workshops.

Please do not focus on the fact that in the images it appears to be a digital platform (if digital is not your preference). We will not be developing a digital platform during prototyping but a physical version of the 2 'box' concepts.

Therefore please take a look at the 2 visualisations.

Draw or write your thoughts on them:

1. What are your initial thoughts?

2. Anything that you feel needs adding?

3. Anything you feel needs amending?

Finally, there is an A4 sheet with a list of items to be included in the information hub. Again let me know whether you think there is anything else that needs altering or adding to this list.

Either post your annotated sheets back to me in the envelope provided or if you prefer email me a list of your suggestions.

cheryl.grindell@sheffield.ac.uk/c.grindell@nhs.net

Items in the info hub

Evidence in a box- physio facing

Library resources – open Athens , evidence searching,

crit appraisal etc

Research and guidelines

Local protocols

Exercise library (leaflets and videos)

Public health/general health facts/messages

Recommended websites/SM/podcasts etc

Evidence summary template – clinical focus

Assessment template

Personal rehab plan and exercise log

Mentoring/supervision/IST evidence templates

Physio in a box – patient facing

Physio department info

Staff profiles

Pre appointment info and questionnaire

Research and guidelines

Local protocols

Exercise library (leaflets and videos)

Public health/general health facts/messages

Recommended websites/SM/podcasts etc

Personal rehab plan and exercise log

Service/physio feedback/reviews

Appendix 9d Patient Prototypes 'Physio in a Box' version 1

[ALL YOU NEED TO]
Know4Physio
Activity & Exercise

All I need to know before my appointment

What to expect

What is physiotherapy and why have I been referred?

You have been referred to physiotherapy by your doctor or other health care professional eg. a nurse from minor injuries because you are experiencing problems with your muscles, joints or bones.

For example you may have back, knee or shoulder pain or you may have sprained a ligament, muscle or tendon or broken a bone.

Physiotherapy helps restore movement and function when someone is affected by injury, illness or disability. We help facilitate your recovery to achieve your personal goals. We do this through a combination of movement, activity and exercise, and provide you with information and advice to help you understand your problem and how best to manage it.

Physiotherapy is based on you and your personal circumstances as well as the best available evidence

This means we don't focus on treatments such as massage and joint manipulation because the evidence shows these types of passive treatment techniques only give short term relief.

Instead we focus on helping you help yourself.

Please note: Most physiotherapists cannot request images such as X-rays, ultrasound scans and MRI's. This is done at a more specialist level.

What will happen during the appointment?

First of all your physiotherapist will go through your 'about you' questionnaire with you.

You should have received and completed this before you attend. They will listen to you and check they have all the information they need about you, your problem and how it is impacting on your day to day life. Sometimes this process may seem repetitive to you but it is important we have up to date information so we can fully understand your problem from your perspective and make safe decisions about your care.

Your physiotherapist will then examine you and look at how you move. They will provide support and reassurance and make sure you understand what is likely to be causing your symptoms. They will work with you to devise a plan of what to do which will include information, exercises or activities relevant to your needs. They may also sign post you to other resources that are relevant to you and your problem. This information can be posted or emailed to you. They will discuss the next steps with you and make you a review appointment if this is appropriate.

What if I can't attend my appointment?

Please let us know if you are unable to attend via the contact details on the back of this leaflet.
We can then arrange an alternative appointment for you. If you feel you no longer require treatment please let us know so we can offer your appointment to someone else.

ℹ️ **Helpful information while you wait for your appointment can be found at: www.▬▬▬▬▬▬.com**

How often will I need to come?

How often you need to attend physiotherapy varies and depends on each individual and their specific problem.

Physiotherapy is usually not a quick fix and relies on you carrying out the advice and activities you and your physiotherapist have agreed on based on your goals.

If a review appointment is appropriate for you this will usually occur approximately 2-6 weeks after your initial assessment.

On average people usually attend between 2-6 appointments but this could be more or less depending on your personal situation.

If one of our groups/classes are suitable for you these may run more frequently.

You may be offered an 'open' appointment. This means no follow up appointment is made but you have the option to make another appointment if you feel you need more support or are struggling to meet your goals. 'Open' appointments unfortunately do not last indefinitely. You will agree the length of time your appointment is 'open' for with your physiotherapist.

You may not be fully recovered by the time you are discharged from physiotherapy. We aim to equip you with all the information you need so you feel confident to continue to manage your problem in the future.

How long will it take for me to be seen

Our average waiting times are:

███████████████████

outpatient physiotherapy services (acute services) 2-4 weeks.

████████community outpatient physiotherapy service 6-12 weeks.

How long will the appointment last?

Your initial appointment will last between 30-45 minutes.

Subsequent appointments last between 20-30 minutes.

We always strive to see you on time. But please be aware that your physiotherapist may need to spend time checking your medical notes, reading relevant letters and reports about xrays, scans or other tests. They also have to write a record of each consultation. This sometimes means they may bring you into your appointment a little later than scheduled.

What should I wear?

Please wear comfortable clothing that you can move around in and that may easily roll up to expose your affected limb. You may want to bring a pair of shorts to change into if your problem is your back or lower limb eg your hip or knee, or wear a vest top if it is your neck or upper limb you're your shoulder or elbow.

About our services

Service profiles:

X number of staff

Main specialities:
Facilities: individual consultation rooms,

Tel: ████████████

Email: something@something

X number of staff

Main specialities:

Facilities: Individual consultation rooms, gym, hydrotherapy

Tel: ████████████

Email: something@something

X number of staff

Main specialities:

Facilities: Individual consultation rooms, gym, hydrotherapy pool

Tel: ████████████

Email: something@something

If you do not speak English or have a disability that affects your ability to communicate please let us know or ask a friend or relative to. They can also access all the information here.
www.sth.nhs.uk/patients/interpreters

MSK DIRECTORATE
All Together Better

410

[ALL YOU NEED TO]
Know4Physio
Activity & Exercise

About me

Name: .... **DOB:** /   /

Date: /   /   **Hospital No:** ....

① **In your own words, please tell us about your problem**

....
....

② **Do you have any specific worries or concerns?**

....
....

③ **What are the important things in your life that your problem is impacting on?**

....
....

④ **What are you expecting from physiotherapy?**

....

Find out more: www.know4physio/personal rehab plan

It is important that we are aware of any other significant health problems, illnesses or injuries that you have or have had in the past. Also your current medication.

The physiotherapists at the hospital do not have access to your GP record so do not always have this information.

The physiotherapists in community can access your GP record but sometimes this isn't possible.

If you can please provide this information below:

Other health issues (illnesses, injuries, operations) - current, in the past or under investigation

....
....
....
....
....

Current medication

....
....

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My personal rehabilitation plan

Name: _____ **DOB:** __ / __ / __

Date: __ / __ / __ **Hospital No:** _____

Diagnosis: _____

What is *likely* to be contributing to my symptoms:

1. ....
2. ....
3. ....
4. ....
5. ....
6.

What is *unlikely* to be contributing my symptoms:

1. ....
2. ....
3. ....
4.

What is the best way to manage my symptoms:

1. ....
2. ....
3. ....
4.

Find out more: www.know4physio/personal rehab plan

What are my treatment options?

1. ....
2. ....
3. ....
4.

What are my goals? Please circle

Feel stronger   More flexibility   Better sleep   Improve mobility   Housework   DIY

Return to sport   Improve mood   A social life   Driving   Gardening   Be generally active

What is the agreed treatment plan to meet my needs & goals?

1. ....
2. ....
3.

What if the plan doesn't work? (plan B)

1. ....
2. ....
3.

How long will it take to improve? _____

How often will I be reviewed? _____

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412

Easy mini squats
Moderate leg strengthening

🧍 What I will need?
Space to stand with support if I need it ie: kitchen worktop or sturdy table or cupboard.

☺ What are the benefits?
Ooles aut re dolum ipis ipis volo te mincto dit, aut aped is vellaborum que comni de intium aut odipien

ⓘ Things to be aware of:
Step by step instructions:
1. Niendi core venihil is vellaborum
2. Aped et reius aut dollesed quo estiat
3. Stiatur core venihi vellaborum que comni intium

My personal activity and motivation diary

Exercise/activity: Moderate leg strengthening - mini squats

My specific exercise goal:

My overall goal:

	MON	TUE	WED	THUR	FRI	SAT	SUN
Week 1							
How often							
How many/long							
How I feel during	☺ ☹	☺ ☹	☺ ☹	☺ ☹	☺ ☹	☺ ☹	☺ ☹
How I feel after	☺ ☹	☺ ☹	☺ ☹	☺ ☹	☺ ☹	☺ ☹	☺ ☹
Week 2							
How often							
How many/long							
How I feel during	☺ ☹	☺ ☹	☺ ☹	☺ ☹	☺ ☹	☺ ☹	☺ ☹
How I feel after	☺ ☹	☺ ☹	☺ ☹	☺ ☹	☺ ☹	☺ ☹	☺ ☹
Week 3							
How often							
How many/long							
How I feel during	☺ ☹	☺ ☹	☺ ☹	☺ ☹	☺ ☹	☺ ☹	☺ ☹
How I feel after	☺ ☹	☺ ☹	☺ ☹	☺ ☹	☺ ☹	☺ ☹	☺ ☹
Week 4							
How often							
How many/long							
How I feel during	☺ ☹	☺ ☹	☺ ☹	☺ ☹	☺ ☹	☺ ☹	☺ ☹
How I feel after	☺ ☹	☺ ☹	☺ ☹	☺ ☹	☺ ☹	☺ ☹	☺ ☹

Progress (What has changed?)	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8
Do I have more movement?	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N
Do I feel stronger?	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N
I can do x								
I can do y								
Have I achieved my activity/ exercise goal?	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N
Set new goal	Y N	Y N	Y N	Y N	Y N	Y N	Y N	Y N

How can you make this exercise easier?

How can you make this exercise more challenging?

Name:

Physio: Date: /   /

Go to this address to access a video of this exercise if you prefer:
www.know4physio/easyankleexercise

[ALL YOU NEED TO]
Know4Physio
Activity & Exercise

Personal activity and motivation diary

It will help you and your physiotherapist if you can keep your diary regularly updated and make notes of anything that concerns you.

It is important that you are honest with yourself and your physio about your activity and healing progress.

? Did you know?
Alcohol can affect muscle strength.
Find out more...

Go to this address for more information or to access a video of this exercise if you prefer:
www.know4physio/ minisquats

My next physiotherapy review appointment is:

Physio department contact details

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Appendix 9e Meeting 2 schedule

Prototype development meeting 21st and 24th Nov 2022

Time: 1 Hour (ish)

Aim:

To obtain group feedback on 1st versions of patient resource items. Feedback on content, lay out, practicalities of use.

What do we want to know?

Are the items what you expected?

What do you like about them?

Does anything need adding, removing, changing?

Could they work in practice?

How could they be improved?

Name of overall concept?

Time	Activity	Purpose of activity	Notes about activity, what is needed - before session
19.00-19.05	Welcome, plan for today	Check everyone has copies of prototypes and is clear on what need from session this evening	Send everyone prototypes email and post
19.05- 15	Individual look at prototypes Pre appt info Pre appt questions Personal rehab plan Exercise card and activity log	Give everyone a chance to look at each prototype and note any comments	Ask: Were they what you were expecting? What do you like? How could they be improved?
19.15- 25	Feedback from initial 1st look	Gain initial feedback on Pre appt info Pre appt questions Personal rehab plan Exercise card and activity log	
19.25 – 19.55	Break out rooms – (2 rooms 1 patient 2-3 physios) then role play	Feedback from pre appointment info then Patient to read out their answers to the pre appointment questions – 1 physio to respond and clarify with patient	Patient participants to complete pre appt info before session based on current/past problem or just make up?

		Then try out personal plan based on pre appt info – physio with patient. Then choose one exercise card and complete this with patient. Other physios to make notes of what goes well what doesn't go well	
19.55-20.05	Feedback from role play	To gain feedback re content, and practicalities of use	
20.05-20.10	Name		
20.10-20.15	Next steps Dates for showing whole prototype in depts		

Appendix 9f Prototype meeting 2 feedback forms and scenarios

<u>Feedback form</u>

Thank you for reviewing the **1st versions of the patient resources**. Please think about and answer the following questions about the prototype items you have been sent.

Please remember these are very much still drafts and nothing is final yet, so please be honest about what you like, don't like and anything you feel needs changing to improve them.

   a) **The 'All I need to know4physio' - Before my appointment info**

Is this item what you expected?

Yes/No

Why?

What do you like about this item?

Does anything need adding, removing, changing?

Could this item work in practice?

Yes/No

Why?

How could it be improved?

b) The 'All I need to know4physio'- About you questions

Is this item what you expected?

Yes/No

Why?

What do you like about this item?

Does anything need adding, removing, changing?

Could this item work in practice?

Yes/No

Why?

How could it be improved?

c) The 'All I need to know4physio' - My personal rehab plan

Is this item what you expected?

Yes/No

Why?

What do you like about this item?

Does anything need adding, removing, changing?

Could this item work in practice?

Yes/No

Why?

How could it be improved?

d) **The 'All I need to know4physio' – My exercise and activity card and diary**

Is this item what you expected?

Yes/No

Why?

What do you like about this item?

Does anything need adding, removing, changing?

Could this item work in practice?

Yes/No

Why?

How could it be improved?

And any comments about the folder:

Finally you may have noticed the name change. Potential names suggested so far for the overall concept and physio and patient packs are below:

Evidence in a box (for the digital evidence hub and physio facing resources)

Physio in a box (for the digital information hub and patient facing resources)

(All I need to) **Know4Physio** (for the digital hub and associated resources)

Please let me know if you have a preference for any of the names already suggested above

 OR please suggest alternatives. All names for the prototype will be considered so please don't be shy.

Write or draw your name suggestions/preferences for the MSK therapy evidence/info hub concept and resources below:

Thank you for taking the time to review the prototypes. Please return this completed form to me in the pre paid envelope

Hi I'm Jo

I twisted my knee playing netball 3 weeks ago. I had to stop playing and it swelled up that night but I could weight bear on it the next day so I didn't do anything about it as I thought it would just get better.

It hasn't so I rang my GP who told me to go to the MIU. They have xrayed it and advise physio
It's still swollen and I can't fully bend and straighten it. It hurts if I jar it mainly on the inside of my knee. I'm still walking with a limp.

I'm normally fit and well
I live with my partner and have a 2 year old.
I work part time in an office and am off work at present.
I normally drive to work and don't feel confident to yet.
I usually play netball once a week and go to the gym if I have time.

Here's my answers to the 'About me' questions

2. One of my friends damaged her cartiledge playing netball and now has arthritis and can't play anymore. I'm worried that's what I might have done.

3. It's impacting on my daughter as I can't tend to all her needs and run around after her. I also can't exercise which is important to me as it is the only time I get to have a break from my busy home and work life. I was also trying to lose weight so being so immobile isn't helping.

4. I'm hoping that the physios will be able to tell me exactly what I have done to my knee and that they will be able to do something like massage to it to help it get better quicker.

Hi I'm Andy

Here's my answers to the 'about you' questions

I've got low back pain. I've had it on and off for years but I've been doing a lot of lifting at work and now it's got worse again.

2. I'm worried that this is it and my back won't get better and I'm going to have this pain forever. I'm also worried about work because I can't afford to be off for much longer.

I rang my GP initially and he said to wait and see if it got better. It hasn't so my GP referred me to physio. It's been 3 months now and it's getting worse not better. Painkillers aren't helping.

3. I normally go out to the pub to have a few pints with my mates but I don't feel up to it because of my back. I'm struggling to even get my socks on.
I can't get out fishing either.

I struggle with my back, neck and knees. I think I've got arthritis.
I live by myself.
I'm a lorry driver and like to go fishing.

4. I've had physio before. They only saw me once and gave me exercises to do. I tried them but stopped because they made my back hurt. I'm hoping this time they'll do something different.

Appendix 9g Physio Prototypes 'Evidence in a Box' version 1

MyPhysio
Evidence appraisal template

Type of evidence eg. Research paper, guideline, podcast, webinar

....

Title and where to find:

....

Author/Presenter: ....

What is their role? ....

Key features of evidence:

Type of study: (if applicable) eg. systematic review, randomised controlled trial, qualitative, case study or other)

....

....

Population: (type, number, relevant to your clients)

....

Context/Setting:
If not a research paper or guideline what evidence is it based on?

....

....

Key messages:

1. ....
2. ....
3. ....

Clinical relevance

Is it reliable? | Yes | No |

Why?
....

Does it fit with your current thinking/decision making?

Eg. Does it fit with your current practice, does it make sense to you, does it fit with other knowledge you use to inform your decision making eg. experience, protocols, policies and procedures, colleagues, patient views, etc.

Do you have the skills to use it or do you need training?

Which type of patients is it suitable for?

Should/could you use it in your practice? | Yes | No |

Why?
....

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424

Mentor and Supervision template

Topic discussed/to be discussed:

....

....

Key discussion points:

....

....

Clinical plan:

....

Is the above based on:

1. Research study
....
<div align="right">with link to paper</div>

2. Clinical guideline
....
<div align="right">link to guideline</div>

3. Podcast or webinar
....
<div align="right">link to</div>

4. Experience/opinion – whose?
....
<div align="right">ie; own, supervisors, patient, other?</div>

Any ongoing training needs?

....

Recommended further reading/webinars/podcasts etc

....

....

425

Staff knowledge & Library Service

Introducing the new Knowledge and Library Service

The Knowledge and Library Service is a new service run in house at ▓▓ by a dedicated team of librarians.

We aim to support you in obtaining all the evidence that you need to inform your practice.

Open Athens

All NHS staff have access to Open Athens for free. Once you have activated your account you can access the NHS Knowledge and Library Hub, eBooks, journals, databases and the clinical reference tool BMJ Best Practice. Create your account by entering your details at *OpenAthens | Registration (nice.org.uk)* Any issues, please get in touch.
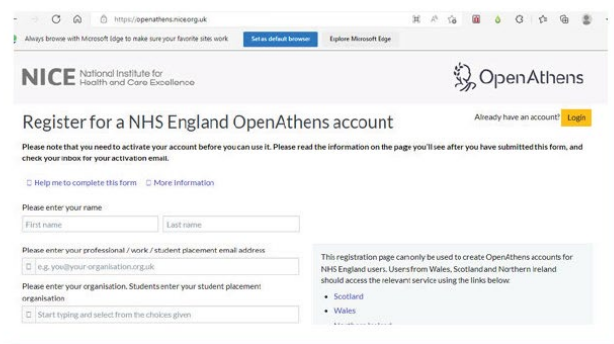
NHS Knowledge and Library Hub

Once you have created your Open Athens account, you can log into the Knowledge and Library Hub where you can access a wide range of resources and conduct your own literature searches.

Literature searching

To build an effective search, use the 'Advanced Search function'. Split the question into your search terms. For search term, use synonyms which may be used in the literature e.g. physica therapy OR physiotherapy OR rehabilitation.

If we have access to the paper you can click 'Get PDF' to view the full version but if we don't jus click 'Request this item' and the library service will send you the full text.
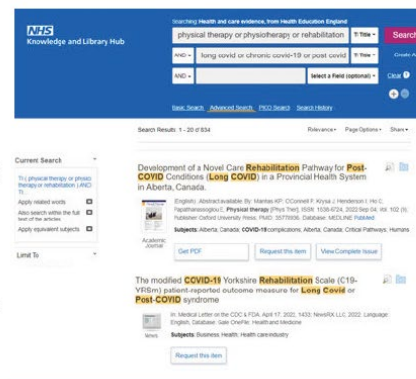

> **For more support with literature searching, you can book a one to one or group literature searching training session by getting in touch with the library team.**

Search for Books

You can see what books we have either on eBook or physically here - Sheffields Teaching Hospitals NHS Foundation Trust catalog (koha-ptfs.co.uk).

You can collect physical books from either of our library sites and remember if we haven't got the book you are after, you can email us details and we can order it.
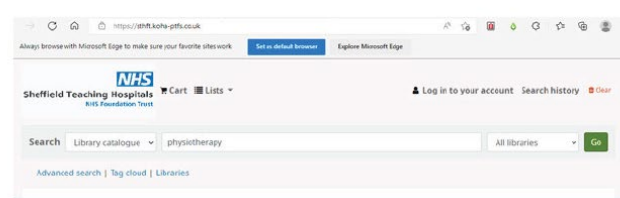
Physical library spaces:

iStation, Medical Education Centre, ▓▓▓▓▓▓▓▓ (open weekdays 8.30am–5.00pm)
Opening Learning Centre, D Floor, ▓▓▓▓▓▓▓▓ (Opening April 2023)

Contact Details:

Feel free to get in contact for more information about how we can support your work

Email: ▓▓.library@nhs.net or d.froste@nhs.net
Call: ext. 14659

MyPhysio

Evidence and information online resources

This booklet contains a list of resources available digitally

Local STH NHSFT Resources

	Contents	Access
▇ MSK therapy shared drives	Local protocols, IST's, area specific info	*Therapy Services: 'S' drive* *S:\T▇▇▇ \Teams* *MSK\Outpatients Division* *Specialties* ▇▇▇ *'L' drive* *L:\CS S▇▇* *Information*
▇▇▇ website (NHS and ▇ affiliated)	Area specifc HCP and patient information. Including pathways, information booklets etc. for back and neck, hip and knee, foot and ankle, shoulder and elbow, wrist and hand. Also extremely helpful social prescribing document with links to local physical activity support, mental health support, weight loss etc.	*www s▇▇▇▇ s.* *com* Use wellbeing tab to access social prescribing document
▇ therapy services website	A-Z of patient information leaflets (nb not exhaustive)	*www ▇ nhs.uk/patients/* *patient-information/* *find-a-leaflet/view-all-by-* *specialty?i=97*
▇ physiotherapy website	Physiotherapy video library (not just MSK) Also available for patients to download as an App.	*vide▇ h.nhs.uk/physiotherapy*

427

Condition specific websites

	Contents	Access
British elbow and shoulder society	Shoulder and elbow guideline summaries and clinical pathways. Plus exercise and information videos and leaflets.	www.bess.ac.uk
British orthopaedic foot and ankle surgeons	Foot and ankle orthoapedic conditions and procedures. Patient information and clinician portals (need to be a member to access most clinician content).	www.bofas.org.uk
British association of spine surgeons	Patient tab has useful booklets, NICE guidelines etc	spinesurgeons.ac.uk
VersusArthritis (previously arthritis research UK)	Patient and clinician facing website for all things arthritis related. Mixture of good and not so good resources so please take time to look through and check with local Rheumatology and area specific guidelines/practices and ESP's/ERP's before using.	www.versusarthritis.org
National Axial spondylarthritis association	Useful information booklets available to order and download	nass.co.uk
ShoulderDoc	Lennard Funk (shoulder surgeon) education website for all things shoulder. Again check in line with local protocols/practice	www.shoulderdoc.co.uk
Royal college of physicians	Useful fibromyalgia guidelines and resources	www.rcplondon.ac.uk
Pain related websites	Free online pain education resources suitable for clinicians and patients. Retrain pain resources available in a range of different languages	www.retrainpain.org www.tamethebeast. org/#tame-the-beast www.flippinpain.co.uk
Physiopedia	Online charity led organisation for rehabilitation knowledge. Lots of easily accessible MSK condition info. Please check clinical tests and management suggestions are in line with local clinical standards.	www.physio-pedia.com

National guidelines

	Contents	Access
NICE clinical knowledge summaries	Summaries of NICE guidance aimed at primary care clinicians. Diagnosis and first line management of many MSK conditions available. Always check with your clinical lead that these are in line with STH practice.	cks.nice.org.uk
NICE guidelines	Evidence based guidelines eg; Low back pain, osteoarthritis etc	www.nice.org.uk Sign up for alerts here www.nice.org.uk/news/nice-newsletters-and-alerts
Stanmore Royal National Orthopaedic hospital guidelines	RNOH guidelines. Please check these are in line with STH guidelines before using	www.moh.nhs.uk/services/rehabilitation-guidelines
British Orthopaedic Association	BOA standards for trauma, elective and specialities eg; management of distal radius fractures, ACL injuries etc Please check these are in line with STH guidelines before using	BOA Standards for Trauma and Orthopaedics (BOASTs)

428

Websites and resources for literature searching and evidence appraisal

	Contents	Access
NHS library services knowledge hub	Access to journals, books, databases and guidelines	*library.nhs.uk/knowledgehub*
Physiotherapy evidence database	Physiotherapy data base searches, sign up to free evidence alerts and tutorials.	*pedro.org.au* *Evidence in your inbox - PEDro*
National Institute for health Research	National funding body for health and social care research.	*evidence.nihr.ac.uk*
Cochrane UK	UK institute for healthcare systematic reviews	*www.evidentlycochrane.net*
NHS Scotland knowledge network	**Current Awareness Bulletins:** produced by NHS Scotland librarians covering a wide range of topics. **Alert Services Information:** such as journal table of contents and alerting services which help you to keep up to date with chosen publications and subjects.	*www.knowledge.scot.nhs.uk/musculoskeletal.aspx*
Critical appraisals skills programme	Critical appraisal checklists, training and resources	*casp-uk.net*
Evidence in to practice groups	Allied health professional critical appraisal topic network.	*www.keele.ac.uk/iau/evidenceintopracticegroups/usefullinksandresources/* *www.keele.ac.uk/iau/evidenceintopracticegroups/alliedhealthprofessionals/*
Open Access works	Free and legal way to access all research papers	*OA.Works: Powerfully simple open access tools*

Social media - Instagram

Just to get you started on Instagram. Please use our own judgement	trustmephysiotherapy Adammeakins clinicalphysio the.hip.physio mickhughes.physio- ACL rehabscience – Tom Walters	The_endurance _physio Dr samspinelli – S&C Pheasyque – S&C Physiomeetsscience BJSM

Podcasts

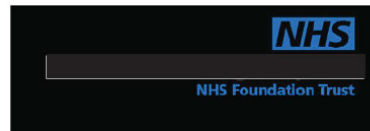|	Contents	Access
Physio matters TPMpodcast	Varied speakers on varied MSK topics	*physio-matters.com*
Clinical Edge	Varied speakers on varied MSK topics	*Clinical Edge - Podcasts*
Body Logic Physiotherapy	Empowered beyond pain podcast series. Varied clinician, researchers and patient speakers.	*The Empowered Beyond Pain Podcast - Body Logic*
BJSM	Sport AND Exercise medicine research podcasts	*Stream BMJ talk medicine | Listen to BJSM playlist online for free on SoundCloud*
Words matter. Improving clinical communication	Clinical communication podcasts	*www.wordsmatter-education.com/blog*

Social media - Twitter

People		Organisations
Just to get you started – a list of physio related people and physio and evidence related organisations to follow. Please use your own judgement.	@LaurafinucaneB @ShoulderGeek1 @PeteosullivanPT @AdamMeakins @GregLehman @DrPeteMalliaras @ProfFJillCook @JeremyLewisPT @RogerKerry1	@Claire_Minshull @AnjuJaggi @alisongrimaldi @LPhysioprof @c_hebron @McCreesh_Karen @MarcusbatemanPT @MattLowePT

Organisations
@Flippin pain *@Escape_pain* *@VersusArthritis* *@DerbyShoulder* *@BJSM* *@CochraneLibrary* *@NIHRevidence* *@NICEComms* *@PhysioMeScience* *@AHP2mintalks* *@TPMPodacst* *@PEDro_database* *@official CAHPR*

Social media - Facebook

Clinical Edge	MSK clinical content, courses and Free weekly shoulder webinars	*Varied clinicians* *Jo Gibson (free shoulder webinars)*
Physio matters	MSK clinical content, podcasts, webinars	*Varied clinicians*

Other physio evidence & information

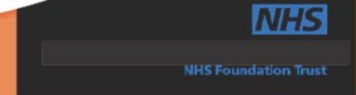|	Contents	Access
Physio Network	Subscription required for research reviews, video courses, mentorship. Some free resources include podcasts, research reviews, infographics, blog	*www.physio-network.com*
Physio Matters including Therapy Live	Subscription required for CPD library, clinical mentoring but some free resources include podcasts and Therapy Live webinar/conference.	*physio-matters.com*
Physio Tutors	Subscription required but some free to sign up to research in your inbox – research reviews, podcasts, blogs, webinars (pay), clinical presentations/patterns, practice exams, free videos, course (pay)	*www.physiotutors.com*
Clinical Edge	Subscription required. Some free content. Blog, podcasts, courses, member training and resources	*www.clinicaledge.co*
The Better Clinician Project	Subscription required for weekly clinical reviews, research reviews, rehab reviews	*www.physiotutors.com*
Words matter	Podcasts (free) courses and mentorship for communication skills	*www.wordsmatter-education. com*
The National Elf Service	Subscription required. Keep up to date with health and social care research, network and training.	*The Musculoskeletal Elf - National Elf Service*

Physio in a Box
MyPhysio patient information hub/resource

1
This is Mo.
Mo has been referred to physiotherapy.
They receive a text/letter which directs them to the Know4Physio info hub (Or access via 'MyPathway')

2
Mo creatyes a patient user account on the Know4Physio hub using the simple step by step process and are directed to the pre-appointment information page.

3
Information about the different STH physiotherapy departments, staff profiles and what to expect when coming for an appointment are all available here.

4
There are some pre-appointment questions for Mo to answer prior to coming to their appointment. Mo can submit the answers via the hub or give them to their physio when they attend.

5
The info was useful and I've tried the exercises but my knees still hurt

Mo receives the date for their first appointment and confirms they can attend via the hub.

6
In the waiting room...

They're running a little late. They must be reading my pre-appointment info and looking at my X-rays

7
Can I just check I have all the information I need before I take a look at your knee?

The physio calls Mo in.
They go through Mo's completed pre-appointment information together.
The physio then focuses their assessment on Mo's priorities and expectations.

8
Lets go through what is wrong and develop a rehab plan together

After the examination the physio explains to Mo what is wrong and what is the best way to manage it.
They discuss Mo's priorities and goals. Everything is documented on the personal plan and given to Mo.

9
The physio and Mo then choose the appropriate advice and exercise or activity cards tailored to Mo's needs from the exercise library.
They practice the exercises together.

10
What should I do if I get worse?

Try X exercise if they get worse.
Try Y exercise if they feel too easy

The physio suggests alternative exercises or activities for Mo to do should things change between appointments.
These are added to the plan.

11
Mo is shown the exercise diary that they can complete to help keep track and stay motivated between appointments.
Mo can contact their physio or notify them via the hub if they have any problems.

12
Mo leaves feeling confident to act on the advice and their personal plan.
Mo knows they can complete an 'AskMy Physio' query card should they have any questions or concerns and share with their physio via the hub or at their next appointment.

All I need to know before my appointment

What is physiotherapy?

Physiotherapy helps restore movement and function when someone is affected by injury, illness or disability. We help aid your recovery to achieve your personal goals.

We do this through a mix of movement, activity and exercise, and provide you with information and advice to help you understand your problem and how best to manage it.

Why have I been referred?

You have been referred to physiotherapy by your doctor or other health professional eg. a nurse from minor injuries because you are experiencing problems with your joints or soft tissue.

For example you may have back, knee or shoulder pain or you may have sprained a ligament, muscle or tendon.

Physiotherapy is based on you and your personal circumstances as well as the best available evidence

This means we may not to focus on treatments such as massage and manipulation because research shows they only give short term relief.

Instead we focus on helping you help yourself.

But don't worry your physiotherapist will explain what treatment options are best for you.

What will happen during my 1st appointment?

Your physiotherapist will go through the 'About me' questionnaire with you, that you should have received and completed before your appointment.

They will listen to you and check they have all the information they need.

This process may seem repetitive to you, but it is important your physiotherapist has up to date information so they can make safe decisions about your care.

Your physiotherapist may then examine you and look at how you move.

They will provide you with support and reassurance and ensure you understand what might be causing your symptoms.

You and your physiotherapist will then develop a personal treatment plan together.

This will include advice, information and exercises or activities relevant to your needs.

They may direct you to other resources relevant to you and your general health needs.

A review appointment will be made for you if appropriate.

How often will I need to come?

This varies and depends on each person and their specific problem.

- Physiotherapy is usually not a quick fix.
- It relies on you carrying out the advice and activities that you and your physiotherapist have agreed on.
- If a review appointment is needed, this will take place around 2-8 weeks after your first assessment.
- You may attend between 2-6 appointments but this may vary depending on your personal situation.
- We offer some group classes but these aren't suitable for everyone. Your physiotherapist will advise which of our treatment settings is most appropriate for you.

Will I have physiotherapy until I am fully recovered?

- Often people are not 100% recovered by the time they are discharged from physiotherapy.
- We aim to equip you with all the information you need to feel confident to continue to manage your problem in the future.

Please note:
Most physiotherapists cannot request images such as X-rays, ultrasound scans and MRI's. This is done at a more specialist level.

How long will it take for me to be seen

Our average waiting times are:

The Northern General Hospital and Royal Hallamshire Hospital acute MSK therapy services 2-4 weeks.

Physioworks community MSK therapy services 6-12 weeks.

How long will the appointment last?

Your initial appointment will last between 30-45 minutes.

Subsequent appointments last between 20-30 minutes.

We always strive to see you on time.

Please be aware your physiotherapist will need to spend time checking your medical notes, relevant reports, xrays, scans or other tests before they see you.

They also have to write a record of each consultation, so sometimes they may run a little late.

What should I wear?

Please wear comfortable clothing that you can move around in and can be easily rolled up if required.

If you are seeing us for your back, hip or knee you may want to bring some shorts to change into.

If you are seeing us for your neck, shoulder or elbow you may want to wear a vest top.

About our services

Therapy Services Outpatients

██████ ██████ ██████

Location: ███ ████ ███ ████ ████ Hospital. ██ ██

Number of staff: 32 (includes physiotherapists, extended role physiotherapists (ESP's) and therapy assistants)

What we treat: Any bone, joint, muscle or soft tissue problem. Including post orthopaedic surgery, fractures and lower limb reconstruction.

Who do we accept referrals from: Orthopaedic consultants, A&E and minor injuries unit.

Facilities: Individual consultation rooms, dedicated gymnasium with a comprehensive range of exercise equipment and hydrotherapy pool for individual patients and group activities. NB: not all facilities will be available to everyone.

Contact details:
Tel: ███ ██████ / ██████
Email: ██████ @nhs.net

What if I can't attend my appointment?

Please give us as much notice as possible if you are unable to attend or no longer require treatment via the contact details ..

We can then arrange an alternative appointment for you if required and offer your cancelled appointment to someone else.

Helpful information while you wait for your appointment can be found at: www██████████**.com**

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MyPhysio

About me

Name: _____ **DOB:** ___ / ___ / ___

Date: ___ / ___ / ___

① Please describe your problem in your own words

....

....

....

② The important things in my life that my problem is impacting on are...

....

....

....

③ My worries and concerns about my problem are

....

....

....

④ I am hoping that physiotherapy will...

....

....

....

It is important your physiotherapist is aware of any other significant health problems, illnesses or injuries you may have or had in the past.

Your physiotherapist may not have access to your GP record so please provide this information below:

Other health issues (illnesses, injuries, operations – current, in the past or under investigation)

....

....

....

Current medication

....

....

....

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437

MyPhysio

My personal rehabilitation plan

Name:
....

DOB: / / **Date:** / /
....

Diagnosis:
....

Key things to understand about my problem:

What are my treatment options?

....

....

i Supporting advice and information can be found here: **www.myphysio/ rehabinfohub**

What are my goals? Please circle

Feel stronger	More flexibility	Better sleep	Improve mobility	Housework	DIY	Crafting
Return to sport	Improve mood	A social life	Driving	Gardening	Be generally active	Dancing
Dressing yourself	Personal hygiene	Cooking	Shopping	Work	Care for family	Playing an instrument

My specific goals:
Short term (next 4-12 weeks)

....

....

....

Longer term:

....

....

....

What is the agreed treatment plan to meet my needs & goals?

1. ....

2. ....

3.

What are the alternatives should my needs change? (plan B)

1. ....

2. ....

3.

How long is it likely to take to improve? ....

439

My physiotherapist is called:

They can be contacted on:

....

Or complete the 'Ask my physio' card and
bring it to your next appointment.
www.knowledge hub/physio-query-card)

My next physiotherapy review appointment is:

....

....

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MyPhysio
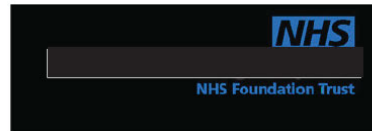
Easy ankle exercise

Non weight bearing ankle movement

Purpose
This exercise is good for loosening up your ankles and maintaining the circulation in your lower legs and feet.

What I will need?
Space to sit down on the floor, or on a bed, or on a sofa or foot up on a stool.

Things to be aware of

....

....

....

....

Step by step instructions

Sit with your legs stretched out in front of you. Move your foot up and down, that is point and flex your foot.

How many?

How often?

### How can I make this exercise easier?
Assist pulling your foot up towards you with a towel.

How can you make this exercise more challenging?
Resist pointing your foot downwards using a resistance band or towel.

Access a video of this exercise here:
www.myphysio/easyankleexercise
or ask your physio to video you doing the exercise on your own phone.

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441

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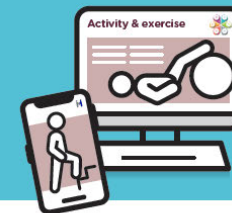
My personal activity and exercise diary
Daily progress

Name:

Date: / /

Write in each box what exercise or activity you do and for how long each day.

Be guided by your personal rehab plan, goals and symptoms.

Remember it's okay to have rest days if you need them
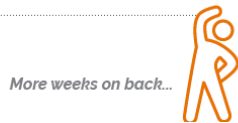
WEEK 1: This week's goals are:

	MON	TUE	WED	THUR	FRI	SAT	SUN
Activity/ exercise							
How I did	☺☐☹	☺☐☹	☺☐☹	☺☐☹	☺☐☹	☺☐☹	☺☐☹

What went well this week?

What was difficult this week?

What can I do differently next week?

More weeks on back...

WEEK 2: This week's goals are:

	MON	TUE	WED	THUR	FRI	SAT	SUN
Activity/ exercise							
How I did	☺☐☹	☺☐☹	☺☐☹	☺☐☹	☺☐☹	☺☐☹	☺☐☹

What went well this week?

What was difficult this week?

What can I do differently next week?

WEEK 3: This week's goals are:

	MON	TUE	WED	THUR	FRI	SAT	SUN
Activity/ exercise							
How I did	☺☐☹	☺☐☹	☺☐☹	☺☐☹	☺☐☹	☺☐☹	☺☐☹

What went well this week?

What was difficult this week?

What can I do differently next week?

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MyPhysio

My personal activity and exercise diary
Weekly progress

Name: ....

Date: /   / ....

This month's goals are:

....

....

....

	Week 1	Week 2	Week 3	Week 4	Week 5
What I achieved this week					
What progress did I make towards my goals					
How am I feeling	☺ ☺ ☹	☺ ☺ ☹	☺ ☺ ☹	☺ ☺ ☹	☺ ☺ ☹

What went well this month? ....

What was difficult this month? ....

What can I do differently next month? ....

More weeks on back...

This month's goals are:

....

....

....

	Week 1	Week 2	Week 3	Week 4	Week 5
What I achieved this week					
What progress did I make towards my goals					
How am I feeling	☺ ☺ ☹	☺ ☺ ☹	☺ ☺ ☹	☺ ☺ ☹	☺ ☺ ☹

What went well this month? ....

What was difficult this month? ....

What can I do differently next month? ....

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443

Prototype development feedback questionnaire

Research Project Title: Exploring the role of creative co-design to improve knowledge and evidence use in musculoskeletal physiotherapy.

Thank you for taking the time to have a look at these prototypes. They have been developed with physiotherapists and patients as part of a PhD project which has explored evidence and information use in the musculoskeletal outpatient physiotherapy setting. The project has involved interviews and co-design workshops with physiotherapists and people who have received physiotherapy for a musculoskeletal problem within the Sheffield Teaching Hospitals therapy services. The prototypes you see today are the final results of this work.

We would be extremely grateful if you could take the time to leave your feedback about the prototypes.

By completing this questionnaire it is assumed that you understand the above information and agree for your answers to be used in my research.

Section 1

To be completed before you take a look at the prototypes by those people who have already been involved in the project so far, that is either an interview or the co-design workshops.

1) **What are you expecting the prototypes to be?**

2) **What are you expecting the prototypes to look like?**

3) **What are you expecting the prototypes to achieve?**

3a) How are you expecting the prototypes to achieve this?

Section 2:

The All I need to Know4Physio patient resource

How would you rate the items you have seen today?

The overall look

Comments:

Ease of use (of the box/folder)

Comments:

The content:

The All I need to know4physio before my appointment info

Does it contain all the information I need?

Comments:

a) **The all I need to know4physio 'about you questions'**

Comments:

b) **The All I need to know4physio 'my rehab plan'**

Comments:

c) **The All I need to know4physio 'exercise and activity card and diary'**

Comments:

d) **The 'all I need to know4physio 'useful links'**

Comments:

Quality and usefulness of the overall 'All I need to know4physio' <u>patient resource</u>

😊 🙂 😐 🙁 ☹️

Any other suggestions/comments:

<u>Section 3</u>:

<u>The All I need to Know4Physio staff resource</u>

Please note that the staff prototype is a first draft only of what the resource could look like. Please keep this in mind when completing this section. Thank you.

How would you rate the items you have seen today in the 'All I need to Know4Physio' <u>staff resource</u>?

The look

😊 🙂 😐 🙁 ☹️

Comments:

Ease of use (the box/folder)

Comments:

The content:

a) The 'All I need to know4physio' - example library info

Comments:

b) The 'All I need to know4physio' - example evidence summary template

Comments:

c) The 'All I need to know4physio' – example mentor/supervision template

Comments:

d) The 'All I need to know4physio' – example In service training summary sheet

Comments:

e) The 'All I need to know4physio' – example useful links

Comments:

f) The 'All I need to Know4Physio' – example information and exercise library

Comments:

Overall potential for use of the All I need to know4physio <u>staff resource</u>

Any other suggestions/comments:

If you have any questions about this research project please contact the project lead:

Cheryl Grindell

Tel: 07783767817

Email: Cheryl.grindell@sheffield.ac.uk/c.grindell@nhs.net