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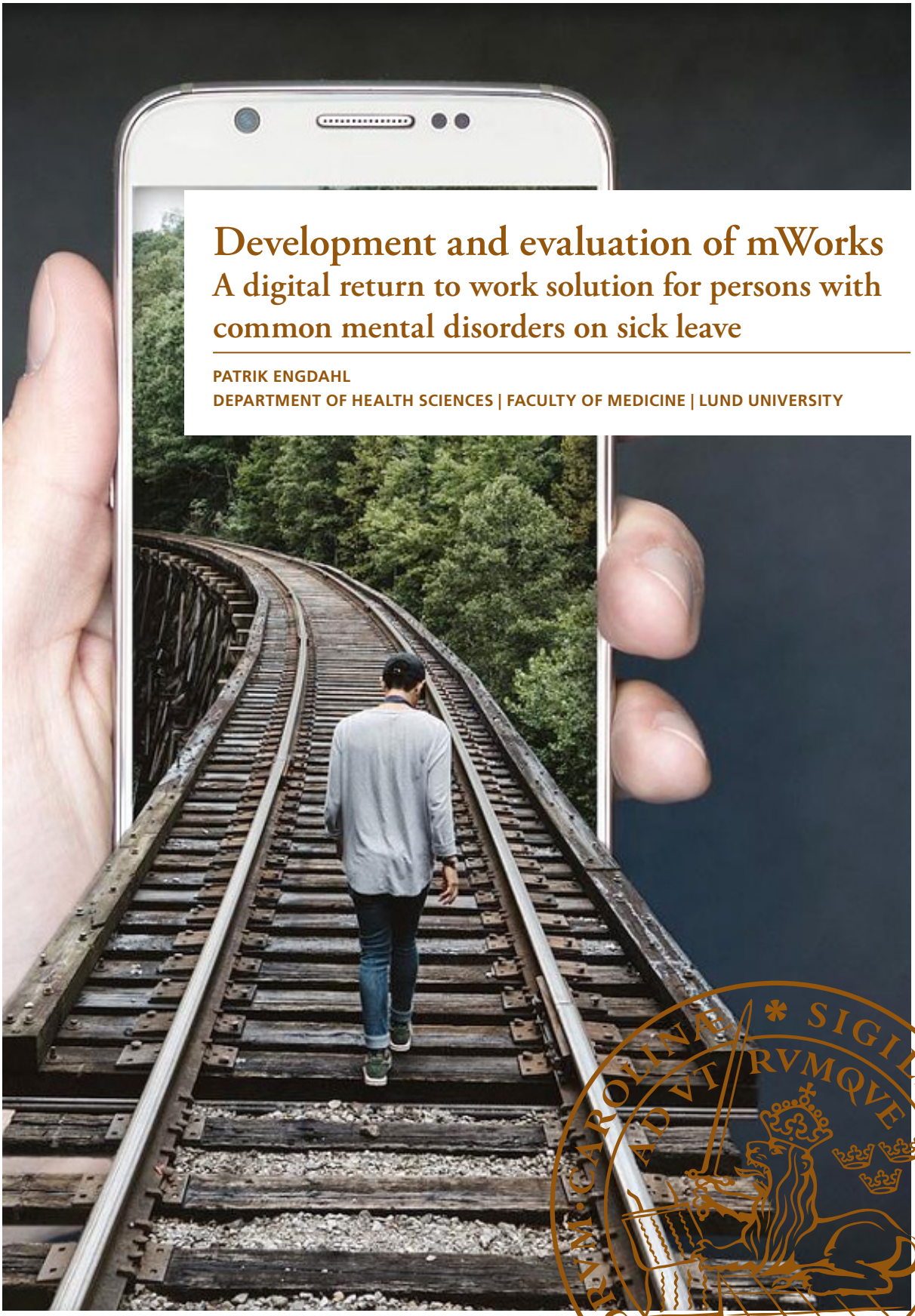

Development and evaluation of mWorks

A digital return to work solution for persons with common mental disorders on sick leave

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LUND
UNIVERSITY

DOCTORAL DISSERTATION

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Abstract

Introduction: Common mental disorders are currently the leading causes of disability worldwide and in Sweden. These illnesses are associated with tremendous personal suffering in terms of negative impact on well-being, diminished financial security, and risk of social isolation. Digital solutions are presumed to remedy the evident discrepancy between the need and provision of effective return to work (RTW) interventions in existing mental health services. A lack of knowledge in developing and evaluating digital solutions impedes the success of future interventions.

Aims: This thesis aims to develop knowledge about the relevance, development, and evaluation of mWorks, a digital RTW solution for persons with common mental disorders on sick leave. *Studies I and II* provide formative research to develop the knowledge base and theory regarding stakeholder needs, preferences, and service user acceptability of a digital RTW solution. *Study III* includes an iterative and co-design development process of mWorks with stakeholders. *Study IV* evaluates the process of implementing the delivery of mWorks over ten weeks in a mental health service context.

Methods: *Study I* was a qualitative content analysis with three stakeholder groups (n=46) recruited with a purposeful snowball sampling method. *Study II* was a qualitative thematic analysis. Service users (n=12) recruited via purposeful snowball sampling. *Study III* utilized a co-design approach to develop mWorks with stakeholders (n=86). Both purposeful and convenience sampling methods was used. *Study IV* was a process evaluation bounded by a single case, using both qualitative and quantitative methods. RTW professionals (n=2) at two separate primary care units were recruited by purposefully sampling, who then recruited service users (n=6).

Results: *In study I*, the central theme revealed that a digital RTW solution has the potential to enable service users to take control over their RTW process. *Study II* revealed that for digital RTW solutions to be acceptable, they must be designed to supplement traditional services by providing accessible and person-centered support throughout the RTW process. *Study III* showed the importance of empowering service users with their own personal digital support solution that engages them back to work. *Study IV* demonstrated positive impacts on service users and RTW professionals who benefitted from mWorks by generating more active service users during the RTW process.

Conclusion: The main contribution of this thesis demonstrates the value of leveraging the ingenuity of stakeholders to co-produce digital solutions. In so doing, mWorks evolved into an acceptable and usable web-based self-management tool with a focal point on empowering service users during their RTW process. mWorks provides alternative support pathways that can help remedy the service gap and supplement traditional RTW services by delivering person-centered and strength-based RTW interventions for persons with common mental disorders on sick leave. The evaluation of mWorks indicates several impacts that mWorks may have on users' RTW process that seemed to have altered their empowerment, engagement, self-efficacy, mental health, and quality of life in a positive trajectory.

Key words: mental health, return-to-work, digital solutions, co-production, mental health services.

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"He who has a why to live for,
can bear with almost any how".

Viktor E. Frankl

Table of Contents

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As this doctoral thesis comes to a close, I so happened to stumble onto a column in a scientific journal. In short, a doctoral student explained the importance of carefully choosing considerate, kind, and thoughtful supervisors. Reading through the column I felt a powerful resonating feeling. For it is precisely these combinations of traits I've come to cherish greatly in my supervisors. It is my strongest conviction that the ability to deliver brilliant, but thoughtful supervision and support enabled me to flourish and become the person I am today. My sincerest thanks to my main supervisor, Ulrika Bejerholm, and co-supervisor, Petra Svedberg, for taking me under your wings, sharing your knowledge, provide unwavering support, and encouragement during this journey.

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Abbreviations

CMD	Common mental disorders
GAD	Generalized anxiety disorder
ICD-10	International Classification of Diseases 10th Edition
ICT	Information and communication technology
IES	Individual Enabling and Support
MHS	Mental health service
MRC	Medical Research Council
OCD	Obsessive compulsive disorder
PES	Public employment service
PTSD	Post traumatic stress disorder
RC	Rehabilitation coordinator
RCT	Randomized controlled trial
RTW	Return to work
SE	Supported employment
SIA	Social Insurance Agency
SMD	Severe mental disorders
WHO	World Health Organization
OECD	Organization for Economic Co-operation and Development

List of publications

Study I: Engdahl, P., Svedberg, P., Lexén, A., & Bejerholm, U. (2020). Role of a Digital Return-To-Work Solution for Individuals With Common Mental Disorders: Qualitative Study of the Perspectives of Three Stakeholder Groups. JMIR Formative Research, 4(9), e15625.

Study II: Engdahl, P., Svedberg, P., & Bejerholm, U. (2021). Acceptability of a digital return-to-work intervention for common mental disorders: a qualitative study on service user perspectives. BMC Psychiatry 21(1), 1-12.

Study III: Engdahl, P., Svedberg, P., Stridh, C., Lexén, A., Tjörnstrand, C., & Bejerholm, U. (submitted). Co-design process of a digital return-to-work solution for people with common mental disorders: a qualitative study.

Study IV: Engdahl, P., Svedberg, P., & Bejerholm, U. (in manuscript). A web-based self-management intervention for return-to-work among persons with common mental disorder on sick leave: A process evaluation study

Definitions used in this thesis

Co-design	Co-design in a healthcare context can be defined as the partnership of individuals who work within the system (healthcare staff), individuals who have lived experience of using the system (patients and their families and carers) and the 'designers' of the new system (whether that be IT personnel for electronic platforms to improve efficiency, or researchers who assist with designing interventions to improve health systems). Co-design involves working together to design a new product, making full use of each other's knowledge, resources and contributions to achieve better outcomes or improved efficiency (Ward et al., 2018)
Co-production	Stems from economics and civil rights contexts. Co-production refers to the value created by engaging service users in service delivery (Boyle, Clark, & Burns, 2006; Ostrom, 1996). Co-production in a healthcare context has been described as: The interdependent work of service users and service provider professionals to design, create, develop, deliver, assess and improve the relationships and actions that contribute to the health of individuals and populations (Batalden et al., 2016; Elwyn, Nelson, Hager, & Price, 2020)
Digital health	The field of knowledge and practice associated with the development and use of digital technologies to improve health. The term digital health is used as an umbrella term, encompassing both eHealth and mHealth (WHO, 2021).
E-health	E-health is an emerging field at the intersection of medical informatics, public health and business, and refers to health services and information delivered or enhanced through the Internet and related technologies. In a broader sense, the term characterizes not only a technical development, but also a state-of-mind, a way of thinking, an attitude, and a commitment for networked, global thinking, to improve health care locally, regionally, and worldwide by using information and communication technology (Eysenbach, 2001).
Empowerment	The level of choice, influence and control that users of mental health service can exercise over events in their lives (WHO, 2010).
Information and Communication Technologies	Refers to a diverse set of technological tools and resources used to transmit, store, create, share or exchange information. Internet is one of the key features, but it also involves cell phones, wireless networks and other related communication technologies (Peña-López, 2009).

Mental Health	A state of well-being in which the individual realizes his or her own abilities, can cope with the normal stresses of life, can work productively, and is able to make a contribution to his or her community (WHO, 2004b).
Mental disorders	Mental illness reaching the clinical threshold of diagnosis according to psychiatric classification systems. The broader terms mental ill-health, mental illness and mental health problems are used interchangeably and refers to mental disorders defined in this way but also include psychological distress, i.e., symptoms or conditions that do not reach the clinical threshold of a diagnosis with the classification systems (so-called sub-threshold conditions) (OECD, 2012; WHO, 2004b)
mHealth	The use of mobile wireless technologies for public health (WHO, 2017a)
Return to work	Return to work refers to the process an individual with mental health problems follows when returning to, and remaining at work (Ekberg, Eklund, & Hensing, 2015; Waddell et al., 2008, Young et al., 2005).
Self-efficacy	Individual beliefs concerning one's ability to perform the behaviours needed to achieve certain desired outcomes (Bandura, 1977).

Preface

While I was involved in my graduate studies, I had the opportunity to do an analysis job in my current research group. The material I was tasked to examine pertained to accounts of persons who were on sick leave as a consequence of depressions and anxiety disorders. I vividly remember one person's story that made me feel emotions of sadness, anger, and sorrow for the injustice she had to suffer. She was particularly productive, successful, and a stellar performer at her occupation. She experienced a life crisis, as we all may do at some point in our lives, that culminated in depression that was severe enough to put her on sick leave. The description of her circumstances made it clear that there was no available support to allow her to regain the former work role she had cherished for many years. In addition, she had an employer who indicated little resemblance of understanding or compassion for her circumstances, in a particularly degrading manner let's say. Consequently, she lost her sense of identity, felt utter hopelessness for the future, and could not see any way forward. Having experienced depression myself, I was struck by the unjust situation that had befallen her, and this sparked my motivation to in mWorks research project. Her story is part of the reason I decided to embark on my doctoral journey and ultimately write this thesis. To this day, four years later, I carry this anecdote with me as a reminder of why the work herein is important, and more importantly, why there must be available support when life throws us a curveball; to have access to personal return to work support that strengthens and empowers the individual when the system insufficiently does so. This thesis outlines the transformation of the Individual Enablement and Support model into a digital RTW solution (i.e., mWorks). mWorks eventually became a web-based self-management tool to empower service users on their journey back to work from common mental disorders and sick leave (www.mworks.nu).

Thank you, Person X, for sharing your sincere story and strengthening my resolve.

Introduction

The World Health Organization's (WHO) vision is to achieve good health and well-being for all persons at all ages (WHO, 2019a). This progress is hampered by the fact that four percent of the global population suffers from common mental disorders (CMD), such as depression and anxiety disorders. CMDs are currently the leading causes of disability worldwide (WHO, 2017b). In Sweden, CMDs constitute one of the most prominent reasons for sick leave (Försäkringskassan, 2020a; Vingård, 2015), and paradoxically these individuals remain one of the most underserved populations by welfare services (OECD, 2012). In addition, service users in the return to work (RTW) process have historically lacked a voice (Elwyn et al., 2020; Hickey, Richards, & Sheehy, 2018; Ocloo & Matthews, 2016; Sangill, Buus, Hybholt, & Berring, 2019). Neither they nor their relatives have been able to influence or participate in decision-making, and they remains at risk of social discrimination and exclusion in many aspects of their lives (WHO, 2010). Likewise, service users experience a lack of faith, empowerment, and influence in the currently scattered RTW process (Bejerholm, Larsson, & Hofgren, 2011). This combination has detrimental effects on their health and prospect to achieve RTW (Bejerholm, Larsson, & Johanson, 2017; WHO, 2010). Considering the existing evidence, improving service user empowerment and integrating services should be a priority to facilitate service users' RTW prospects (Bejerholm et al., 2017; Johanson & Bejerholm, 2017; Porter & Bejerholm, 2018).

Part of WHO's remedy and global strategy, is to achieve universal health service coverage by tapping into the underutilized potential of digital solutions (WHO, 2018a). This transformation has the potential to provide service users with remote access to RTW support that otherwise would be impossible (Lord et al., 2014). Digital solutions are believed to be able to transform the Mental Health Service (MHS), including primary and specialist psychiatry services, with a focus focal service user needs and participation (Socialdepartementet, 2021; WHO, 2018a). This transformation is anticipated to enable the relinquishment of the current disease-orientated focus in favour of a more central, integrated and empowered service user (Eysenbach, 2001; WHO, 2018b). As a contribution to the aforementioned progress, the humble intention with this thesis is to provide knowledge for the development of a digital RTW solution that strengthens and empowers persons on sick leave due to CMD. The work

herein reports the formative research, co-design and evaluation process used to meet the requirements of service users and other stakeholders, and to ensure that such a digital solution is usable, acceptable, and grounded in their interests, needs and preferences.

Mental Health, empowerment, and self-efficacy

WHO's visionary perspective on health was initially defined in 1948 and states that health is "a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity" (WHO, 2006). This definition acknowledges that health differs from the traditional medical model that narrows the concept to the absence of disease or illness. The definition explicitly links health with well-being and frames the concept as a positive state. WHO's definition of health has been criticized for framing health as an ideal state that is impossible to reach. The WHO definition is suggested to be supplemented with a person's ability to adapt to and self-manage certain social situations and contexts (WHO, 2006). Affirmation of the social dimensions highlights the importance of a more holistic approach to health and links to participation in society and is better suited for a MHS context.

Mental health forms an integral part of the understanding of health. This recognizes mental health as an essential component of public health. In essence, mental health pertains to emotional, psychological, and social well-being. Our mental health reflects how we feel, think and act in the world. It determines our ability to cope with stressors, relations to others, and health choices (Saxena, Funk, & Chisholm, 2013; WHO, 2004b). Contrary to the health definition, mental health is more inclusive and can be conceptualized as: "a state of well-being in which the individual realizes his or her own abilities, can cope with the normal stresses of life, can work productively and fruitfully, and is able to make a contribution to his or her community" (WHO, 2004b). In turn, empowerment forms an integral part of mental health. According to the WHO, empowerment in a mental health context refers "to the level of choice, influence and control that user of MHS can exert over events in their live" (WHO, 2010). Empowerment can be conceptualized as both a process and a goal. The latter can be explained as controlling the determinants that constitute a person or a group's quality of life (Tengland, 2007). The process and goal are suggested to incorporate the following six determinants: (1) circumstances that influence an individual's physical and mental health, (2) current living situations, (3) occupational circumstances, such as where, with, what, and how the person makes a living, (4) one's close and intimate

relationships, (5) how to spend one's leisure time, (6) and control over one's political, sexual, moral and religious values (Tengland, 2008).

Empowerment is central to mental health research and is related to recovery and RTW (Bejerholm & Björkman, 2011; Bejerholm & Roe, 2018; Leamy, Bird, Le Boutillier, Williams, & Slade, 2011; Porter & Bejerholm, 2018). Quantitative research shows that empowerment has an inverse relationship with depression (Bejerholm & Björkman, 2011; Porter & Bejerholm, 2018), self-stigma and engagement in life (Bejerholm & Björkman, 2011). In the aforementioned research, empowerment was operationalized as self-efficacy and self-esteem, power and powerlessness, activism and autonomy, optimism and control over the future, and righteous anger (Rogers, Chamberlin, & Ellison, 1997). Likewise, in a meta-review of RTW interventions by Joyce and colleagues, control over one's work situation increased employee mental well-being and protects against mental ill-health (Joyce et al, 2016).

The Individual Enablement and Support (IES) model is a strength-based supported employment (SE) model adjusted for persons with CMD. A trial showed that the IES model was more effective in increasing empowerment, decreasing depression, and increasing RTW as compared to fragmented interventions that are provided by the traditional rehabilitation context (Bejerholm, Larsson, & Johanson, 2017; Johanson & Bejerholm, 2017). Similar results are found in relation to SE for persons with severe mental disorders (SMD) (Areberg & Bejerholm, 2013; Bejerholm, Areberg, Hofgren, Sandlund, & Rinaldi, 2015; Bejerholm & Björkman, 2011). According to qualitative research on the experiences of IES study participants, being provided with hope and power, working with professionals who had a person-centred approach, and having integrated RTW services were critical parts of RTW (Porter & Bejerholm, 2018).

Although there is a lack of conceptual consensus, holistic care, recognition of personhood, and importance of developing meaningful partnerships are recurring aspects of person-centred care (Håkansson & Eklund et al., 2019; Morgan & Yoder, 2012). Lynöe and colleagues (2011) illustrated the value of a meaningful partnership when they found associations between experiencing positive health care engagement and having greater perceptions of one's ability to RTW among patients on sick leave. Thus, a vital component entails not reducing a person to their illness, disability and vulnerability, but recognizes that they possess strengths, resources and capabilities, (Lauver et al., 2002; Leplege et al., 2007). Similarly, a case-study showed that being empowered and focusing on strengths in the RTW process were closely related to the self-efficacy of participants and their belief that RTW work was possible (Johanson, Markström, & Bejerholm, 2019). Bandura first coined the term self-efficacy within the field of social psychology. As suggested, self-efficacy concerns an individual's belief in one's ability to perform the required behaviours to achieve certain desired outcomes

(Bandura, 1977). Self-efficacy is one of the strongest predictors for RTW for persons with mental health disorders (Andersén, Larsson, Lytsy, Kristiansson, & Anderzén, 2015). In contrast, low self-efficacy is associated with increased sick leave duration (Volker, Zijlstra-Vlasveld, Brouwers, van Lomwel, & van der Feltz-Cornelis, 2015). The importance of supporting empowerment and strength-based approaches to self-efficacy highlight the value of not focusing solely on symptoms when facilitating RTW. Supporting control to increase self-efficacy for persons with CMD produces shorter duration until full RTW (Bejerholm et al., 2017; Lagerveld, Brenninkmeijer, Blonk, Twisk, & Schaufeli, 2017; Porter & Bejerholm, 2018).

The level of choice, autonomy, and control that service users exercise in the RTW process is vital for the promotion of good mental health and RTW. A key to empowerment is the removal of formal and informal barriers as well as changing power relationships between users and professionals (WHO, 2010). A strength-based and empowerment approach that supports self-efficacy is acknowledged as critical (Bejerholm & Björkman, 2011; Johanson et al., 2019). Therefore, providing access to services that strengthen and empower services users during their journey back to work is vital for efficient use of societal resources and improving the RTW process for persons with CMD. Digital solutions are thought to be an important pathway for facilitating service user empowerment, and are sometimes referred to as Patient 2.0. This is described as "the active participation of the citizen in his or her health and care pathway with the interactive use of information and communication technologies" (Bos, Marsh, Carroll, Gupta, & Rees, 2008; Van De Belt, Engelen, Berben, & Schoonhoven, 2010).

Common mental disorders

Most mental disorders people experience are mild to moderate. Mood disorders (depression and bipolar disorder) and neurotic disorders (anxiety) are usually the most predominant (OECD, 2012). These CMDs constitute the largest contributor to global disability (WHO, 2017b) and are highly prevalent, affecting people across all regions of the world (Steel et al., 2014; WHO, 2017b). Evidence suggests that three-quarters of those affected by mental disorders suffer from CMD. The estimated number of persons living with depression is 322 million globally, and account for 4.4% of the global population. Depression is more prevalent among women (5.1%) than men (3.6%). The total prevalence of persons living with depression increased by 18.4% between 2005 and 2015. The total number of persons living with anxiety disorders is 264 million, estimated to be 3.6% of the global population. Similar to depression, anxiety disorders are more frequent in women (4.6%) than men (2.6%). The

prevalence of anxiety disorders increased by 14.9% between 2005 and 2015 (WHO, 2017b). If CMDs are left unattended, they can become severe and are then classified as severe mental disorders (SMD). A person is regarded as having SMD if psychosis or another mental illness is present, psychiatric symptoms are severe, persist over time (>2years), are functionally disabling, and impact everyday life (Ruggeri, Leese, Thornicroft, Bisoffi, & Tansella, 2000).

The symptoms inherent in depression are sadness, loss of interest in previously enjoyable tasks, impaired appetite and sleep, tiredness, feelings of guilt and worthlessness, and impaired concentration. In the most severe cases, depression can lead to suicidal thoughts and acts (WHO, 2004a, 2019b). Depending on the number and severity of symptoms, a depressive episode can range from mild to moderate or severe. Dysthymia is a persistent or chronic form of mild depression but is generally less intense than depressive episodes (WHO, 2004a). Another important classification is bipolar disorder, which characteristically consists of depressive episodes separated by periods of normal mood.

Anxiety disorders are characterized as a group of mental disorders that include generalized anxiety disorder (GAD), panic disorder, phobias, social anxiety disorder, obsessive compulsive disorder (OCD), and post traumatic stress disorder (PTSD). Symptoms associated in anxiety disorders are recurrent feelings of fear and worry. These feelings can be connected to certain events or situations and effect well-being and functional level. Similar to depression, symptoms can vary from mild to severe (WHO, 2004a, 2017b).

In the scope of this thesis, individuals with CMD are the primary group of interest. The CMDs include depression episodes and recurrent depression disorder (F32.0-F32.2, F33.0-F33.2), including depressive episodes inherent in bipolar disorder (F31.3, F31.4) without psychosis, and/or anxiety disorders (F40-41) according to the ICD-10 code classification (WHO, 2004a). Persons with bipolar disorder are included since depressive episodes have greater effect on their disability and employment status than manic episodes (Godard, Grondin, Baruch, & Lafleur, 2011).

Common mental disorders and sick leave

CMD may contribute substantially to disability and negatively impact work-related functionality (OECD, 2012). Because of the high prevalence, the overall societal cost of CMD is larger than that of SMD (OECD, 2012). In Europe alone, these mental illnesses account for over EUR 600 billion annually as a consequence of sick leave, increased healthcare costs and lost productivity (OECD, 2018). Depression and anxiety

are a major cause of reduced work performance (presenteeism), and increased risk of extended sick leave (absenteeism) (Harvey et al., 2011; Harvey, Henderson, Lelliott, & Hotopf, 2009). Workers with a CMD are absent from work for health reasons more frequently than other workers (32% versus 19%), and when they are, they are absent longer (6 versus 4.8 days of absence). Based on data from 21 European OECD countries, 69% of persons with CMD report reduced productivity at work. Presentism is also a predictor of future sick leave. Twenty-eight percent of persons with CMD report absence from work during a 4-week period; this is 9% more frequent than those with no mental disorder (OECD, 2012). Working environments where employees experience low opportunity for control and high demands, low support from leadership or co-workers, and low work rewards have higher symptomatic CMDs (SBU, 2014). In Sweden, depression and anxiety are the most common psychiatric reasons for sick leave. Ninety percent of the Swedish population on sick leave for mental disorders can be attributed to CMDs (Försäkringskassan, 2020a; Vingård, 2015). Paradoxically, data from the OECD suggest welfare services are disproportionally targeted at jobless people with SMD, whereas individuals with CMD who are unemployed or struggling to keep their employment remain underserved by interventions targeting RTW (OECD, 2012). Within the research sphere, the majority of efforts focused on RTW interventions for persons SMD such as schizophrenia and psychosis (Bond, Drake, & Becker, 2012; Modini, et al., 2016a). Thus, effective interventions to assist persons with CMD to RTW are scarce. Most interventions target the alleviation of symptom-related outcomes and these do not necessarily improve RTW outcomes (Joyce et al., 2016). This contrasts with evidence suggesting the need for more integrated interventions between health and rehabilitation services to achieve RTW (Joyce et al., 2016). Interventions such as reducing the service gap between mental healthcare and welfare actor are key factors to improving RTW outcomes (Lexén, Emmelin, Hansson, & Bejerholm, 2019).

The complex rehabilitation chain

A stepwise approach dominates the current rehabilitation chain, and this is referred to as the "*train then place*" approach and has the underlying assumption that persons with mental disorders need to train their work ability in a stepwise manner prior to RTW (Corrigan & McCracken, 2005; Lindqvist & Lundälv, 2018; Seekles, van Straten, Beekman, van Marwijk, & Cuijpers, 2011). Furthermore, the rehabilitation chain is criticised for being predicated on a medical perceptive where successful reduction of symptoms is paramount to regaining employment (Corrigan & McCracken, 2005;

Lindqvist, 2018). This persists even though policies have introduced new forms of governance to limit the action radius of medicalisation (Lindqvist & Lundälv, 2018). One initiative entailed making the medical examinations and certificates focus on functional and work abilities in order to forgo a strict biomedical view on the right to sickness subsidies (Socialdepartementet, 2009a, 2009b). In reality, this initiative had little effect on halting medicalization because the guidelines simultaneously introduced the "rehabilitation chain". The intention was to produce uniform and stricter regulations of paid sick leave with time periods for sickness benefits for different diagnoses that could be modified depending on the patient's work (Proposition, 2007/08:136). During the initial 90 days of sick leave, a person is entitled to sickness benefits if they cannot carry out their current work. The decision on whether the illness causes sufficiently reduced work capacity is based on the medical certificate and information provided by the claimant, employer, and other relevant welfare actors. After 90 days of sickness benefits, work capacity is assessed for whether the person can do some other work at the current employer. After 180 days of sick leave, work capacity is assessed in relation to the entire labour market regardless of work context. Medical certificates are shown to substantially impact stakeholders within the social insurance agency (SIA) when deciding whether an individual is granted sickness benefits (Karlsson, Seing, Sandqvist, & Ståhl, 2020). This reductionist view forms a substantial part of the criticism aimed at the current RTW paradigm, as it reinforces the recovery process as an individualised phenomenon (Karadzhov, 2021). Forgoing the contextual and socio-structural disadvantages may inadvertently place great emphasis on individual responsibility, both in terms of problem descriptions and solution proposals to regain employment (Karadzhov, 2021; Lindqvist, 2018).

To make matters more complex, the responsibility for a service user's RTW process is dispersed among different actors in the rehabilitation chain (Porter, Lexén, & Bejerholm, 2019a, 2019b). These actors include primary and specialist MHS, SIA, public employment services (PES), social services (if unemployed), and employers (Försäkringskassan, 2020b). The complexity increases when these actors attempt to interact and integrate their services and employ a person-centred approach. None of the aforementioned organizations have overall responsibility for the sick listed RTW process, and they operate differently based on their own prevailing social and legal structures. Ståhl (2010) explained that these organizations represent different perspectives that are dependent on their inherent social norms, and this makes cooperation challenging. The various social systems embedded in the rehabilitation chain are suggested to consist of the following four perspectives (Lindqvist, 2003; Loisel et al., 2005; Ståhl, 2015):

- The sick-listed individual represents the individual perspective where the perceived view of one's self-narrative and broader context in which the individual operates are essential
- The employer represents the productivity and profitability perspective, with a focal point on a sick-listed employee's capacity to fulfil the requirements of the employer's economic goals
- The insurance system represents a legal and bureaucratic perspective that focuses on the right to work-related compensation from injuries and illnesses
- The healthcare system represents a medical viewpoint that primarily focuses on treating illness and determining a diagnosis.

Traditionally, the RTW process is initiated in the context of a primary or specialist MHS. Primary healthcare is often referred to as the first line of MHS. The majority of persons with CMD symptoms initially seek care and are also sick listed within the primary healthcare context. According to the Swedish National Board of Health and Welfare, 70% of the total population with depression is being treated in primary healthcare (Socialstyrelsen, 2017) without integration into other welfare services or connections to the workplace (Johanson & Bejerholm, 2017). This is despite the current knowledge base, which depicts the importance of integrating RTW services to deliver a person-centred RTW process for persons with CMD (Joyce et al., 2016; Lexen, Hofgren, & Bejerholm, 2013; Lynöe et al., 2011). Instead, medical treatment with antidepressants for approximately six months, and cognitive behavioural therapy (six to ten sessions) are delivered as isolated interventions (Läkemedelsverket, 2016; Socialstyrelsen, 2017). If none of these treatment alternatives is sufficient for being able to work, a medical sickness certificate is often issued. The SIA decides whether one is entitled to economic compensation. They assess the right to payment based on a medical statement written by the service user's doctor (Försäkringskassan, 2020b). The medical certificate weighs heavily when deciding on rights to sickness benefits (Karlsson et al., 2020). For this reason, the focus of existing RTW services is on the diagnosis, functional disability, and activity limitation. The rehabilitation chain is dominated by a medical model and primarily communicates in terms of health and disease. This is congruent with the current "train then place" paradigm. (Bejerholm & Björkman, 2011; Johanson et al., 2019). Within this paradigm, single interventions are delivered in a stepwise manner (Joyce et al., 2016). The initial step traditionally focuses on re-gaining better health by treating symptoms. Primary MHS play critical roles for persons with CMD. The next step usually entails periods of vocational training activities and work ability assessment prior to exposure to workplace settings. Hence, RTW

interventions from the various welfare organizations are seldom coordinated or integrated into one overall solution to facilitate person-centred support for service users (Bejerholm et al., 2017; Harvey et al., 2009). The current RTW model prolongs periods of sick leave and long-term unemployment (de Vries, Hees, Koeter, Lagerveld, & Schene, 2014; Johanson & Bejerholm, 2017), and has a negative impact on service user mental health (Modini, et al., 2016a). During the sick leave period, service users often get stuck in their RTW process (Burstrom, Nylen, Clayton, & Whitehead, 2011). In addition to this service gap, there is also a knowledge gap among professionals and employers about how to promote mental health in connection to RTW and work (Porter et al., 2019b). This stepwise and disintegrated approach contrasts with evidence highlighting the importance of RTW service integration (Joyce et al., 2016; Porter, Lexén, Johanson, & Bejerholm, 2018).

Supported employment approach

Supported employment (SE) models are mental health and recovery oriented RTW approaches that depart from service user strengths, resources, and mental health status (Bejerholm & Roe, 2018). The evidence-based SE model for persons with SMD is named the Individual Placement and Support model (IPS) (Bejerholm & Roe, 2018; Modini, et al., 2016b). The model's "*place then train*" approach is characterized by an early introduction to the workplace while integrating support by MHS and other RTW actors in a person-centred fashion. In contrast to "*train then place*", IPS emphasizes the integration of RTW interventions into one overall service that corresponds to an individual's preferences, resources and needs (Johanson et al., 2019). IPS is the most effective intervention for RTW in Sweden (Bejerholm et al., 2015) and internationally (Frederick & VanderWeele, 2019). The IPS model was recently adapted for persons with CMD by integrating cognitive strategies, including motivational and time use strategies (Bejerholm et al., 2017; Johanson et al., 2019), and is referred to as the Individual Enablement and Support (IES) model. IES is more effective than traditional RTW interventions in a Swedish context (Bejerholm et al., 2017). A Norwegian RTW trial on the effectiveness of IPS in combination with group-based CBT found similar results in favour of the "*place then train*" approach compared to the traditional rehabilitation chain and "*train then place*" approaches (Reme, Grasdal, Løvvik, Lie, & Øverland, 2015).

Implementation barriers

Introducing new interventions that are person-centred, and involve and empower the service user to actively participate in a traditional RTW paradigm presents several implementation barriers (Bergmark, Bejerholm, Markström, 2017; Hasson, Andersson & Bejerholm, 2011). The traditional RTW service originates from medical and clinical perspectives. Consequently, rehabilitation is focused on diagnosis, symptom alleviation, functional disability, and activity problems at work (Corrigan, 2001; Försäkringskassan, 2020b). Professionals and employers can harbour negative attitudes towards models that place belief in a person with CMD's ability to return to and stay at work. Structural barriers also commonly occur since it is difficult for welfare actors in the RTW process to deliver their services as one integrated and coherent intervention (Johanson, Markström, Larsson, & Bejerholm, 2020). Each welfare agency has a prevailing perspective on how to best support service users in the RTW process, and this is a hindrance to the implementation of SE interventions (Bejerholm et al., 2011; Bergmark, Bejerholm, & Markström, 2018; Hasson, Andersson & Bejerholm, 2011). Even though the IES model can be implemented with good fidelity, and implementation barriers such as negative attitudes and integration difficulties can be overcome, implementation on a large scale has been unsatisfactory (Johanson et al., 2020).

Transforming the IES model into digital solutions is anticipated to transcend the existing implementation barriers and bridge the current service gap (Lord et al., 2014). Research suggests that service users will be empowered and more involved in decision-making with supplementation of traditional RTW interventions (i.e., the "*train then place*" model) with a person-centred perspective grounded in the IES model (Bejerholm et al., 2017; Porter & Bejerholm, 2018). In addition, the digital format of the IES model provides a strength-based perspective and is expected to increase service user self-efficacy and hope for the future (Porter et al., 2018). With the support of strengthened service users, professionals and employers in the RTW chain will simultaneously benefit from improving their mental health literacy (Lexén et al., 2019). Service users and other stakeholders have not traditionally been allowed to co-produce MHS services (Elwyn et al., 2020; Ocloo & Matthews, 2016). RTW research has also been slow to adopt co-design approaches, and thus failed to meet the requirements of service users and deliverers (Bakker et al, 2016). Thus, it is vital to develop knowledge on how to co-design digital RTW solutions with stakeholders to ensure the relevance and legitimacy of such interventions.

Digitalization

The United Nations (UN) calls for global action to achieve a better and sustainable future for all. To transform this vision into reality, the UN created a series of sustainable development goals (UN, 2016). Goal number three seeks to ensure healthy lives and promote well-being for all ages. WHO adopted these aims to achieve universal health service coverage for 1 billion more people by 2030 (WHO, 2019c). A substantial part of the WHO's strategy to reach this ambitious goal is directed at scaling up and utilizing digital solutions to promote accessible health services (WHO, 2004b, 2008). This is also a prioritized political area in Sweden, as can be seen by the vision to become a leading nation on developing, providing and utilizing digital solutions within the healthcare context (Socialdepartementet, 2020). Digital transformation in healthcare is anticipated to strengthen service users, enable greater reach, and improve quality of care with less demand on resources (Blix, 2018; Kraus, Schiavone, Pluzhnikova, & Invernizzi, 2021).

As such, digital solutions are becoming an important resource to solve problems related to public health and welfare services. There exist a substantial number of terms and definitions associated with digital solutions and a unified terminology is directed by Swedish authorities (Socialdepartementet, 2020). A common term in this context is "digitalization", which pertains to the process of transforming analogue information into a digital format. Digitalization also refers to the larger societal process where various forms of technology are integrated into organizations and the private sector, fundamentally shaping how they operate (Reis, Amorim, Melão, Cohen, & Rodrigues, 2019; Socialdepartementet, 2020). Digitalization is often described as transformative or disruptive (Värri, 2020). The application of digital solutions in the welfare sector, also known as welfare technology, is another common term and can be defined as: "the knowledge about and the use of technologies that can contribute to increased security, activity, participation and independence for people with disabilities in all ages" (SBU, 2017; Socialdepartementet, 2020; Søndergård, 2017). Furthermore, digital health is used as an umbrella term and refers to a field of knowledge and practice associated with the development and use of digital technologies to improve health (Värri, 2020; WHO, 2018a). eHealth can be understood as a subset of digital health, enhanced by the use of information and communication technologies (ICT) to support health promotion (Al-Shorbaji, 2013). Use of the internet is a key future of ICT and necessary to exchange information and facilitate communication. Particularly relevant in this context are mobile wireless solutions because of their ease of use, broad reach, and acceptance. Mobile health or mHealth is an integral part of eHealth and pertains to the use of mobile wireless devices to promote health. The relevance of smartphones is apparent

by the estimated 7 billion mobile phone subscriptions according to the International Telecommunication Union (ITU, 2016).

Digital solutions shaping mental health services

In light of the increased need for capacity to support mental health and the RTW process of persons with CMD on sick leave (OECD, 2012), digital solutions are becoming more important in supplementing existing mental health and other RTW services. The utility of digitalization provides the MHS system with flexible and scalable solutions with the potential of improving access and convenience for service users. Digital solutions are expected to fundamentally reshape the MHS context (Proudfoot, 2013; WHO, 2018a). The MHS in Sweden is currently undergoing a reform referred to as the 'good and accessible care reform' and is focused on providing care based on accessibility, participation, and continuity (SOU, 2019). The reform aims to ensure that care is more organized and based on service user needs and preferences. Digitalization is a fundamental component supporting this transformation. A key tenet of the utilization of digital solutions is to harness service user strengths and resources to support person-centred services, which are believed to promote service user participation, efficient use of resources, and public health (SOU, 2019). Digital solutions are expected to supplement the current MHS and with adequate RTW support in a manner that strengthens and empowers the service users (Lord et al., 2014; Proudfoot, 2013). eHealth is one of the ways modern MHS can become more efficient by limiting the number of healthcare visits or strengthening service user self-management (Karasouli & Adams, 2014). For example, eHealth is applied to increase service user self-monitoring, and improve their interaction with service deliverers and potentially third parties such as professional contacts and relatives. (Karasouli & Adams, 2014; Reynolds, Griffiths, Cunningham, Bennett, & Bennett, 2015). eHealth has the potential to affect the behaviours of both patients and health care providers and to impact service user autonomy, roles, and responsibilities in the recovery process through self-management (Boers et al., 2020).

Much work still needs to be done to harness digital solutions in the MHS. Addressing the so-called "digital divide" is critical. The phenomenon reflects the discrepancy between those who have and those who do not have access to a computer and the internet as this means that certain sub-groups may experience barriers to service delivery (Hollis et al., 2015). For example, older persons report less familiarity, access, and confidence with digital technologies. This is suggested to be associated with cost and skill gaps rather than disinterest (Ennis, Rose, Denis, Pandit, & Wykes, 2012). Paradoxically, solutions to the digital divide are often centred on providing more access

through increased digital infrastructure and access to devices. Although efforts to improve access are essential steps, access alone will not eliminate the digital divide. Investing in the ability of the public to use ICT to find, evaluate, create, and communicate information requires both cognitive and technical skills (i.e., digital literacy), and is recognized as an essential component to lessen the digital divide (van Kessel, Wong, Clemens, & Brand, 2022). While the digital transformation has tremendous potential to improve public health, a real threat is that it may exacerbate inequalities (van Kessel, O'Nuallain, et al., 2022). Digital solutions also pose a series of ethical questions. One of the essential questions pertains to safeguarding data protection, privacy, and security as these are paramount to maintaining public trust in digitalization. Personal data are often highly sensitive and so wrongdoing in the handling and sharing of personal data in the MHS risks undermining the utility of digital solutions (Boers et al., 2020; Hollis et al., 2015; Lattie, Stiles-Shields, & Graham, 2022). Despite the apparent value of digital solutions, current evidence suggests that its potential is not being realized, and there is limited uptake and lack of connection to service user needs, preferences, and interests (Bakker et al, 2016; Hollis et al., 2015). Thus, ensuring that service users and their needs remain at the centre of digital development is vital.

Along with digital transformation, more widespread use of digital mental health interventions (e.g., digital solutions that deliver psychological strategies, interventions via online and/or mobile platforms) are believed to provide scalable and equitable services across healthcare settings (Lattie et al., 2022). While the majority of digital solutions fail to meet the requirements of service user needs and preferences (Bakker et al, 2016), some endeavours show promise. For example, evidence-based, face-to-face interventions such as cognitive behavioural therapy (CBT) have been successfully transformed into a digital format, i.e., internet-based CBT (iCBT). Research shows that iCBT coupled with human support is as effective as CBT delivered face-to-face (Carlbring, Andersson, Cuijpers, Riper, & Hedman-Lagerlöf, 2018; Cuijpers, Donker, van Straten, Li, & Andersson, 2010; Lattie et al., 2022). Unguided self-help and psychological interventions via smart-phone applications are also found to be as effective in ameliorating depression and anxiety symptoms, but with a smaller effect size (Lattie et al., 2022; Lindner, Ivanova, Ly, Andersson, & Carlbring, 2013; Titov et al., 2016). Self-guided digital solutions are valuable since their potential for scalability is not limited by the scarcity of professionals to deliver the intervention (Lattie et al., 2022). While digital endeavours have great potential and are effective for ameliorating symptoms related to CMD, they are not without challenges (Mohr, Riper, & Schueller, 2018). Attempts to implement digital mental health interventions in real world settings have been largely unsuccessful and people do not engage with them

(Lattie et al., 2022; Ricciardi, 2019). These digital solutions are not perceived as acceptable to the targeted service user or those delivering them (Borghouts et al., 2021). The lack of acceptability and subsequent adoption risk render digital solutions irrelevant from public health and RTW perspectives. Human support is often more engaging and thus more effective than self-guided or automated interventions (Karyotaki et al., 2021). Therefore, ongoing research is encouraged to further automate intervention delivery of these tools and solve the engagement conundrum (Lattie et al., 2022). Some progress has been made. A randomized clinical trial of artificial intelligence-directed chatbots, designed to simulate human support, that delivers CBT to young adults significantly reduces CMD symptoms, and is suggested as an engaging alternative to human guidance (Fitzpatrick, Darcy, & Vierhile, 2017).

Similar to the transformation of ordinary face-to-face interventions into a digital format, effective RTW interventions are expected to be streamlined (Lord et al., 2014). Relatively modest progress has been made and digital RTW solutions have primarily focused on the symptom alleviation that constitutes first-line treatment in MHS and is the initial step of the RTW process. Examples are web-based self-management interventions for employees intended to prevent sick leave (Geraedts et al., 2014) and digital platforms for decreasing depressive symptoms and promoting well-being at the workplace (Deady et al., 2018). However, the RTW process demands a holistic and individualized approach in which the service user is provided with hope and empowerment along the different steps and does not only aim to alleviate symptoms (Porter et al., 2018). In fact, RTW interventions that focus on person-centeredness in relation to the entire RTW process and integrate services into one overall solution are generally more effective (Bejerholm et al., 2017; de Vries et al., 2014; Joyce et al., 2016; Lynöe et al., 2011; Reme et al., 2015). Some digital RTW solutions focus on providing person-centred care. One particular case by Cederberg et al. (2020) includes telephone support and the provision of a digital platform where services users, through dialog with healthcare professionals, can take a more active role in their recovery and rehabilitation process (Cederberg et al., 2020; Cederberg, Fors, Ali, Goulding, & Mäkitalo, 2022). However, digital RTW solutions that account for the entire RTW process have yet to be developed.

Co-production and co-design of digital solutions

The term co-production was coined by Ostrom and colleges (1996) in their seminal work on economy and refers to the value created by engaging service users in a variety of different contexts. Co-production is a practice that emphasizes citizen involvement in the creation, design, and delivery of public services. In a healthcare context, co-

production is defined as "The interdependent work of users and professionals to design, create, develop, deliver, assess and improve the relationships and actions that contribute to the health of individuals and populations" (Batalden et al., 2016; Elwyn et al., 2020). Co-production harnesses the combined effect of user-centred design, technology innovation, and human learning. Efforts to leverage service user ingenuity are effective in alleviating illness, burden, and costs in healthcare services (Elwyn et al., 2020; Essén & Lindblad, 2013). For example, a cross-sectional study comparing a co-production mental health centre to traditional services showed a significant 63% decrease in hospital admissions and a 39% reduction in psychiatric medications in the intervention group (Pocobello et al., 2020). In addition to improving service delivery and user outcomes, the most critical benefits of service user involvement in the co-production of healthcare services involves enhanced personal choice, self-care, and empowerment (Elwyn et al., 2020; Essén & Lindblad, 2013). Co-production is believed to result in fundamental changes on how we as a society deliver care and support. One aspect is the relationship dynamic between service users and deliverers. This is a paradigm shift from the traditional professional-service user relationship (Batalden et al., 2016). Health service professionals are conventionally characterized as experts and decide on procedures, neglecting service user autonomy (i.e., medical paternalism) (Batalden et al., 2016). In co-production, the relationship is characterized as a partnership, shifts the power balance, and increases the extent of decision-making and empowerment in favour of the service user (Blomkamp, 2018; Ocloo & Matthews, 2016).

The co-design concept shapes part of the co-production construct and originates from software system design nearly 40 years ago (Blomkamp, 2018). Co-design is regularly confounded with co-production and co-creation, and is used interchangeably. Actually, the co-design relationship is a subset of these two co-production and co-creation (Windasari & Visita, 2019). Co-design in a healthcare context can be defined as the "partnership of individuals who work within the system (healthcare staff), individuals who have lived experience of using the system (patients and their families/carers) and the 'designers' of the new system (e.g., IT personnel working with electronic platforms to improve efficiency or researchers designing interventions to improve health systems). Co-design involves working together to design a new product, making full use of each other's knowledge, resources and contributions, to achieve better outcomes or improved efficiency" (Ward et al., 2018). A distinguishing feature of co-design is its underlying philosophy, which draws on the tradition of participatory design (Blomkamp, 2018; Noorbergen, Adam, Roxburgh, & Teubner, 2021). The main tenet is that the service users who are most affected by health decisions should be involved in the process of making them. This means enabling or empowering communities and

people affected by a problem to actively contribute to developing a solution (Noorbergen et al., 2021). A delineation between participatory design and co-design is that co-design emphasizes that service users are the experts in their own experiences (Blomkamp, 2018).

A series of research initiatives in co-design digital solutions was undertaken to tackle the growing mental health crisis of the last ten years (Noorbergen et al., 2021). Examples include suicide preventions (Thorn et al., 2020), digital mental health clinics (Ospina-Pinillos et al., 2019), and digital self-management solutions for youths (Hodson et al., 2019). Although there is a steady increase of co-design initiatives and health policies clearly state the value of service user lived experiences in research and evaluation (Sangill et al., 2019), the adoption of a co-design approach in MHS and RTW research has disseminated slowly. Service users and other stakeholders are traditionally not included. When co-design procedures are applied, the extent to which they are involved varies from none to full inclusion (Beresford, 2013). Authors of a scoping review on service user involvement in MHS research concluded that collaborative research requires changes to traditional practices (Sangill et al., 2019). This is needed to create and support genuine co-design, and more importantly, to avoid tokenism and power inequalities (Ocloo & Matthews, 2016). The emerging paradigm of co-design challenges scientific communities to re-think conventional research practices and to develop a genuine co-design research culture (Beresford, 2013; Berring, Buus, & Hybholt, 2021; Sangill et al., 2019).

Development of digital solutions

The development and evaluation of digital solutions for provision by the MHS is a complex endeavour (Michie, Yardly, West, Patrick & Greaves 2017; West, 2016). The concept of a digital solution arises from knowledge of a given area of interest. The concept should address a particular need to improve public health and society. Thus, the concept must establish knowledge of what role the digital solution will play, and if not known, formative research needs to address stakeholder needs, preferences, and interests (Bakker et al, 2016). Once legitimacy and acceptability are recognized, establishing potential health gains in terms of positive outcomes is essential. Considering what gap the specific digital solution fills in the broader context of available interventions is essential (Michie et al, 2017). According to Larsen and colleges (2017), the concept needs of digital solutions should elicit the "big questions". These questions involve what intervention (content and delivery), with what usage (uptake and level of engagement), in what context, affect outcomes or behavioural

change, and through what mechanisms of change. The authors have illustrated how these constructs interact in an ontological model (Figure 1).

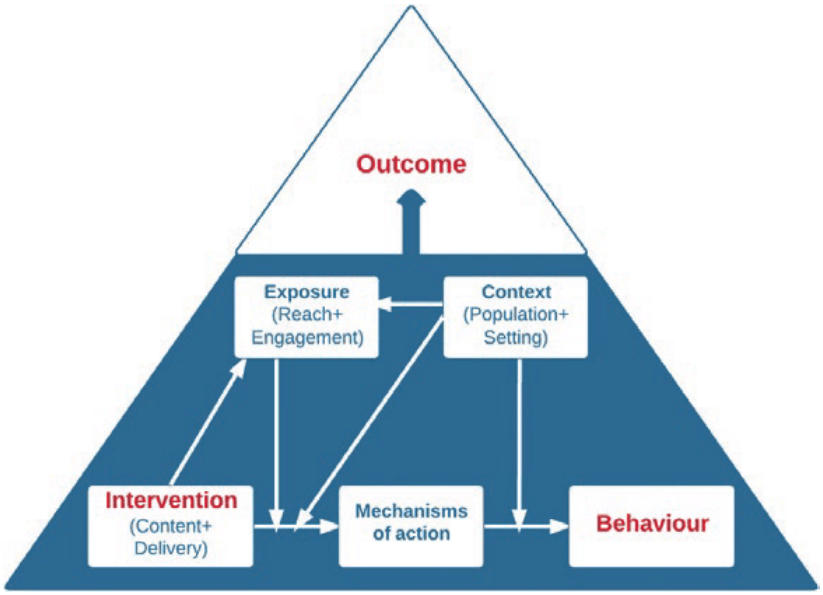


Figure 1. Larsen et al. (2017). On digital behaviour change interventions ontology

Testing and evaluation of digital solutions occurs once the concept is sufficiently developed. As the digital solutions begin to take shape, the resources needed to test and evaluate the project will typically increase (West, 2016). Preferably, this process is performed in an iterative manner, which allows for continuous refinement and testing. The process involves gathering evidence such as assessing usability, acceptability and satisfaction with the concept (West, 2016). The majority of digital solutions have not been developed or evaluated in connection to service user and other relevant stakeholder needs, preferences, and interests (Bakker et al, 2016). But robust and early engagement with stakeholders is important to gain knowledge about whether and how digital solutions and interventions will be scalable, acceptable, implementable, and transferable to other contexts (Skivington et al., 2021). In this thesis, stakeholders are those who are targeted by the intervention (service users), involved in the delivery and development, or whose personal and professional interests are affected (Skivington et al., 2021). Appropriate engagement with stakeholders is needed to develop digital solutions that have the potential to have a positive impact on health and enhance prospects of achieving changes in practice (Skivington et al., 2021). Development of digital solutions is rarely a linear process, and usually is iterated from initial conception

to testing to evaluation. In combination with iterative development, engagement with stakeholders allows for continuous usability refinement, more acceptance by those receiving and delivering the interventions, and greater feasibility of future planned evaluations (Skivington et al., 2021; Yardley, Morrison, Bradbury, & Muller, 2015).

Theoretical Frameworks

The following section describes the theoretical frameworks employed in this thesis. First, described is the Medical Research Council (MRC) framework for developing and evaluating complex interventions, which inspired this thesis and studies I-IV (Craig et al., 2008). Secondly, the acceptability construct is dissected, through the Theoretical Framework of Acceptability (TFA), which is used to understand anticipated acceptability of mWorks during Study II.

The Medical Research Council framework

There exist a number of frameworks relevant to development and evaluation of digital solutions. One is the comprehensive guidance provided by the UK's Medical Research Council (MRC) on the development and evaluation of complex interventions (Craig et al., 2008). According to the MRC, an intervention is complex when it contains several interacting components, such as a range of targeted outcomes; expertise and skills required by those delivering and receiving the intervention; the number of targeted groups, settings, or levels; or the permitted level of flexibility of the intervention or its components (Skivington et al., 2021). The proposed framework entails a four phase circular process. These phases are delineated by development, feasibility and testing, evaluation, and implementation. The MRC recognizes that the process is rarely linear, but in reality, should consider factors associated with the different phases throughout the entire process (Craig et al., 2008). For example, considering factors associated with implementation early in the development phase increases the potential to develop an intervention that can be widely adopted and maintained in a real world context (Skivington et al., 2021). The first phase involves development of new interventions, or adapting existing interventions to a new context based on research evidence and theory of the problem. During the feasibility phase, the MRC highlights the importance of conducting sufficient testing to examine key uncertainties prior to preforming rigorous large-scale evaluations. The evaluation phase includes assessing the effect of an intervention's desired outcome, cost effectiveness, or understanding change processes. Randomized controlled trials (RCT) are usually the

preferred study design to evaluate effectiveness on outcomes, but it is important to choose a design or method best suited to answer the research questions. The last phase involves implementing the intervention in a real world context (Craig et al., 2008; Skivington et al., 2021). In addition, a process evaluation phase of feasibility can serve to provide vital information about fidelity and quality of implementation, elucidate causal mechanisms, and identify contextual factors that impact outcomes (Craig et al., 2008; Moore et al., 2015). Process evaluations are especially valuable because they can serve to optimize the implementation and allow for further refinement of the digital solution, thus generating greater usability and acceptance by those receiving and delivering the interventions, and greater feasibility of future full-scale evaluations (West, 2016; Skivington et al., 2021; Yardley et al., 2015).

Understanding the philosophical underpinning of the MRC's (2008) 'development-testing-evaluation-implementation' process is essential, partly because it explains the researcher's worldview, but also because of the polarization between qualitative and quantitative methods that still exists despite the health service research community calling for change (Borglin, 2015). The epistemology (i.e., how we conceptualise and gain knowledge) of the MRC framework arguably aligns with pragmaticism (Borglin, 2015). This recognizes that knowledge is formed both objectively and subjectively and is not impervious to influence by human interests and values. Thus, the ontology (i.e., the nature of reality and what is real) departs from the assumption that there are multiple ways to view, hear, and understand the world (Kivunja & Kuyini, 2017). This pragmatic stance implies the rejection of having to choose from either a post-positivistic or constructivist perspective but instead seeks to merge them in a more pluralistic approach (Kivunja & Kuyini, 2017). As such, inductive and deductive research approaches are of equal importance. Regardless of methodology (i.e., strategy, plan of action or design of research, procedures of gathering and analysing data), the method best suited to answer the research questions and generate knowledge is applied (Kivunja & Kuyini, 2017). Thus, the methodology in the current thesis utilizes both deductive and inductive reasoning to generate knowledge regarding the overall aim.

Theoretical Framework of Acceptability

The importance of ensuring acceptability of service users and those who deliver digital solutions gained credence over time. From the service user's perspective, the context, content, and quality of services received may all have implications regarding acceptability. Thus, service users are more likely to engage with a digital solution and thereby benefit from its positive effect. From the perspective of healthcare professionals, low acceptability of digital solutions will typically result in failure to deliver the

intervention as intended, and thus undermine the overall effectiveness (Proctor et al., 2009; Sekhon, Cartwright, & Francis, 2017). The increased interest in evaluation of acceptability has resulted in increased references to the term in academic publications. For example, the MRC has increased the mention of acceptability by each published guidance document for developing and evaluating complex interventions However, the MRC guidance fails to provide a unitary definition of acceptability or sufficient description on how to operationalize it. Traditionally, assessment of acceptability is conducted by using various objective measures of behaviour as indicators of acceptability such as discontinuation and dropout rates. Others have assessed acceptability via self-reported data, including interviews regarding their open-ended interviews, and various satisfaction and attitudinal measures (Sekhon et al., 2017). Sekhon and colleges attempted to solve the conceptual confusion by providing a Theoretical Framework of Acceptability (TFA) and accompanying definition. The definition states that "acceptability is a multi-faceted construct that reflects the extent to which people delivering or receiving a healthcare intervention consider it to be appropriate, based on anticipated or experienced cognitive and emotional responses to the intervention" (Sekhon et al., 2017). One of the main contributions of TFA is the addition of temporal dimensions to acceptability as a construct. This suggests that acceptability can be assessed prior, during, and after (i.e., prospective, concurrent, retrospectively) intervention delivery. In addition, TFA consists of seven component constructs: affective attitude, burden, perceived effectiveness, ethicality, intervention coherence, opportunity costs, and self-efficacy. Thus, TFA provides an understanding of how the assess acceptability based on these constructs both qualitatively and quantitatively throughout the development and evaluation of complex interventions.

Rationale

Common mental disorders are one of the most common reasons for sick leave (Vingård, 2015; WHO, 2017b), and paradoxically, they remain one of the most underserved populations by welfare services (OECD, 2012). The current RTW model is predicated on a medical paradigm, and this has limited the extent to which service users can influence the RTW process (Dimopoulos-Bick et al., 2019; Elwyn et al., 2020; Hickey et al., 2018; Ocloo & Matthews, 2016) and allow themselves to focus on their mental health and resources. Service users report frustrations with the lack of sustainable support and control during their RTW process (Harvey et al., 2009; Johanson & Bejerholm, 2017; Porter & Bejerholm, 2018). The lack of integrated and person-centred RTW interventions that strengthen and empower the service user results in the need for innovative and scalable solutions to provide service users with effective RTW interventions.

The bureaucratic and segregated RTW model reflected in the traditional "*train then place*" model hinders the RTW process for many. In contrast, the person-centred "*place then train*" IES model helps facilitate the RTW process (Bejerholm et al, 2017; Porter & Bejerholm, 2018). Implementing novel interventions that focus on empowering service users in a sectorized welfare system, where professionals typically have low mental health literacy, has proven troublesome (Harvey et al., 2009; Hasson, Andersson, & Bejerholm, 2011; Johanson et al., 2020). Hence, the transformation of an IES-supported employment model into a digital solution has the potential to empower the service user directly, and make this empowering approach widely accessible (Lord et al., 2014; Proudfoot, 2013). Such transformation must be co-produced to have relevance for stakeholders in the rehabilitation chain context and for service users. Unfortunately, the majority of digital solutions were not developed and evaluated in collaboration with stakeholders in the rehabilitation chain or service users who have CMD and are on sick leave. Co-production should increase the uptake and value to society (Bakker, et al, 2016; Lal & Adair, 2014). To understand the needs, preferences, and interests of stakeholders for a digital RTW solution is the first step. Formative research will help assure that a digital RTW solution is warranted and acceptable, and user- and implementation-friendly to those providing RTW support in the MHS or service users (Craig et al., 2008). If the digital solution is acceptable to

stakeholders, particularly service users, the next step is to enter a co-production development phase. Robust engagement with stakeholders throughout the development process allows for continuous usability refinement and iteration of content features, design, and format (West, 2016; Yardley et al., 2015). Lastly, to evaluate the implementation of the delivery phase, including delivery to RTW professionals and uptake by service users with CMD would further elucidate contextual barriers, delivery issues, and possible mechanisms of impact, i.e., which mechanisms influence positive outcomes such as improved service user empowerment. Together such knowledge can form the basis for future research on the effectiveness of digital RTW tools for mental health and sick leave duration over a more extended period.

Aims and specific aims

The overall aim of the thesis is to develop knowledge about the relevance, development and evaluation of mWorks, a digital RTW solution for persons with common mental disorders who are on sick leave. Studies I-IV are closely related and consecutively build on each other. Studies I-III helped to inform the development and critical content features of the mWorks prototype from the stakeholder perspective while Study IV was a process evaluation to assess the implementation process during the first 10 weeks of delivery in a MHS context.

Study I

To understand the role and legitimacy of mWorks as a digital RTW solution for individuals with CMD on sick leave in primary and specialist MHS settings from the viewpoint of different stakeholder groups, i.e., service users, RTW professionals, and influential persons in managerial positions.

Study II

To increase the understanding of service user acceptability of a proposed digital RTW solution, mWorks, for persons with experience of CMD and being on sick leave, with the aid of the theoretical framework of acceptability (TFA).

Study III

To describe stakeholder perceptions gained from the co-design process during the prototype development of mWorks.

Study IV

To evaluate the implementation process of mWorks delivery in a MHS context for persons with CMD on sick leave during their RTW process with the objective to develop knowledge about contextual and implementation factors as well as to understand initial mechanisms of impact.

Methods

Overview of the four studies

Studies I-IV follow a consecutive order, inspired by the logical order of the Medical Research Council framework on the development and evaluation of complex interventions (Craig et al., 2008). Studies I and II address formative research with the aim of developing the knowledge base and theory regarding stakeholder needs and preferences, as well as service user acceptability of a digital RTW solution (Engdahl et al., 2021; Engdahl et al., 2020). Study III includes an iterative and co-design mWorks development process with stakeholders. Studies I-III helped to inform the mWorks prototype development. Study IV evaluated the feasibility of mWorks delivery by means of a case study, following MRC established process evaluation methods (Moore et al., 2015, Saunders, Evans, & Joshi 2005).

Table 1. Overview of thesis studies I-IV

Study	Design	Participants	Data collection	Analysis	Recruitment
Study I	Qualitative	Participants with CMD with experience of sick leave and RTW; RTW professionals; Influential stakeholders (n=46)	Individual and focus group interviews	Inductive content analysis	Purposeful snowball sampling
Study II	Qualitative	Participants with CMD with experience of sick leave and RTW (n=18)	Individual and focus group interviews	Deductive thematic analysis according to the TFA	Purposeful snowball sampling
Study III	Qualitative	Participants involved in the iterative prototype development of mWorks: service-users, employers, RTW professionals, digital design and system developers, and the public (n=86)	Audio and video recordings; field notes; mock-ups; photographs; think-aloud interview; feedback sheets	Inductive content analysis	Purposeful and convenience sampling
Study IV	Qualitative and quantitative	Participants involved in the three-session delivery of mWorks (10 weeks): RTW professionals in a primary MHS settings, and persons with CMD on sick leave	Audio recordings; field notes; memos; online questionnaire; interviews	Multiple methods	Purposeful sampling

CMD=common mental disorders; MHS=mental health service; RTW=return to work; TFA=theoretical framework of acceptability

Research context

Sweden is renowned for its robust welfare state and universal healthcare model—funded by taxes, the government pays for its citizens' medical needs (Andersen et al., 2016). In general, the MHS is divided into two separate components. These include healthcare clinics and hospital settings operated by the county councils, and community-based settings directed by the local municipalities. Both parts can include services managed by non-profit organizations and the private sector. Sick leave certificates are issued in Sweden by primary and specialist MHSs, and occupational health care. In these contexts, RTW professionals work and have regular RTW assignments to facilitate and coordinate the RTW process for service users.

This thesis is part of the research project "*Work support in your pocket: Development and evaluation of mWorks digital mental health intervention for return-to-work*" (Bejerholm, Sundqvist, et al., 2017). The concept departs from the idea of transforming the supported employment model of Individual Enabling and Support (IES) for persons with CMD into a digital solution called mWorks. While formative studies, co-development ,and process evaluation of delivery are within the scope of this thesis, evaluation of project effectiveness will be studied elsewhere. This thesis was conducted within the research group of Participation, Activity and Participation at the Department of Health Sciences, Lund University, in collaboration with the County Council of Region Skåne. The Skåne region was also the primary research context since primary and specialist MHSs are the clinical settings in which persons with CMD become sick-listed and where the first step of RTW with mWorks will be available to service users to support their RTW journey.

Studies I and II

Participants and recruitment

Studies I and II aimed to examine stakeholder needs, preferences, interest, and acceptability of a suggested digital RTW solution. For Study I, three stakeholder groups were identified and recruited (Table 2). The first group included potential service users, i.e., individuals with experience of CMD, sick leave and RTW. The second group consisted of County Council RTW professionals who provide diagnoses, sick leave certificates, and RTW support for persons with CMD on a day-to-day basis, i.e.,

medical doctors, psychologists, physiotherapists, RCs, supported employment specialists, and occupational therapists in primary and specialist MHSs. The last stakeholder group included professionals with strategic, influential, or managerial positions in the County Council of Region Skåne. These professionals are critical for the future implementation of mWorks. Only the service user stakeholder group was invited for Study II.

A purposeful snowball sampling method was utilized to recruit information-rich participants regarding the RTW process and the planned delivery and implementation context (Patton, 1999). Recruitment was initiated by researchers who approached previously identified stakeholders from each stakeholder group. Initially, a strategist responsible for a national evaluation of implementation of the Rehabilitation Guarantee and its effect on sick leave and health for the target groups of CMD and back pain within the County Council of Region Skåne was contacted. This strategist named other potential participants within the stakeholder group, e.g., digitalization, MHS, and RTW professionals. Also, previously known RTW professionals in primary and specialist MHSs contacted the first two service users, who in turn suggested others. RTW professionals were recruited in the same logical manner. Regardless of group affiliation, each stakeholder participant was asked to nominate potential study participants who could provide information about the current study. To avoid introducing recruitment bias, as skewing the sample group is common in snowball sampling, each participant could only nominate two potential interviewees (Smith & Noble, 2014). Accrual of participants continued until the sample distribution was satisfied for gender and age. Likewise, service users were asked whether they had recently been sick-listed due to CMD, if they were currently involved in a RTW process, or had prior experience being on sick leave due to CMD and involved in a RTW process. This was done to ensure that the sample represented the entire return to work process.

Table 2. Sociodemographic and data collection of participants in studies I and II (n=46)

Stakeholder group	Data collection method	Mean age in years (range)	Men/women (n)
Service users (n=18)	Individual interviews (n=12)	30 (24-48)	7/5
	One focus group interview (n=6)	55 (44-74)	4/2
RTW professionals (n=20)	Individual interviews (n=12)	44 (30-60)	3/9
	Employment specialists; one focus group interview (n=4)	40 (26-61)	0/4
	Psychologists; one focus group interview (n=4)	40 (38-47)	1/3
Influential strategists and mangers in the County Council (n=8)	Individual interviews (n=8)	53 (39-59)	1/7

Notes: RTW=return to work

Data Collection

Data collection took place between April 2017 and January 2018. Data were collected through semi-structured individual and focus group interviews (Kvale, 1994; Wilkinson, 1998). Individual interviews lasted 30-45 minutes; focus group interviews lasted 45-60 minutes. The interviews were audio recorded and transcribed verbatim. To aid in the interpretation of the data, each interview was supplemented with field notes to provide additional meaning and understanding. Both types of interviews were guided by questions inspired by a similar study to develop a digital solution within the health service context but each had a different target group (i.e., childhood cancer survivors) (Wärnestål & Nygren, 2013). Thus, the interview guide and accompanying probing questions were adjusted to fit the current stakeholder groups.

The interview guide contained four broad subject areas: 1) earlier experience with and current interest in a digital solution in the RTW sphere, 2) critical features and content necessary in digital RTW solutions to meet service user needs, and 3-4) possible barriers and success factors for implementation in primary and specialist MHSs in relation to the entire RTW process. To avoid influencing participant responses, the interview was organized to pose the most general questions first. Furthermore, the questions were structured to avoid leading answers and closed yes and no answers. The interview guide areas were broad so that data could be used for an inductive analysis in Study I and also for a deductive analysis in Study II. The individual interviews were conducted by one researcher. The focuses group interviews involved two researchers; one moderated while

the other took notes and helped to facilitate the dialogue as needed. Based on their preferences, the interviews were conducted on the campus area, the participants' workplace (for managers and RTW professionals), or service users' homes. Data collection continued until saturation was reached, meaning that no additional insights or new information arose in the subsequent interview. The decision to stop interviewing was discussed between the researchers to assure that saturation was met.

Data analyses

The Study I analysis was performed according to Graneheim and Lundman (2004) framework for conducting inductive qualitative content analysis. This included reading through the field notes and transcribed material to get a broad understanding of the content. Meaning units that corresponded with the aim of the study were extracted and subsequently reduced into smaller meaning units that represented the original statements (Table 3). These condensed meaning units were coded by attributing phrases representing the transcribed interview's manifest content. The coding procedure was performed until consensus was reached. Subsequently, the codes were organized into categories that represented the same phenomena. The process of defining and sorting categories were iteratively refined until consensus was formed to capture the manifest content, i.e., content representing what was being said with a minimum level of interpretation. Throughout the analysis, the focus was to describe the visible components from the transcripts to represent best what the respondents said in their own words. In contrast to the categories, the themes represented an underlying meaning to a greater extent and were interpreted through researchers' previous experiences and knowledge in the field. Content analysis lends itself well to examining large data sets from different stakeholder groups due to the process of data coding. This procedure helps to determine how words and word patterns are used in context (Graneheim & Lundman, 2004; Vaismoradi, Turunen, & Bondas, 2013).

Study II, the analysis procedure of the transcribed interview material was subject to a "top-down" (i.e., deductive) thematic analysis, according to Braun and Clarke (2006). The themes were informed by the seven attributes of the Theoretical Framework of Acceptability (TFA) (Sekhon et al., 2017). Thematic analysis is recognized as a flexible method that can be used in deductive interview studies when the researchers want to focus on specific aspects of the data corpus during the analysis procedure, such as understand how people consider a healthcare intervention to be appropriate, based on expected or experienced cognitive and emotional responses to an intervention (Clarke, Braun, & Hayfield, 2015; Sekhon et al., 2017). Therefore, thematic analysis is appropriate to examine service user perceived acceptability of a digital RTW solution.

Study II focused on investigating vital acceptability factors before (i.e., prospective acceptability) participating in the mWorks intervention. The analysis procedure began with thoroughly reading field notes and transcribed interview material to gain a sense of the whole material. A software tool developed to analyse qualitative data, Open-Code version 4.03, was subsequently used to organize and gain an overview of the data. Content from the transcripts that corresponded with the acceptability attributes was then assigned a theme and collapsed into smaller components to clarify distinctions in the data. For example, one participant explained how digital solutions may provide a sense of security and safety since mWorks makes the RTW support accessible. This was assigned the acceptability construct of *affective attitude* and assigned to the theme "creates a sense of safety".

The interpretation of the data was continuously scrutinized and refined, which was an iterative process, to ensure that the interpretations of the material were credible. Next, the research team worked together continuously to ensure that the narrative represented the data, which helped to form consensus. To avoid confirming personal experiences or missing data inconsistent with personal beliefs, all data were considered and revisited throughout the analysis procedures by the research team with diverse expertise, background, and experiences. In addition, the research team involved both junior and senior researchers, with the thesis author having his own experiences of mental illness, RTW, and sick leave.

Table 3. Example of the analysis process in Study I

Interview	Meaning of unit	Condensed meaning unit	Code	Categories
I am going to explain how I feel about all this…Long silence… I feel set aside by having to deal with all my problems without any help. I don't know if this is any valuable information for you?…Long silence..… I hope so, at least. Do you want me to explain in more detail?	I feel set aside by having to deal with all my problems without any help	He/she feels set aside without help	Insufficient support, feels neglected	Need for accessible RTW chain
Yes. And also things like this… maybe some form of links to different sits where it says for example what is a depression huh, what is this huh, what is a crisis reaction, how can this arise, that you get a little more understanding	Links to different sites where it says for example what is a depression huh, what is this huh, what is a crisis reaction, how can this arise, that you get a little more understanding	Link with info about depression and what happens in the body	External link with info about depression	Strategies for handling stress and anxiety

Study III

Participants and recruitment

Throughout the mWorks development process, stakeholders were recruited by means of a purposeful sampling method to maximize the targeted population of the research context (Marshall, 1996). Stakeholder participants were previously known by the researchers or were suggested by strategists of the County Council of Region Skåne. Known participants were initially contacted by e-mail and asked to participate, while other, previously unknown, participants were contacted through the strategist. During the think-aloud interview (*Iteration 6*), four participants from the service user group were recruited from studies I and II and one was recruited via a flyer posted on a billboard in the general campus area at Lund University. Public involvement was recruited via convenience sampling (Marshall, 1996). During the initial stage of co-design, there were insufficient younger stakeholders (i.e., 18-25 years of age). Therefore, a secondary school teacher and service user at a known clubhouse (i.e., user organization with SE as part of their social program) were contacted by email and informed about the study. In the next step, these individuals told stakeholders who agreed to participate and suggested a time and date. The combination of sampling methods allowed for generation of a broad group of information-rich stakeholders who were especially knowledgeable about or experienced with the current iteration aims and could participate in a time efficient manner. This allowed for a multitude of perspectives to emerge until sought after saturation appeared to be achieved (i.e., obtaining a comprehensive understanding by continuing to sample until no new information is acquired) (Palinkas et al., 2015).

Five stakeholder groups participated in the co-design process during the prototype development of mWorks. Their ages ranged from 18-65 years, with a mean age of 37 years. The gender distribution was approximately equal (women=56%). In total, 86 stakeholders participated: 1) service users (n=25, 29%) with experience of sick leave due to CMD (i.e., depression, including depressive episodes inherent in bipolar disorder, and/or anxiety disorder), three of whom had professional experience of digital system development (i.e., software and gaming designers, and app development in the private sector); 2) RTW professionals (n=19, 22%) such as occupational therapists, rehabilitation coordinator (RC), SE employment specialists and CBT psychologists; 3) employer (n=1, 1%); 4) design and system developers (n=4, 5%) from regional and national levels of the healthcare system; 5) public involvement (n=37; 43%) including

young adults (n=22) from a secondary school class who represented frequent users of digital tools and members and mentors (n=15) from a clubhouse.

Data collection and iteration procedures

Data collection took place between March 2018 and November 2020. As seen in Table 4, multiple data collection methods were used during *Iteration 1-7*, e.g., audio and video recordings, field notes, mock-ups, photographs, think-aloud interviews, and feedback sheets. Between iterations, data were synthesized to allow for feeding information forward to further refine the prototype.

The co-design procedure was initiated by *Iteration 1*, a stakeholder workshop of national and regional digitalization interests within MHSs, as well as service user representatives and RTW professionals familiar with supported employment and CBT. The workshop was commenced by presenting the mWorks project, pre-prototype with initial design ideas, two personas, and typical frustrations in the RTW process. Stakeholders were divided into two groups with an even distribution of stakeholder group participants. Open-ended questions regarding frustrations and needed content features of a digital RTW solution for persons with CMD were discussed. Stakeholders were prompted to use post-it notes to stimulate idea generation while discussing different features of mWorks such as the design, content, usability, and potential service user needs. *Iteration 2* involved four iterative cycles with a reference and a user group. This iterative process allowed oscillation between ideation (reference group) and validation (user group). The reference group met at the beginning and end of each workshop to introduce the co-design session and discuss elicited, central co-design ideas. During the main part of the workshop, stakeholders were split into two different reference groups and encouraged to discuss problems and frustrations from *Iteration 1* utilizing redemption scenarios (Wärnestål, Svedberg, & Nygren, 2014). After each session, the research group compiled a requirement list and the user group, consisting of service users, was encouraged to provide feedback on the list. Further refinements to the requirements list were merged with the pre-prototype content and designs derived from the IES model. The pre-prototype was subsequently transformed into a paper prototype version that matched stakeholder group needs, values, and requirements. During *Iteration 3*, a downsizing workshop was conducted with stakeholders to inform what to include in the requirement list related to the IES and RTW process (Table 4). The workshop session was started with a PowerPoint presentation of the merged pre-prototype and co-design material from *Iterations 1* and *2*. Subsequently, the final paper prototype was presented to a software company that developed the alpha prototype. In *Iteration 4*, a downsized reference group consulted on the software programming. They

provided feedback on mWorks usability and content features, formats, and functions (Table 4). Stakeholders were asked to complete predefined tasks in the digital alpha prototype, write down comments and bullet points on usability aspects such as effectiveness (ability to complete a task in a specified context); efficiency (ability to complete a task with accuracy; and satisfaction (perceived comfort and pleasantness during interaction (Harrison, Flood, & Duce, 2013). The public involvement (*Iteration 5*) included workshops with young adults from a secondary school class and members and mentors from user organizations (clubhouses) familiar with the SE model. The students were separated into three groups and handed a table top device to interact with the alpha prototype. Each group discussed aesthetic design, content features, formats and function, motivation to use, and navigation. In addition, they were prompted to place post-it notes on a mock-up that represented the discussion points. During the clubhouse workshop, service users and researchers jointly presented a PowerPoint about the project and alpha prototype. Participants were prompted to discern critical implementation factors for real-world usage of mWorks via an open discussion. During *Iteration 6*, service users with experience of CMD verbalized their thoughts, feelings, and experiences while doing predefined tasks in mWorks (think-aloud interviews). Each user was asked a series of open-ended questions regarding their experiences (Table 4). This step allowed evaluation of the usability of the newly developed beta prototype. For *Iteration 7*, the last iteration, the downsized reference group from earlier iterations provided last feedback on the alpha prototype. Their comments were compiled and processed by the research team to further enhance the prototype before it was tested for intervention delivery in a real-world context.

Table 4. Overview of iterations performed and data collection procedures during the mWorks co-designed prototype development.

	Iteration 1 Pre-prototype	**Iteration 2 Pre-prototype**	**Iteration 3 Paper prototype**	**Iteration 4 Alpha prototype**	**Iteration 5 Alpha prototype**	**Iteration 6 Beta prototype**	**Iteration 7 Beta prototype**
					Change of software company		
Purpose	Workshop with stakeholders to inform the pre-prototype draft in relation to legitimacy, relevance, and content features	Iterations between reference and user groups to inform the development of content and features in relation to typical RTW frustrations (four cycles)	Downsizing workshop to inform decision making to identify and prioritize most critical content features, format and functions needed to condense the material into a paper prototype	Downsized reference group trialled the alpha prototype to inform on what needed to be refined during software development	Public involvement of young adults and clubhouse members and mentors to inform the alpha prototype in relation to public terms of content features and format, and to inform clubhouse members in terms of acceptability	Think-out-loud interviews when users verbalized thoughts while using mWorks; aimed to inform usability dilemmas during software development of the beta prototype.	Downsized reference group trialled the beta prototype during software development to refine content and optimize function and usability

Recruited stakeholder groups	Total (n=11): 1) User, n=3 2) RTW professional, n=4 4) Digital system developer, n=4	Total (n=16): 1) User, n=10 2) RTW professional, n=5 3) Employer, n=1	Total: (n=6) 1) User, n=2 2) RTW professional, n=4	Total: (n=5) 1) User, n=2 2) RTW professional, n=3	Total: (n=37) 5) Public, n=37	Total: (n=6) 1) User, n=6	Total: (n=5) 1) User, n=2 2) RTW professional, n=3
Data collection	Audio recordings; field notes; mock-ups; photographs	Audio and video recordings; photographs; scribblings; field notes (four sessions)	Audio recordings; photographs; scribblings; field notes	Feedback sheets (Word document), comments, bullet points, and screen-shots of digital content and features	Audio and video recordings; photographs of mock-ups; field notes	Audio and video recordings; fieldnotes; open-ended interview questions, e.g. “Did you understand how to use mWorks? Was something easier or more difficult to do? What would you change?”	Feedback sheets (Word document) with bullet points and related screenshots of digital content and features

RTW=return to work

Data analyses

All data gathered during *Iterations 1-7* of the development process were subject to qualitative content analyses, according to Graneheim & Lundman (2004). The chosen analysis method is preferred when processing a large dataset in order to capturing diverse patterns in the material (Graneheim, Lindgren, & Lundman, 2017; Graneheim & Lundman, 2004). The initial analysis step involved reading through fieldnotes, listening to and watching the digital recordings, and examining visual data sets such as photographs, scribblings, and mock-ups, to gain a comprehensive understanding of the data. Sequentially, the audio and video recordings were transcribed verbatim and visual data were observed and described in words for merging into sections with other text portions. The next step involved identifying meaning units associated with delivery and content features, functions, and formats that was accumulated during the co-design process. The meaning units were then condensed, and assembled into categories. These categories represented similar patterns and phenomena. Lastly, the categories were sorted into themes that heighten degrees of abstraction and interpretation. The process of defining and sorting categories and themes were performed iteratively until consensus was achieved (Graneheim et al., 2017). During *Iteration 2*, the research team met between each reference group workshop to compile a requirement list from elicited data. This may have contributed to biased interpretations in favour of what the research team deemed most important (Korstjens & Moser, 2018). However, the researchers synthesized data separately and compared their syntheses until concerns were resolved. In addition, each requirement list was presented to the reference group during the next workshop to allow them to validate or reject the interpretations.

Study IV

This process evaluation study exists in the feasibility stage of the MRC framework and was intended to evaluate the context, implementation process, and mechanism of impact of mWorks (Grant, Bugge, & Wells, 2020; Moore et al., 2015). The study was bounded by a single case, in accordance with Yin (2013). The central phenomena that constitutes the unit of analysis focuses on the delivery process of the mWorks intervention during a 10-week-period in the context of the primary MHS units with authority to bestow medical sick leave certificates.

The mWorks intervention

mWorks is designed as a web-based platform inspired by the IES model to support persons with CMD back to work (Bejerholm et al., 2017). mWorks is a person-centred tool designed to foster ongoing self-management during the RTW process and at work, and the content features are updated as the individual progresses in their RTW journey. Service users and RTW professionals are provided with separate manuals. RTW professionals can navigate freely in an administrative version but do not have access to the user's self-management tool. To foster a positive user experience, mWorks is permeated with positive language, and has an absence of limitations, diagnoses, and medical orientation.

During their first login session, the service user is presented with a tutorial to provide context and explain that mWorks is their support tool for RTW and should be used according to their own preferences. An AI-directed conversational agent (i.e., chatbot) called "Mott" guides service users with bite-sized information in order to pedagogically initiate usage. Mott nudges service users to start with the content feature called "My mWorks" (Figure 2). My mWorks initiates usage in a safe and pleasant digital space where the user is prompted to elicit their self-narrative concerning past and present experiences. The user can write notes about anything they feel is important, use a motivational interviewing ruler, and elicit pro and con questions to explore intrinsic drives for RTW. Service users may freely use mWorks' "five-steps back to work". These steps include:

1) My Resources: designed to help the service user identify their strengths and resources and compile a work profile used in different occupational settings to communicate their capabilities effectively;

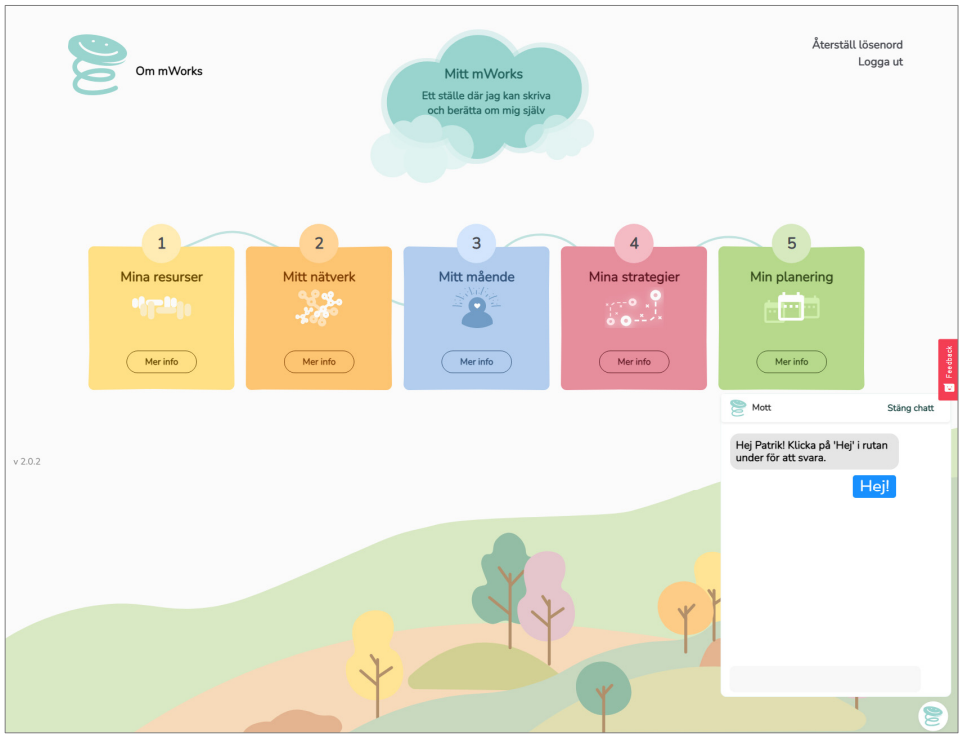
2) My Network: helps coordinate, identify, gather and clarify essential others, their function, and contact information;

3) My Well-being: helps to detect thoughts, emotions, and behaviours that affect service user well-being at work. In addition, this step provides support for decision-making about disclosure of their mental health to others and psycho-educational digital film clips of fictional success stories;

4) My Strategies: helps identify difficult thought-emotion-behaviour situations at work, provide a list of beneficial work-health balance and cognitive strategies to support coping with these situations, and compile a list of preferred strategies to use;

5) My Planning: includes helping service users strategically plan the RTW process, using goal-setting strategies, a to-do list, and a schedule as support.

mWorks is intended to facilitate the service user's individual RTW process, elicit their experiences and strengths, and distinguish what is essential for them during the RTW process and ultimate return to work. Service users are presumed to benefit from informed decisions, a view and belief of their strengths, recognition of essential others, well-being, and related strategies used and planned during sick leave and when at work. As such, mWorks may increase service user control during their RTW process and is assumed to increase empowerment, self-efficacy, own attitudes towards depression (stigma), decreased symptoms, and, hopefully, increased occupational engagement, quality of life and global health, which are likely to precede reduced sick leave days



Note. mWorks=About mWorks, Mitt mWorks= My mWorks. The five-steps: (1) My Resources, (2) My Network, (3) My Well-being, (4) My Strategies, (5) My Planning.

Figure 2. Overview of mWorks, a web-based self-management tool.

Implementation program

During Study IV, the mWorks implementation program intervention was evaluated according to established process evaluation frameworks (Moore et al., 2015; Saunders, Evans, & Joshi, 2005). The implementation program describes the planned clinical intervention in the context of sick leave certificate issuance in a Swedish primary MHS context. The implementation program was initiated by preparatory planning, such as designing written manuals and the mWorks website six months prior to the intervention start. Preparatory activities also included initiating contact with stakeholders. This involved creation of mailing list, introduce mWorks broadly to stakeholder gathering, and anchoring via telephone, email and physical meetings. Next step involved introducing unit managers and RTW professionals to the project: 1) Introduce the mWorks concept via online meetings 2) Take part of written information about the project. The RTW professionals subsequently started to recruit service users by purposeful sampling according to inclusion criteria (See Participants and recruitment), and informing potential participants about mWorks with the aid of flyers and the mWorks website. Implementation was followed by a half-day workshop that educated RTW professionals who would deliver mWorks to service users. The education included the previous research findings regarding the IES model and initial formative research on mWorks, information regarding the delivery, their role in helping service users with usage, and training of user administrators in navigation within mWorks. Active delivery at the intervention start constituted of a minimum of three face-to-face meetings (Table 5) with RTW professionals in the MHS context assigned to deliver mWorks over ten weeks.

Table 5. Description of mWorks delivery program

Delivery step	Content	Time
Dialogue meeting 1: Introduction	Inform about mWorks content and usage Deliver manual brochure and login details	Baseline
Dialogue meeting 2: Follow-up	Follow-up of ambiguities regarding usage Planning for continuous support	2 weeks post intervention
Continuous support and follow-up	Follow-up support according to service user needs and preferences	0-10 weeks, continuously
Dialogue meeting 3: Completion	Follow-up on user experience of mWorks and what it provided	At 10 weeks

Participants and recruitment

Initially, primary and specialist MHS organization in the County Council of Region Skåne with the authority to bestow medical sick leave certificates for persons with CMD was included during recruitment, with RTW professionals who provide RTW support or services in conjunction with the medical team. In a primary MHS context in Sweden, these positions are typically called Rehabilitation Coordinators (RC) and can be held by occupational therapists, physiotherapists, nurses, social workers, or psychologists (SKR, 2022). In 2019, the opportunity to participate in the evaluation of mWorks was offered to primary MHS units with an RC or RTW professional with a similar assignment to facilitate and coordinate the RTW process for service users. Attempts to recruit were also carried out at the regional and national network of primary MHS and a national RTW network with practitioners, researchers, and service users four times between 2019-2021. Notices in national papers and social media were published in 2021. Initially, three primary MHS units enlisted. However, attempts to participate ended due to COVID-19 pandemic restrictions. The primary MHSs re-directed their attention and resources elsewhere due to the ongoing pandemic. Two RTW professionals at two separate units stayed positive during the shutdown and entered the study in the fall of 2021, when social restrictions eased. The mWorks intervention was eventually tested in these two primary MHS units in the southern region of Sweden, with participants including RTW professionals (n=2) and service users (n=6).

The included service users were persons with a medical certificate for CMD, i.e., depression episodes and recurrent depression disorder (F32.0-F32.2, F33.0-F33,2), including depressive episodes inherent in bipolar disorder (F31.3, F31.4) without psychosis, and/or anxiety disorders (F40-41) by ICD-10 code classification (WHO, 2004a), being on sick leave (< 2 years), and between the ages of 18-65 years. Service users were initially purposely selected based on their diagnosis by a RTW professional responsible for delivering mWorks. Subsequently, potential participants were informed about the study by the RTW professional, who confirmed participant suitability with regard to the inclusion criteria. The RTW professionals were employed as RCs at 20-25 percent of full-time at separate primary care units in the south region of Sweden. They were 29 and 39 years old. Both were women and had university educations. The service users were middle-aged and identified as women (Table 6). Self-reported diagnoses were: anxiety and other diagnosis (exhaustion) (n=1); depression (n=3); depression and another diagnosis (exhaustion) (n=1); and comorbidities of depression, bipolar and anxiety disorder (n=1).

Table 6. Demographic and clinical characteristics of the six mWorks service users

Characteristics	Participants
Sex	
Female/male	6/0
Age in years	
Mean, SD (Range)	52, 7 (44-64)
Country of origin	
Sweden	4
Germany	1
Iraq	1
Civil status	
Married/not married	3/0
Divorced	3
Living situation and children	
Cohabiting/living alone	2/4
Have children, Yes/No	6/0
Educational level	
Middle school <16	0
Upper secondary >16	2
College/university >18	4
Sick leave status	
Sick leave days, mean (range)	264 (80-365)
Full time sick leave, Yes/No	4/2
Clinical characteristic	
Depression (female/male)	4/0
Bipolar (female/male)	1/0
Anxiety (female/male)	2/0

Data collection

Data collection took place between August 2021 and June 2022. A variety of qualitative and quantitative data were gathered to evaluate mWorks in relation to the context, the implementation process and the mechanism of impact (Table 7). During the 10-week study period, data collection included an online questionnaire, SMS questionnaire, written memos, and semi-structured follow-up interviews (Figure 3). In addition, the digital platform recorded frequency and time of use.

Table 7. Blueprint of process evaluation components

Process evaluation components	**Description**	**Process evaluation questions**	**Data sources**
Context	Contextual factors that affect implementation, intervention, mechanism of impact	What contextual barriers and facilitators affect implementation of delivery?	Follow-up interviews, online questionnaire, documentation, field-notes
Implementation	What and how was delivery achieved	Was mWorks delivered according to plan?	Follow-up interviews, online questionnaire, documentation, field-notes
		What adaptions were made to fit the context?	Follow-up interviews, documentation, field-notes
		What dose did service users receive, and RTW professionals deliver?	Online questionnaire, log data
Mechanism of impact	What are service users and professionals' response to interacting with the intervention	What were service users' and professionals' experience of mWorks?	Follow-up interviews, online questionnaire, documentation, field-notes
		How does mWorks produce change?	Follow-up interviews, online questionnaire, documentation, field-notes

Note: RTW=Return-to-work

For service users, the online questionnaire was distributed at baseline and after the ten-week study period. Baseline questions contained demographic and clinical questions. In addition, the questionnaire contained a variety of different instruments, with approximately 130 questions in total. Service users received the SMS questionnaire bi-weekly, for a total of five times during the ten-week study period. The questions related to service user perceived usability (inspired by the PACMAD usability constructs) (Harrison, Flood, & Duce, 2013), and their experience regarding the dose and delivery of the intervention.

RTW professionals were prompted to document their reflections in "My memos" throughout the study period. The memos contained both free text questions and 1-10 Likert scales regarding fidelity, dose, and reach, and were inspired by Saunders' framework for process evaluation (Saunders et al., 2005). To avoid recollection bias, RTW professionals were instructed to respond to the questions in connection to the dialogue meetings. In addition, RTW professionals were sent an online questionnaire after ten week study period and prompted to elaborate on these questions to provide more detailed accounts of their experiences. These were the same process evaluation components highlighted in the memos. Both RTW professionals and service users participated in follow-up individual and group interviews regarding their experiences of the implementation process and the intervention. For these, the interview guide involved questions regarding fidelity, received and delivered dose, reach, context, and influencing factors that could affect the impact of the intervention (Saunders et al., 2005).

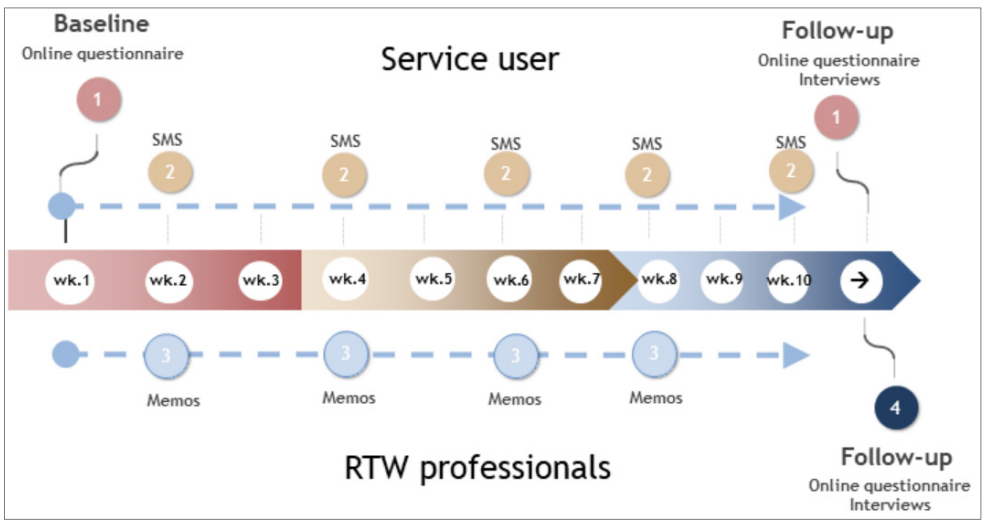


Figure 3. Overview of data collection during Study IV

Included questionnaires

Empowerment Scale (ES)

The Empowerment Scale, developed by Rogers and colleagues, has good psychometric properties (Rogers et al., 1997). ES has five subscales: self-efficacy/self-esteem, power/powerlessness, community activism, righteous anger, and optimism/control over the future. Each item is rated on a scale from strongly agree = 1 to strongly disagree

= 4. The calculated sum score can range from 28 to 112, with a higher score indicating a higher view of empowerment.

Self-Efficacy Scale (GSE)

The General Self-efficacy Scale is a ten-item scale that assesses the strengths of an individual's belief in their own ability to respond to novel or difficult situations and deal with any associated obstacles or setbacks (Schwarzer & Jerusalem, 1995). Each item can be graded from 1 = 'not at all true' to 4 = 'exactly true'. The sum ranges from 10-40, and more points indicate higher self-efficacy.

Depression Stigma Scale (DSS)

The Depressions Stigma Scale measures the stigma associated with depression (Griffiths, Batterham, Barney, & Parsons, 2011). The scale has good psychometric properties and consists of two subscales for two different stigmas, i.e., personal and perceived. Each subscale consists of nine items rated on a 5-point Likert scale ranging from strongly disagree = 0 to strongly agree = 4. The total score for each subscale ranges from 0 to 36. A higher score indicates greater perceived stigma.

Montgomery-Åsberg Depression Self Rating Scale (MADRAS-S)

The Montgomery and Åsberg Depression Self-rating Scale (MADRAS-S) is a sound psychometric scale measuring depression severity (Montgomery & Asberg, 1979). The instrument consists of nine self-rating topics: mood, sleep, appetite, feelings of unease, concentration, emotional involvement, initiatives, pessimism, and zest for life. Each item uses a seven-point scale with four defined and three undefined intermediate scale steps, and can range from 0-54 points. Scores indicate no or hardly any depression (0-12), less severe depression (13-19), moderate depression (20-34), and severe depression (≥35).

Generalized Anxiety Disorder (GAD-7)

The GAD-7 instrument measures anxiety severity (Spitzer, Kroenke, Williams, & Löwe, 2006). Its seven items can be graded between 0-3, with 0 representing 'not at all', 1 'several days', 2 'more than half the days', and 3 'nearly every day'. The summed score can range from 0 to 21, where 5, 10, and 15 represent mild, moderate and severe general anxiety.

Profiles of Occupational Engagement Scale (POES-S)

POES measures occupational engagement and shows good psychometric properties (Bejerholm & Lundgren, 2015). The instrument consists of two parts. The first is a 24-hr time-use diary that focuses on activities, the social and geographical environment, and reflections about the performed activities. Next, the content of the time-use diary is self-assessed on a five-point scale in relation to nine items addressing balance in the daily rhythm of activity and rest, the variety and range of activities, time spent in social and geographical environments, dealing with social interactions, reflections on occupational experiences, perceptions of meaningful activity, and routines and initiations of activities. The sum score represents a higher score of occupational engagement and ranges from 9-36.

EuroQol 5-dimensions (EQ-5D)

The EQ-5D is an instrument that evaluates generic quality of life over five dimensions (TheEuroQolGroup, 1990). These dimensions include mobility, self-care, usual activities, pain/discomfort, and anxiety/depression. The instrument also includes an item where the respondent can report their perceived health status ranging from 0 (the worst possible) to 100 (the best possible).

Data analyses

The process evaluation had a case study design that aimed to obtain a multitude of complementary data about the delivery of mWorks in a primary MHS context. Through triangulation of qualitative and quantitative data, the research questions at hand can be comprehensively understood (Table 7) (Borglin, 2015). Qualitative content analysis is preferable as it is well suited, regardless of the research paradigm, to analyse a variety of research questions by describing the manifest content or interpreting the latent and underlying content (Graneheim et al., 2017; Graneheim & Lundman, 2004). Initially, the qualitative data were transcribed verbatim. The analysis procedure was inspired by similar process evaluations on digital solutions (Bejerholm, Allaskog, Andersson, Nordström, & Roe, 2022; Svedberg, Arvidsson, Larsson, Carlsson, & Nygren, 2019). The transcripts and written memos were subsequently analysed using qualitative content analysis that is well situated for handling large and diverse datasets (Graneheim et al., 2017; Graneheim & Lundman, 2004). The analysis procedure entailed reading the field notes, memos, and transcripts thoroughly to gain an understanding of the overall data. Next, the content was deductively identified and organized by process evaluation constructs: contextual factors, implementation process, and mechanism of impact (Moore et al., 2015). For example, one service user explained

how mWorks provided them with meaningful insights about themselves and was attributed to the mechanism of change construct. The different data sources were then triangulated to compare similarities and differences between data sets. Finally, content that illustrated a similar pattern was coded to illustrate and clarify nuances in the material. This was an iterative process to ensure that the narrative representing the data was coherent. The final step involved transforming the analysis into a coherent narrative representation until consensus was formed. The data analysis was critically scrutinized during the procedure to ensure consensus, mitigate interpretation bias and increase the trustworthiness and rigor.

The quantitative data were analysed using IBM SPSS version 28.0. Descriptive statistics were used to describe the sociodemographic characteristics of the service users. Comparative statistics were also used to explore tentative trends in user responses between baseline (T1) and after the ten-week study period (T2), using non-parametric (Wilcoxon signed rank tests) and parametric paired-sample statistics (paired t-tests). The confidence intervals were set to 95% for both tests, with a significant p level of < 0.05. Cohen's d statistics were used to calculate the effect size, a measure of the effect of an intervention (mean difference by the standard deviation of the difference, small effect 0.2, moderate effect 0.5 and 0.8 large effect) (Cohen, 2013).

Ethical considerations

The current thesis was conducted in accordance with the ethical standards of the 1964 Declaration of Helsinki, revised in 2008. All included studies were approved by the Lund University Regional Ethics Committee, Sweden (application number 2017/324). The principles involve ethical guidance for researchers to abide by when performing medical research on human beings. The principles underscore the responsibility and duty to keep study participants' health and well-being before researchers' self-interest and the knowledge that can be derived. The researchers who collected the data were thus all sufficiently qualified and trained in research inquiry methods. Consistent with the principles of informed consent and voluntary participation, all participants were given oral and written information before partaking in the study to make an informed decision regarding participation and subsequently provided written consent. All participants were informed about the option to stop their participation at any time without any consequences.

Consistent with the principles when conducting reach on humans, it is vital to safeguard the integrity and anonymity to prevent harm from befalling study participants, which entails intercepting unauthorized persons from accessing the gathered material. As such, the data was securely kept at the research facility in a locked cupboard, with access only available to involved researchers. To protect the private data in mWorks, access to study participants' login credentials was strictly available to them. Furthermore, the data was encrypted to increase security. During the analysis procedure, data mentions of participants were stripped of identifiable information and marked pseudo-anonymously. In addition, the transcripts were replaced in some conditions where the analysis value did not decline, but the integrity of participants was protected.

An important consideration is to not impede care as usual, which informed the decision not to evaluate the intervention as a replacement, but rather as a complement to usual care. Thus, it was also critical not to intervene in any ongoing treatments that study participants had planned at the primary care unit or somewhere else. However, uneasiness for study participants may have been present, for example, expected to answer questionnaires recurrently during the study period. Before inclusion, service

users retrieved oral and written information regarding how frequently and time consuming the data collection procedures would be. However, the evaluation design of Study IV required participants to engage and share their experiences during their RTW process actively. Participants may have found participating in the data collection as burdensome, as putting them outside their preferred comfort may have been part of the process.

The studies included in this thesis were motivated by the large number of people who suffer from mental health problems. They can benefit from gaining a personal digital tool to empower them in the RTW process. That tool, combined with other RTW support, may improve prospects for return to work and achieving employment in a way that supports who they are and what they can be.

Results

The role and legitimacy of a digital RTW solution

In Study I, the resulting main theme represented the central finding and showed that a digital solution enables service users to take control of their RTW process. In addition, the four sub-themes emerged: S*upporting service user empowerment, Addressing implementation challenges, Creating a positive user experience,* and *Critical content for return to work* (Table 8).

Table 8. Subthemes and categories form the perspective of three stakeholder groups, and the main theme: a digital solution enables a service user with common mental disorders to take control over the return to work process.

Subtheme	**Category**
Supporting service user empowerment	Owning one's RTW process Promotes decisions with user consent Accessible RTW chain
Addressing implementation challenges	Professional attitudes and beliefs Legitimacy of digitalization Surrounding legislation and policy Unforeseen costs
Creating a positive user experience	Simplicity The importance of design Emphasis on resources and strengths Alternative communication approaches
Critical content for RTW	Accessible rehabilitation network A clear plan Strategies for handling stress and anxiety

RTW=return to work

Stakeholders assumed that a digital solution could fill the role of *supporting service user empowerment* during their journey back to work. By using a digital solution, service users were perceived to assert greater ownership of their own RTW process. Increased control by the service user was attributed to becoming a more informed and active agent in the decision-making process. Stakeholders predicted that a digital RTW solution had the potential to provide accessible RTW support in an otherwise complex context that was difficult to understand, rigid, and otherwise too challenging to overcome.

> "Well, the mental health service is aimed at those people who are not self-sufficient. Those who actually are (self-sufficient), don't get access to adequate support...But you are still forced to go there while getting worse and worse." [Service users 1]

Some RTW professionals cautioned that a digital RTW solution could inadvertently replace ordinary support and shift the responsibility for recovery and RTW onto the service users, leaving them more exposed and without the aid of professionals.

Addressing implementation challenges related to digital solutions perceived as a prerequisite for mWorks' success. According to stakeholders, meeting RTW professionals' attitudes and beliefs, such as the fear mWorks would threaten their jobs, being extra work, and low interest or ability to use digital solutions, were vital aspects. In addition, privacy and confidentiality regulations were critical features that must be anticipated for successful implementation.

> "Say that you have a new method, that creates a lot of doubts. If you would create an app that is so good that my job is no longer needed, then you would not want to support it, would you?" [RTW professional 2]

Influential managers agreed to the legitimacy of digitalization and stated that "it is the future," "knocking on the door," and was in general viewed as a force for good. However, the surrounding legislative and policy regulations of privacy and confidentiality made it difficult to utilize digital solutions. Constant and rapid technological advancements made it difficult for legislation and regulations to maintain relevance, as they quickly became obsolete. Another implementation barrier was unforeseen costs associated with digital solutions. Service users were hesitant to pay for a software application and other associate expenses, such as the need for an internet connection. RTW professionals agreed that service users, to some extent, are disadvantaged economically and this can therefore be an obstacle to adoption.

C*reating a positive user experience* meant that stakeholders frequently said that the system had to be simple and easy to use. According to stakeholders, software errors, lack of responsiveness, and complicated learning were expected to be cognitively

demanding and generate a loss of engagement. Service users wanted mWorks complexity to be flexible, depending on where they currently were in the RTW process and their symptom severity.

> "What I feel, when I have been down, when everything is difficult, to go through a mobile app with lots of,…lots of settings that I would perhaps normally like…. when I am down, I have no strength for that, …then I would almost like to have it baby-simple." [Service users 1]

Emphasizing service user resources and strengths, in contrast to their limitations and shortcomings, was pivotal to avoiding negative reinforcement. Lastly, the utility of providing alternative communication approaches emerged as critical to fostering a positive user experience. Conventional pathways of communication were sometimes perceived by service users to be as stressful and anxiety-producing.

Stakeholders expressed the need for a wide variety of *critical content to enable RTW* for service users. Critical content included interactive communication content to provide quick and accessible support to key RTW professionals in their rehabilitation network. This support included their physiotherapists, medical doctor, or even family members and could prevent stress and anxiety. Stakeholders valued content that clarified where service users were in the broader RTW process because this could aid in identification and formulation of a clear plan to progress towards RTW. Thus, calendar, schedule, and reminder features were commonly identified as important to define a clear plan for the future. In addition, "to-do lists" and goal-setting strategies were suggested to improve motivation by formulating authentic and meaningful milestones. *S*trategies for handling stress and anxiety at the workplace and in everyday life were perceived as necessary and included mindfulness, cognitive behaviour strategies, and relaxation exercises.

Critical acceptability factors

Study II provided further formative investigation from the perspective of service users regarding critical acceptability factors prior to the development of mWorks (i.e., prospective acceptability), according to the Theoretical Framework of Acceptability (Sekhon, Cartwright, & Francis, 2017). The most frequently raised acceptability construct was burden, followed by affective attitude, ethicality, perceived effectiveness, opportunity costs, self-efficacy, and last intervention coherence (Table 9).

Table 9. Acceptability of mWorks, a digital return to work solution according to the Theoretical Framework of Acceptability

Construct (%)	**Theme**
Affective attitude (18.9)	Avoids feelings of being judged Creates a sense of safety Creates a harmonious feeling
Burden (28.2)	Need for flexibility regarding feedback Motivational difficulties Cognitive strain
Ethicality (14.8)	Increase service user control Reduce clinical and deficit-oriented approach
Intervention coherence (4.9)	Counteracts evasive behaviours
Opportunity costs (11.2)	Complement to traditional RTW support, not a substitute Safe digital space to progress
Perceived effectiveness (13.3)	Involves the entire RTW process Support regardless of place and time Enables a proactive RTW process
Self-efficacy (8.4)	Confidence in using digital platform Increase stress levels Dependent on age and earlier digital experiences

RTW=return to work

To be acceptable, mWorks needed to avoid evoking feelings (*affective attitudes*) of being judged. Service users feared that a judgmental tone would produce a sense of guilt and reinforce negative thoughts, emotions, and behaviours. Instead, they found that mWorks had to create a sense of safety by providing support according to their needs, regardless of time, pace, or place. This contrasted to traditional RTW services, which they perceived as lacking in provision of long-term, sustainable support.

> "But three weeks later, you are back at square one anyway...they felt that you were done there, somehow." [Individual interview 10]

The design also needed to produce a harmonious impression with the focal point on positive aspects and solutions to their circumstances, such as their strengths and resources. This was in contrast to negative aspects such as their diagnosis and limitations.

Feedback features were identified as a double-edged sword. On one hand, feedback could become *burdensome* as negative thoughts, emotions, and behaviour patterns became apparent. On the other hand, feedback was perceived as a powerful tool to increase motivation by illustrating a service user's progress towards RTW by rewarding completion of reaching certain milestones.

Service users further highlighted the need to limit *cognitive effort* and cognitive demand for interacting with mWorks. Cognitively demanding tools were viewed as burdensome and a barrier to usage. Thus, the cognitive barrier needed to be sufficiently low for service users to intuitively understand the concept, usage, and how to orient themselves within mWorks.

> "It is hard enough to do things at all, because you are so terribly exhausted or depressed. So why does it make sense to do it? ... You do not see that much meaning in doing things. You do not think that it will help anyway." [Individual interview 10]

For mWorks to align with service user values (*ethicality*), it needed to increase service user control in usage and data access. Service users themselves had to be controlling and independently choosing how to use mWorks, and with whom they wanted to share their data. Because a clinical focus was associated with reinforcing individual self-stigma for mental illness and sick leave, service users valued a lesser clinical and deficiency-oriented approach and favoured a positive tone that emphasized a positive recovery process.

The *opportunity cost* of a digital RTW solution could not be at the expense of replacing human contact. Thus, mWorks had to be designed as a complement, not as a substitute, to traditional RTW support. Some persons valued the opportunity to self-manage via a digital solution and emphasised that service user preferences should dictate the level of human interaction. Some users viewed the reduction of human support as compensated for by the opportunity of having a safe digital space to progress towards RTW.

Service user anticipation of how mWorks would produce change (*intervention coherence*) was credited to the potential to counteract evasive behaviours such as not showing up to meetings. Calendar and reminder features were explicitly identified as relevant content for strategies regarding their RTW process. These features strengthened the individual by making them more mentally prepared for daily tasks and behaviours required for RTW.

> "If it turns out that in two hours I'll have to go to this meeting and I wasn't mentally prepared, then it might be that I don't go at all." [Individual interview 1]

mWorks was felt to generate a more transparent overview for service users and their family members by displaying what they were working on. This produced feelings of accountability and increased the likelihood of following through on their commitments. Moreover, the *perceived effectiveness* was attributed to access to a portable digital support tool that accompanied them through the entire RTW process. Service users demanded content, including cognitive strategies, in mWorks to manage and gather everything related to the RTW process.

In general, service users were confident in their ability (*self-efficacy*) to use digital platforms as a support tool for RTW. They attributed their confidence to feeling skilled and experienced with managing mobile devices. However, they worried that using mWorks on their mobile device would inhibit them from performing the required tasks in mWorks. Applications on smartphones prompt for attention and users found this distracting and said it increased their stress levels. In addition, older individuals were not believed to be as confident as the younger users, but could compensated for it if they had prior experience of using digital tools on a more frequent basis.

> "The mobile device has also become stressful, because as soon as I open it, there would be SMS and stuff … So, that is why I had to put it away for a while." [Individual interview 7]

Perceptions during the co-design process

Stakeholders' perceptions elicited during the co-design process and the seven iterative cycles in Study III helped to inform the development of mWorks. The central theme showed the importance of *Empowering service users with own personal digital support solution that engages them back to work.* In addition, three sub-themes emerged: *Empowering the service user back to work; Providing service users with own personal* support tool; and *Improving service user engagement* (Table 10).

Table 10. Subthemes, categories, and subcategories from five stakeholder groups during the co-design process of mWorks with the main theme: Empowering service users with own personal digital support solution that engages them back to work

Subtheme	Category and subcategory
Empowering the service user back to work	Enabling self-management back to work
	Supplementing traditional RTW and health care services
	Providing a comprehensible overview of the RTW process
	Coordinating the support network to facilitate RTW
	Resolving ambivalence regarding mental health disclosure
	Fostering service user control
	Breaking the downward spiral
	Assisting device that identifies strengths and resources
	Helping to reshape a positive self-narrative
	Permeating a positive, hopeful and stigma-free impression
	Perceiving the encounter as warm and welcoming
Providing service users with own personal support tool	Mobilizing own strategies
	Coping with thoughts and feelings during work return
	Helping to identify cognitive strategies
	Suggesting a variety of content features
	Helping users to plan for their RTW process
	Improving data privacy
	Implementing measures to safeguard personal data
	Requesting options to interact with self-selected support persons
Improving service user engagement	Facilitating comprehension of mWorks
	Need to understand content intuitively
	Explaining the significance of mWorks content in relation to RTW
	Reducing the amount of text-based content
	Reducing the need for recall
	Need for accessible chat support
	Providing motivation and goal-setting strategies
	Addressing service users' jaded motivations
	Presenting a time-bound, measurable, and concrete development process
	Importance of a goal and reward-oriented design
	Advising for a more engaging design

RTW=return to work; Five stakeholder groups included: 1) service users 2) RTW professionals 3) employers 4) digital design and system developers 5) and public involvement

Empowering the service user back to work

Throughout the co-design process, stakeholders emphasized that mWorks needed to be a service user's own personal tool and focus on strengthening and empowering them back to work. Legal barriers were felt to impede the exchange of information between service users and RTW actors. Thus, one of the most critical design choices during initial prototype development (*Iteration 1 and 2*) consideration of mWorks role as an *enabling self-management tool back to work*. mWorks was presumed to supplement traditional MHSs by filling the service gap with personalized support. Part of the puzzle entailed content features that would help service users coordinate their RTW support network. Another part involved resolving ambivalences related to the RTW process mWorks helped the user consider ways to disclose mental health issues by posing questions such as whom, what, and how to share about their mental health. For example, mWorks assisted the user in identifying which of their colleagues they could confide in.

> "It is important how one can get decision support about telling (regarding mental health), by hearing the story of others, but also to ask some questions that might prepare me, so I can get an idea of what they (managers and colleagues) are interested in knowing." [Iteration 2, employer]

Service user control of mWorks usage was considered essential. While some preferred being tutored while using mWorks, others favoured using the tool independently. Stakeholders demanded that users be able to choose if and to what extent they received human guidance.

Service users sometimes experienced lack of self-confidence and belief, and these were perceived barriers to achieving RTW. *Breaking the downwards spiral* that service users experience during their journey back to work was a necessary content feature. mWorks had to assist service users in identifying strengths and resources in order to counteract negative thoughts and emotions and to reframe them in a positive self-narrative. Motivational and cognitive strategies to initiate goal setting, similar to the IES model, were considered essential content features. In addition, mWorks needed to permit a positive, hopeful, and stigma-free impression and users needed to experience the encounter as warm and welcoming.

Providing service users with own personal digital support tool

mWorks needed to provide service users with their own personal support tool. Therefore, the core content of mWorks was features that aided *mobilizing own strategies*.

The features had to be sensitive to service user needs and preferences. Helping users identify helpful strategies to increase coping skills when negative thoughts and emotions arose during work return was key. Providing a clear pathway by helping users formulate a plan for their RTW process was important. mWorks could thus helped service users prioritize and manage their time via a to-do list and schedule that provided structure for everyday life. Various content features could be individualized according to personal needs and preferences (e.g., adjusting the order of content completion). mWorks were thus preferred to employ a person-centred approach.

> "The possibility of adapting the modules individually, because that may not be the case. As an example, I might not want to work on my anxiety right now, but instead I may want to work on something else. That there is a smorgasbord in some way, that I can choose from to work with these parts because they are important to me right now, this is also a motivating factor." [Iteration 1, researcher]

Improving data privacy was necessary to increase service user trust and, subsequently, adopt mWorks. Thus, stakeholders suggested implementing safety measures to safeguard service users' personal data, so no one except themselves would have access to their data since the topic of mental health was deemed sensitive. Thus, safety measures such as a two-step verification login were suggested.

Improving service user engagement

During the later stages of prototype development (*Iteration 6*), essential factors to increase service user engagement became more apparent and were associated with *facilitating the comprehension of mWorks* content and purpose. Implementing a tutorial and chat-bot (i.e., an AI-directed conversational agent) to set the stage, provide a quick guide on use and navigation, and to provide meaning for back to work were suggested. In contrast, cognitively demanding content features were resulted in loss of engagement.

A perceived prerequisite in facilitating RTW was *addressing service users' jaded motivation* by provision of motivational and goal-setting strategies. Applying motivational interviewing techniques was found to intrinsically motivate service users to produce a more authentic RTW plan. Feedback needed to be included so that service users could see their progress through diagrams or visible steps forward and maintain momentum.

> "Some sort of overview of what I have succeeded with… That you fill in what you have actually done. Because sometimes you can experience that you haven't done anything. But when you can look at it (mWorks), and see that I actually did this, this, and this, it may not be what I set out to do, but I did a lot anyway. So it's some kind of progress list." [Iteration 2, service user]

Stakeholders highlighted the need to present a time-bound, measurable, and concrete process for back to work. Ideally, this would be presented as a roadmap to illustrate service user step-by-step progress, condense goals into feasible sub-goals, and also provide a visual trajectory. The road back to work could thus be embedded in a goal and reward-oriented design that provided users with opportunities to experience increased motivation.

Evaluation of a mWorks in the mental health service context

That initial contextual barrier was related to the recruitment of MHS units and participants. Once overcome, the findings showed that implementing mWorks as a web-based self-management intervention for sick-listed service users with CMD within a primary MHS context was feasible. mWorks provided RTW professionals with a valuable tool to deliver to service users that provided a person-centred practice. The findings further revealed the causal chain by which mWorks produced change was related to providing a creative space for documentation and reflection. By virtue, service users benefited by receiving authentic insights on approaching work return, which was perceived to mediate positive trajectories in empowered, engaged, and generating a more active agent during their RTW process. Both qualitative and quantitative results showed that mWorks might enhance control and benefit users during the RTW process and at work.

Context

The primary MHS units had to adjust their priorities toward prevention and treatment of COVID-19 patients and performing vaccinations. The pandemic was a substantial barrier to recruiting units and service users because professionals rarely meet service users face-to-face as compared to pre-pandemic.

> "Before, I had the patients here on site. Now I do not have this because of COVID, because I cannot see patients anymore....You almost have to be some kind of

> telemarketer. You must have, you know, outreach activities, and you cannot really show exactly what it (mWorks) is made of." [RTW professional 1]

In general, RTW professionals were positive towards mWorks as an intervention. They appreciated being able to provide service users with a tool that would help them be more active agents in their rehabilitation and work return process. Service users were also optimistic about mWorks because it seemed pedagogical, well explained, and was well-structured. However, one service user harboured the notion that mWorks was created by 'society' to force people back to work.

> "This (mWorks) presupposes that everyone wants to return to work quickly. Then you forget the cause of brain exhaustion. This is what I may have reacted to the most—it (mWorks) being too pushy." [Service user 1]

The fit to the current target group was a barrier while recruiting service users. RTW professionals found it challenging to engage with service users who had a combination of exhaustion and depressive symptoms. These service users were observed as reluctant to sit in front of a screen and make an effort.

Professional work assignments were primarily administrative, and constituted 25% of a full-time position. When mWorks elicited questions about service user mental health and well-being, professionals did not believe this was part of their role or work assignment, and this may have presented a contextual barrier. In addition, professionals did not meet all MHS users who were on sick leave. The professionals suggested that mWorks might fit other professions in their units that had a therapeutic component.

Implementation

The COVID-19 pandemic did not affect the initial preparation steps of the implementation program (e.g., creating delivery material). However, the pandemic severely impeded the recruitment of MHS units. Once the initial recruitment barrier was overcome, the subsequent education and active delivery steps were conducted according to plan. Adaptions to the implementation program involved introduction of more frequent follow-up meetings between dialogue meetings 1 and 2 and involving other team professionals from the primary MHS. Both positively impacted service user engagement in mWorks and the RTW process. Due to a lack of resources, the RTW professionals did not have time to memorize the material needed to confidently deliver mWorks to service users. Professionals rated mWorks implementation according to plan as 7 and 8 on the 10-point Likert scale. The ratings were limited because of

difficulties in reaching the correct target group and not being able to meet with possible users due to the pandemic.

mWorks delivery was completed for all users, and dialogue meetings were conducted according to plan. All interviewed users rated the quality of the delivery by professionals at 10 out of 10 on the Likert scale. One professional thought some users had trouble initiating use and preferred more frequent follow-up sessions. Consequently, she adapted the delivery by adding more frequent follow-up meetings before dialog meeting 2 by telephone.

> "In the beginning, I had more frequent follow-ups with the participants, which I experienced as better. Then I had short telephone follow-ups every week. But overall, I have experienced that it has worked well. Sometimes the patients did not start until the subsequent follow-up, and then it might be good to have closer contact in the beginning to try to make sure that they get started." [RTW professional 2]

As planned with the implementation program, mWorks was delivered according to service user needs and preferences. The timing of delivery related to sick leave was best addressed individually. Users cautioned against delivery of mWorks during the first few months of sick leave, when cognitive exhaustion was most often present. Similarly, the dosage of human support was best delivered according to personal preferences since some users preferred using mWorks without designated human support beyond dialogue meetings. Others were reluctant to end the human contact. The dialogue meetings with RTW professionals and all human support from other team professionals were critical for successful delivery of mWorks. mWorks and human support were found to be of equal importance and combining the two was crucial.

> "These two complements, mWorks and psychiatric nurse. Unbeatable combination! I do not think you should choose one or the other, but you should combine them. CBT therapist with this (mWorks)… then you get the optimal fit." [Service user 1]

To summarize, the overall use of mWorks and its constituent content features was diverse. The mean login frequency was 9.8 for all service users (n=6). According to the interviewees, the estimated login frequency ranged from 8 to 40, lasting 7 to 30 minutes per login. The overall usage of mWorks was diverse but aligned to individual users' interests, needs, and preferences. While one user utilized mWorks to engage in and moderate the entire RTW process, from sick leave and back to work, another started by getting to know the app during her three months of full-time sick leave but started to actively use mWorks when she returned to work. Yet another user focused on performing and processing all content features twice within a couple of weeks to

internalize insights and strategies that were helpful to apply to the parallel real-life RTW process.

Overall satisfaction with mWorks received a 6 to 8 rating from service users. One said, "*I have to say an 8, because when I have needed to, I have used what I needed.*" (service user 3). RTW professionals corroborated user perceptions and estimated user satisfaction at 7 on a 10-point Likert scale. Professional satisfaction ratings of different features found My Strategies to be the highest (8 and 10), and My Plan to be the lowest (3 and 5). Service user interviews corroborated professional ratings but also highlighted that My mWorks and My Resources played a central role in clarifying their self-narrative and strengths. The AI chatbot, Mott, was not used by two of the three users interviewed (service users 1 and 3), primarily because they did not find mWorks challenging to navigate independently.

RTW professionals believed that those who benefitted most from mWorks had already initiated their RTW process. Service user reach also depended on the medical sick leave certificate. Thus, even if the diagnosis was depression, exhaustion symptoms were commonly present and resulted in the most difficulty in engaging with mWorks and evaluation activities.

> "So, this whole thing to get into something (new). For me personally, it just came last on the list, so even if I knew it (mWorks) might help me, I did not have the ability and motivation. 'I don't care'. That you only exist. In the beginning, you just try to deal with your anxiety and depression, like everything else just comes last on the list." [Service user 3]

Mechanisms of impact

mWorks provided users with a private space for reflection and documentation of life events, sick leave, and work. This, in turn, provided users with the basis for revealing authentic insights about themselves and their place in the RTW process. These insights made them more aware and helped them to form a more authentic RTW approach that consequently increased their self-confidence.

> "It (mWorks) has helped me to be persistent, that it is important that I heal during the process. It might have been these questions that have been a little further ahead, but I am not there yet, perhaps this has strengthened me? 'Yes, that sounds really nice, but not right now' (…) it has strengthened my self-esteem. Because I have somehow accepted that I can play a role and believe that I can do all that. But that's not what I want, so be genuine and real." [Service user 1]

mWorks helped elucidate negative thinking and behavioural patterns and linked the user to helpful strategies to address them. During this process, essential factors for well-being become apparent, preventing mental ill health from unfolding in the future, and turning these negatives into positives. Service users remarked that mWorks helped them describe and talk about their mental health and RTW with others in their support network.

> "At the same time, I also think it (mWorks) was helpful in how I explain it to others who do not understand, or who do not know. So those were the two things that I thought were great." [Service user 3]

mWorks could be an essential platform for supporting goals and following them through as it became more likely that users would pursue their commitments. Service users explained that the accumulated insight generated an increased sense of 'self-esteem', 'acceptance', and 'self-compassion'. Likewise, RTW professionals thought that mWorks generated more engaged and active agents during the RTW process.

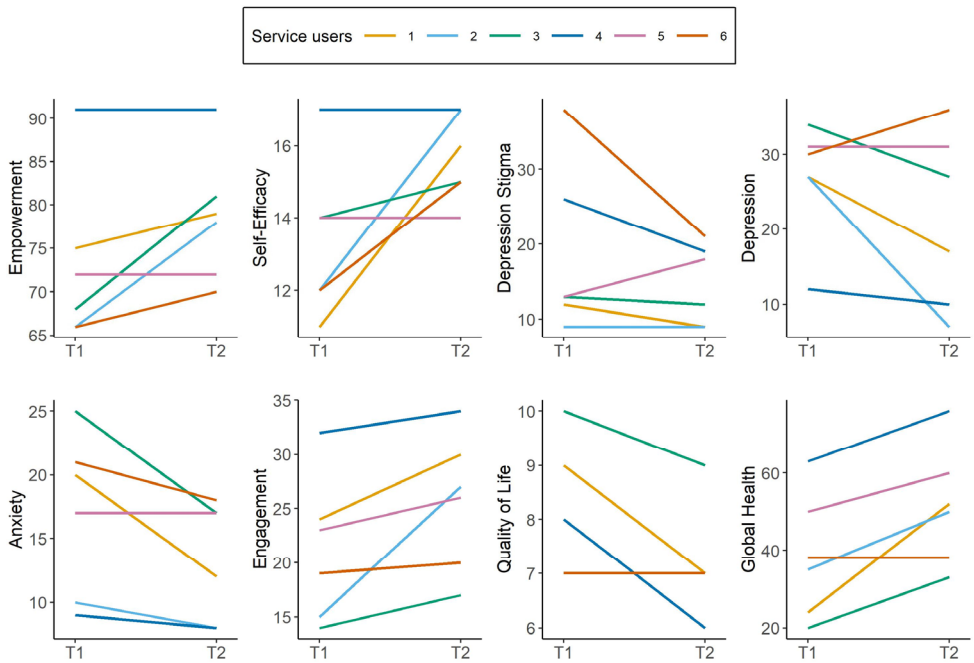
> "It is good to have a tool to give patients to work with when they are on sick leave. It (mWorks) makes them more active during their rehabilitation and return to work process." [RTW professional 1]

Each service user (n=6) completed the online questionnaire without difficulty. This suggests that the questionnaire battery was feasible and acceptable at baseline (T1) and follow-up (T2). Descriptive statistics by service users' self-rated experiences show a direction that further substantiates the sensitivity of the chosen constructs. The mean and median changes for measures during T1 and T2 showed a positive trend (Table 11).

Table 11. Descriptive statistics of service users' (n=6) self-ratings of measurments at baseline (T1) and 10-week follow-up (T2)

Construct	**TI**		**T2**	
	Mean (SD)	**Median (min-max)**	**Mean (SD)**	**Median (min-max)**
Empowerment	73 (9.51)	70 (66-91)	78 (7.45)	78 (70-91)
Self-efficacy	13 (2.16)	13 (11-17)	16 (1.21)	16 (14-17)
Depression stigma (personal)	18 (11.22)	13 (9-38)	15 (5.32)	15 (9-21)
Anxiety	17 (6.36)	18 (9-25)	13 (4.63)	14 (8-18)
Depression	27 (7.73)	28 (12-34)	21 (11.78)	22 (7-36)
Engagement in everyday life	21 (6.68)	21 (14-32)	26 (6.30)	26 (17-34)
Quality of life	8 (1.17)	8 (7-10)	7 (1.09)	7 (6-9)
Global health	38 (16.11)	36 (20-63)	51 (15.49)	51 (33-76)

The individual trajectories and paired sample statistics corroborate the assumptions made, that the mWorks intervention may increase service users' empowerment, self-efficacy, own attitudes towards depression (stigma) as all measurements scores changed between T1 and T2 in a positive direction (Figure 4). In addition, diagnosis-related outcomes such as depression showed a decrease in four users, one who increased and another with the same score at T2, and anxiety scores decreased for all study participants at T2. Health-related quality of life scores showed a positive trajectory for most users except one who reported the same score at T2. The same trend was seen in global health measures.



Note: Low Qulity of life scores indicate higher qulity of life.

Figure 4. Service users' individual trajectories of sum scores between T1 and T2 in relation to different measurements using spaghetti plots.

The paired sample statistics corroborate trajectories and show positive trends (Table 12). Markedly, sensitivity analysis of empowerment showed that sub-scale rating of *Optimisms and control* changed most considerably (Z=–2.032, p=0.042; t=–2.739, p=0.0.41), *Self-esteem* (Z=–1.225, p=0.221; t=-1.467, p=0.202), *Power* (Z=–0.631, p=0.528; t=-0.500, p=0.638), *Activism* (Z= –0.816, p=0.414; t=-0.791, p=0.465), *Righteous Anger* (Z=–0.552, p=0.581; t=-0.500, p=0.638).

Table 12. Results of non-parametric and parametric paired-sample statistics (n=6)

Construct	**Wilcoxon Signed Ranged Test**		**Pared Sample t-test.**		**Cohen's effect size**
	Z	**p**	**t**	**p**	**d**
Empowerment	–1.841	0.057	-2.356	0.650	20
Self-efficacy	–1.841	0.066	-2.445	0.058	39
Depression Stigma (personal)	–1.214	0.225	-1.244	0.269	84
Anxiety	–2.032	0.420	2.564	0.050	50
Depression	–1.483	0.138	1.407	0.219	1.03
Engagment in everyday life	–2.207	0.027	-2.730	0.041	45
Quality of life	–1.890	0.059	2.907	0.034	0.20
Global Health	–2.032	0.042	-3.575	0.016	9.02

Discussion

This thesis aim to expand the knowledge about the relevance, development, and evaluation of mWorks, a digital RTW solution for persons with common mental disorders who are on sick leave. The collected novel insights can be credited to the large variety and quantity of stakeholders who participated in the formative research, co-design, and evaluation processes. Their involvement resulted in increased certainty that mWorks will be acceptable, usable, implementation friendly, and grounded in the interests, needs, and preferences of service users and other stakeholders. In addition, the adherence and use of the guiding framework of MRC were essential to increase the quality of the research and likelihood of mWorks being successfully integrated into practice.

A digital RTW solution to empower the individual

During initial formative research (studies I and II), the traditional rehabilitation chain and support were found to be lacking, rigid, difficult to understand, and resulted in the absence of service user ownership of their RTW process. Stakeholders presumed that a digital RTW solution would enable service users to exert greater control during their RTW process. The solution for this downward trajectory, was found in strengthening the service users through a person-centred digital tool that provided them with adequate support throughout the entire RTW process, thereby empowering the user in a manner that engages them and has service user capabilities as a focal point. This was as opposed to focusing on their diagnoses and shortcomings. Earlier research on the IES-model similarly posits that person-centeredness with a focal point on service users' preferences, motivations, and values helps them become more aware of their wishes and goal setting (Bejerholm et al., 2017). This approach may help to counteract the dominant medical perspective and turn the sick leave role into a more engaged and active role during their RTW process (Johansson, Markström & Bejerholm, 2017).

One of the most vital pieces of knowledge retrieved during the co-design process was to develop mWorks as a self-management tool to enable service users to achieve RTW.

However, the journey back to work differs from one person to another based on their residency in RTW process. Thus, content features had to incorporate the entire RTW journey and apply a person-centred approach that allows for alteration over time to follows the personal growth of service users. In contrast, most digital solutions have focused on partial aspects of the RTW process, such as reducing the symptom severity or facilitating well-being once work return has been initiated (Geraedts et al., 2014; Deady et al., 2018). These steps only constitute the initial or last part of the RTW journey. However, the RTW process is far more diverse, which calls for a plethora of content features to provide support throughout the RTW process, as reflected by the formative studies I and II, as well as the co-design process in Study III. Study IV demonstrated, the overall usage of mWorks and the different continent features was diverse but aligned to individual users' preferences, interests, and needs, suggesting that the proverb "there was something for everyone" may be fitting and can contributed with a holistic and person-centred approach.

Study IV posited initial insights into mechanisms that might increase the sense of empowerment. Service users and RTW professionals agreed that mWorks provided a creative space for documenting and reflecting on motivation, goal setting, strengths, and resources needed during their work return process or while at work. mWorks content features were used in a variety of different ways according to personal needs and preferences. Consequently, service users acquired authentic insights about themselves and how they wanted to pursue RTW. These were vital in increasing self-esteem and awareness of their capabilities. The quantitative data also found a positive trend in empowerment. In the empowerment sub-scales, control and optimism for the future had the largest increases. Self-efficacy also showed a positive increase after the use of mWorks. This findings aligns with earlier RTW research that highlights that the importance of continuous and person-centred support in increasing service user self-efficacy (Johanson & Bejerholm, 2017; Johanson et al., 2019). Moreover, digital solutions are recognised to facilitate service user empowerment and decision-making during the RTW process (Bos et al., 2008; Lord et al., 2014). A systematic review of digital mental health applications links the positive aspects of improving service user locus of control by helping to develop self-management skills (Borghouts et al., 2021).

The current thesis findings further substantiate casual assumptions outlined in Study IV (see The mWorks Intervention) and previous formative research (studies I and II). That mWorks may increase service users' sense of control, improve their empowerment, and strengthen them on their journey back to work. These results are promising for several reasons. First, these findings mirror that of earlier RTW and IES research that has established that self-efficacy and empowerment are crucial factors for enabling the RTW process (Johanson & Bejerholm, 2017; Johanson et al., 2019; Porter

& Bejerholm, 2018; Volker, Zijlstra-Vlasveld, Brouwers, Van Lomwel, & Van Der Feltz-Cornelis, 2015). Second, this suggests that mWorks is a successful digital translation of the IES model and can presumably affect mediating factors for RTW and health-related outcomes such as empowerment and self-efficacy. Mediating such factors can decrease sick leave duration and improve public health (Andersén et al., 2015; Volker et al., 2015). Increased empowerment has also been shown to decrease levels of depression during work return (Johanson & Bejerholm, 2017; Porter & Bejerholm, 2018). Thus, mWorks has the potential to supplement the current RTW chain by providing a web-based tool for self-management that focuses on strengthening and empowering service users. However, recent person-centred eHealth interventions to facilitate RTW for persons on sick leave due to CMD show that although there were significant differences in general self-efficacy, the interventions did not result in decreased levels of sick leave (Cederberg, 2022; Cederberg et al., 2020). This contrasts with the current knowledge base, which clearly shows that RTW interventions that generate increased sense of self-efficacy predict successful RTW (Andersén et al., 2015; Volker et al., 2015).

Addressing the engagement puzzle

Digital solutions are not impervious to implementation barriers. In fact, the greatest barriers to implementing digital solutions in European healthcare systems are engagement barriers (Ricciardi, 2019). Attempts to implement digital solutions in a real-world context have been largely unsuccessful, and people do not engage with them (Lattie et al., 2022; Ricciardi, 2019). In other words, these digital solutions are not acceptable to the targeted service user and those who deliver them (Borghouts et al., 2021). Such challenges risk rendering digital solutions meaningless from public health and RTW perspectives. Solving the lack of acceptability and subsequent lack of engagement must be prioritized. The current thesis provides knowledge on crucial factors for developing an acceptable digital RTW solution for persons with common mental disorders. Perhaps most important is the role of human support. The role of human support and its significance for intervention effectiveness are surrounded by ambiguity (Cuijpers, Noma, Karyotaki, Cipriani, & Furukawa, 2019). Studies I and II of this thesis show that service users need to be able to direct the level of human support based on their preferences. Study III explains that the focus should be to supplement existing face-to-face support rather than replace to it. The potential of digital solutions to provide scalable support that can be accessed regardless of time, place, and pace was valuable for stakeholders because it offered alternative support pathways. Study II

demonstrated that scalable support could not come at the expense of the availability of human guidance because that negatively affects the acceptability of such interventions to service users. Earlier research also suggests that delivering digital solutions in the absence of human support can fail to provide person-centred support, which is sensitive to personal nuances only humans can provide (Yardley et al., 2015). Service users in Study IV corroborated that a combination of human support and mWorks was a winning strategy for increasing the acceptability by those delivering and receiving mWorks. The combination of support increased perceived efficacy and the potential to produce positive outcomes. Unguided and self-managed digital mental health interventions delivered via various digital platform applications can be effective in ameliorating depression and anxiety symptoms, but generally have with lesser effect size than when coupled with human support (Lattie et al., 2022; Lindner et al., 2013; Titov et al., 2016). eHealth support and person-centred care, supplemented by phone calls, are acceptable delivery formats to persons on sick leave with CMDs. The opportunity to provide professional support and not require physical appointments enhances the perception of support without necessarily requiring actual provision of professional support (Cederberg, 2022; Cederberg et al., 2020; Cederberg et al., 2022). The authors concluded that appropriate, face-to-face appointments could be redirected to phone calls without losing value for service users, and may hold true for mWorks as well (Cederberg, 2022). Automated alternatives to human support (e.g., chatbots) generate acceptable and engaging alternatives to human support and are promoted as valuable to improve the scalability of digital solutions (Lattie et al., 2022). Study IV found that the mWorks chatbot was not used to any extent and suggests that the chatbot did not increase engagement. However, mWorks were perceived as an easy system to learn and engage with, which explained why the chatbot was not used to any noteworthy extent. Evident by the fact that service users in Study IV could use mWorks flexibly and function as support along the RTW process and at work.

Findings during Study IV informed that the implementation program related to the active delivery during the ten weeks worked as intended. A more critical stage of the implementation program entailed contextual barriers inherent during the initial preparatory steps due to the difficulty of reaching and recruiting the intended contexts and target group. For example, RTW professionals during Study IV stressed that they lack the resources to learn the delivery process thoroughly due to lack of time. Thus, future education to RTW professionals should highlight critical ingredients for recruitment and delivery to facilitate learning among professionals with restricted resources. Process evaluation on web-based intervention for RTW similarly suggested that professionals within the MHS often lack time and motivation to work with digital

solutions (Volker et al., 2017), which might reflect the hesitation for enrolment but needs to be more thoroughly investigate to facilitate recruitment.

Study I revealed the need for mWorks to be very simple or "baby simple" because of the inherent nature of CMD. Requirements for simplicity are to some extent dependent on symptom severity and service user location in the RTW process. Study II revealed that mWorks had to limit the required cognitive resources in order for it to be perceived as less burdensome and more acceptable. The co-design process in Study III showed that to counteract disengagement, the cognitive threshold must be sufficiently low to intuitively understand mWorks in terms of use, orientation, and where to start. Earlier research indicates that service users spend approximately five minutes trying to understand a new digital solution before discontinuing use (Marshall et al, 2015). Symptom severity is one of the most common engagement barriers for persons with CMD (Deady et al., 2018; Lattie et al., 2022). In an extensive network meta-analysis of data from persons with depression, the effects of guided interventions were more pronounced for those with more elevated symptom severity compared to unguided interventions. This shows that individuals with moderate to severe depression benefit more from interventions with human support (Karyotaki et al., 2021). In contrast, those with subthreshold or mild depression have similar effects with guided or unguided interventions, and suggests that symptom severity can moderate engagement and patient outcomes (Karyotaki et al., 2021; Lattie et al., 2022). Study IV found that waiting to introduce mWorks until after the first few months of sick leave might limit disengagement, especially if comorbid exhaustion is present. Delivery timing is a vital aspect of facilitating service user engagement (Bernard et al., 2022; Volker et al., 2017) and should be addressed individually according to sick leave status and personal preferences.

For mWorks to be acceptable to service users, the design needed to produce a harmonious impression with a focal point on solutions to their circumstances. In addition, mWorks was required to permeate positivity, and users needed to experience the encounter as warm and welcoming. In contrast, a judgmental tone was vital to be avoided, as this was perceived to reinforce negative thoughts, behaviors, and emotions. In line with the IES model, the literature similarly demonstrates that encountering healthcare professionals who provide hope and optimism for the future is critical to facilitating service users' RTW (Bejerholm et al., 2017; Porter et al., 2018). Experiencing positive encounters in healthcare encounter has been associated with a higher degree of one's estimated ability to RTW. In contrast, negative health encounters have an inverse relationship with service users' self-esteem and ability to achieve RTW (Lynöe et al., 2011). A similar pattern can be seen regarding digital RTW solutions, apparent by service users in Study III who warranted less clinical and

deficiency-oriented language usage and design in favor of a hopeful and stigma-free impression. However, similar positive language usage and encounter does not necessarily carry over to digital solutions and should be considered to create acceptable and engaging digital RTW solutions.

Transcending the service gap with a digital RTW solution

The current thesis offers knowledge on how digitalization can help to overcome current problems with adequate RTW support in a MHS context. During the formative phase (studies I and II), when investigating stakeholder needs, preferences, and acceptance of digital RTW solutions, service users often received isolated medical interventions such as CBT or medication for a limited time. Once symptoms subsided, the individual was left to their own devices to achieve RTW. They often experienced a lack of sustained support and found the RTW process difficult to understand. Stakeholders believe that mWorks can fill that gap and provide a digital RTW solution that focuses on a more holistic and person-centred support throughout the entire RTW process. These findings are consistent with earlier research on the IES model from which the mWorks concept originated, which found that traditional step-by-step and segregated RTW models based on a medical paradigm leave the service user without adequate support, empowerment, and hope for the future (Bejerholm et al., 2017; Porter & Bejerholm, 2018; Volker et al., 2015). Our current knowledge base shows the need for more integration of health and rehabilitation service interventions (Joyce et al., 2016). Reducing the service gap between MHS and welfare actors is critical in improving RTW outcomes (Lexén et al., 2019). The digital transformation is essential to increase needed capacity to support mental health and the RTW process, and is anticipated to supplement the current rehabilitation chain in a manner that strengthens and empowers the service user (Lord et al., 2014; OECD, 2012).

During prototype development (Study III), stakeholders believed that mWorks had the potential to fill the current service gap in the seemingly complex RTW chain. They stipulated that mWorks provide service users with their own personal support tool during the overarching RTW process instead of focusing on fractional or partial aspects. Support needed to be connected to the surrounding welfare system and the workplace. mWorks ability to supplement the current RTW chain was partly validated during the evaluation phase (Study IV), when stakeholders referred to the combination of the two as an unbeatable arrangement that helped them '*stand on their own*' and become more active agents in their own RTW process. Although the IES model intervention is superior in helping persons with CMD attain work, the provision of effective RTW

interventions in the MHS is outweighed by implementation challenges (Bejerholm et al., 2011; Bergmark et al., 2018; Hasson, Andersson, Bejerholm, et al., 2011). The current step-by-step RTW approach remains status quo and generates prolonged sick leave periods (Johanson & Bejerholm, 2017). This negatively impacts service user mental health and well-being and hope for the future (Johanson & Bejerholm, 2017; Modini, et al., 2016a; Porter & Bejerholm, 2018). The responsibility for management of the journey back to work falls on the service users because of the absence of person-centred support. In Study IV, service users and RTW professionals seemed to have benefitted from mWorks by introducing a more person-centred practice with greater emphasis on service users' needs and preferences, congruent with the IES model and the current primary care reform (Bejerholm et al., 2017; Socialdepartementet, 2021). Additionally, the qualitative and quantitative data seem to suggest that mWorks produce similar effects to those of the IES model, meaning an increased sense of optimism and hope for the future, empowerment, and decreased symptoms (Bejerholm et al., 2017; Porter & Bejerholm, 2018). This suggests that the primary MHS context is well situated to deliver IES-related interventions. However, findings in Study IV state that more implementation efforts are needed to engage primary MHS units. Such as engaging the entire team, mainly since the RTW professionals' (rehabilitation coordinators) role and work assignments is often limited to part-time work and administration of the RTW process. But also, as a response to the lack of resources to learn mWorks thoroughly. Thus, more education efforts are warranted for RTW professionals and should highlight critical ingredients for recruitment and delivery. If these barriers can be remedied, the findings in this thesis provide promising avenues for delivering person-centred and strength-based RTW interventions on a much larger scale than previously feasible. Earlier research similarly suggests that digital transformation of the IES model can bridge the traditional rehabilitation chain service gap by transcending previous implementation barriers (Volker et al., 2015).

The co-design permitted acquisition of essential experienced-based knowledge for the transformation of the IES model into mWorks, and allowed development to adhere to stakeholder needs, preferences, and values. The co-design, with involvement of stakeholders in the early formative stage, can at least partly explain why mWorks was easy to use and acceptable during the later iterative development and evaluation process (studies III and IV). However, co-production of digital interventions present a number of challenges for researchers. For example, during the initial prototype development, some suggestions were difficult to realize partly because of knowledge transformation challenges between researchers and programmers, and partly because of financial resources and creative programming challenges in the software team. Other challenges related to achieving sufficient stakeholder involvement during the entirety of a research

project. This is seldom feasible as such endeavours are usually extensive processes that occur over several years. During the co-design, stakeholders were limited to evaluating snapshots of section content features of the alpha and beta prototypes or all process-oriented content at once. Cementing anticipated roles and expectations of stakeholders is important to form an authentic and sustainable partnership throughout the research process (Smits, Van Meeteren, Klem, Alsem, & Ketelaar, 2020). Relying on diverse and innovative forms of stakeholder involvement is recognized as a significant aspect of overcoming involvement barriers during co-design research (Ocloo & Matthews, 2016). Nevertheless, the findings in this thesis suggest that co-production can be a valuable avenue by which the digital transformation can stay grounded in service user needs and preferences. In fact, a systematic literature review highlights the value co-production, i.e., increased health outcomes, enhanced patient satisfaction, better service innovation, and cost savings (Elwyn et al., 2020; Essén & Lindblad, 2013; Palumbo, 2016; Shen et al., 2017), are intimately linked to the increased use and enhancement of information and communication technologies. Co-production is a crucial ingredient in the recipe for increased service user engagement (Palumbo, 2016). Co-production and the digital transformation in MHSs and research have a synergic relationship and can benefit from each other's development.

In studies I and II stakeholders cautioned that part of mWorks success and acceptability depended on the target group age and older persons' digital literacy. Earlier research on digital solutions found that older persons are less familiar and confident with digital technologies, which is associated with skill gaps rather than disinterest (Ennis et al., 2012). Similarly, the digital divide is more a consequence of socioeconomic and demographical factors such as age in western countries, such as Sweden, rather than access to a computer or stable internet connection (Mubarak, Suomi, & Kantola, 2020). These factors did not appear to moderate mWorks success in Study IV. Although the majority of service users reached were middle-aged (>50 years) or older, they did not find mWorks troublesome to interact with or use. Rather, participants perceived mWorks as pedagogical, not an intricate system to learn, and became familiar with the application with minimal effort.

Methodological considerations

Study I and II

Efforts to enhance *trustworthiness*, i.e., whether the findings in qualitative research can be trusted (Graneheim & Lundman, 2004; Korstjens & Moser, 2018), were performed to ensure high quality of qualitative research and rigor in studies I-II. These studies were conducted in accordance with the consolidation criteria for reporting qualitative research, COREQ (Tong, Sainsbury, & Craig, 2007). In addition, the TFA and guiding framework of MRC have contributed to improved research description and quality. In Study I, inductive qualitative content analysis was chosen to stay close to participants' descriptions (manifest) and yield richer descriptions from the entire data corpus (Graneheim & Lundman, 2004). In contrast, a deductive qualitative thematic analysis method in Study II is well suited to discern detailed information about specific aspects of the material (Braun & Clarke, 2006), such as the seven acceptability attributes of the TFA (Sekhon et al., 2017).

Several things were done to strengthen the credibility of the findings, i.e., if the findings are a correct interpretation based on the original data and participant views (Korstjens & Moser, 2018). These included taking fieldnotes during data collection to support the data interpretations. In addition, the thesis author moved forth and back between the analysis procedure so as not lose meaning when interpreting the data. Despite these additional steps, some limitations should be considered. One of the foremost salient methods to ensure credibility is member checking (Korstjens & Moser, 2018). This is a weakness of studies I and II since participants did not have the opportunity to validate the findings. However, individual and focus group interviews allowed for a wider plethora of data to emerge and therefore, we did not rely on once source information. Individual interviews generally generate a broad range of topics, while focus group interviews produce more sensitive and personal disclosures (Guest, Namey, Taylor, Eley, & McKenna, 2017). The reliance on two sources of inquiry helped reach adequate saturation, meaning that no additional insights or new information arose in the subsequent interviews.

When analysing the data, multiple researchers continuously discussed assumptions, values, and possible preconceptions. These included influences from previous life experiences and cultures (for example, the first author of studies I-IV is male, Swedish, has experienced depression, has a professional and educational background in public health, and became involved with the mWorks project in 2017 as a project administrator). Many of the interpretations that emerged were thoroughly discussed

between the authors until a consensus was achieved and this aids in ensuring credibility. Also, co-authors of the individual papers have different competencies in their respective research fields, and this should have provided balance. The multidisciplinary research team has expertise in mental health, public health, nursing, occupational therapy, psychology, digital development, qualitative and quantitative analysis, participatory research, research on SE and critical factors for RTW, and implementation. The reliance on multiple- data sources, methods, and researchers have mitigated interpreter bias.

The degree to which the findings are transferable (i.e., *transferability*) to other contexts and target groups is facilitated by providing dense descriptions of the context, sampling, data collection, and applied analysis methods (Korstjens & Moser, 2018). The collected fieldnotes provide a fuller description, which helps readers make inferences regarding transferability to other contexts. Qualitative methods are limited in being able to provide generalizable evidence. This is primarily a result of small sample sizes and lack of randomized sampling methods (Marshall, 1996). In studies I-II, a snowball sampling method allowed us to reach information-rich participants and cover many subjects associated with the specific aims. However, we did not reach a younger population, and this limits transferability to these groups. The use of COREQ and TFA (Study II) enhanced the quality and description of the findings and procedures. Thus, readers can make their own judgments regarding whether these findings are transferable to other settings and subjects of interest.

To ensure that the analytical procedures were consistent with accepted standards for a specific methods or design, i.e., *dependability*, a transparent description and examples of the analysis procedures are provided (Korstjens & Moser, 2018). The theoretical underpinning of qualitative content analysis acknowledges that reality is subjective, and there are multiple ways to interpret it (Graneheim & Lundman, 2014). It is thus critical to ensure the findings are grounded in the data (i.e., *confirmability*) and not based solely on one person's preferences and viewpoints (Korstjens & Moser, 2018), as well as to avoid confirmation bias and overlooking data inconsistent with personal beliefs. Thus, the analytical procedure was continuously considered and revised to ensure interpretations were grounded in the data. These efforts may have mitigated personal biases to influence data interpretation.

Study III

A strength of Study III is the large sample size and diverse range of stakeholders represented. Stakeholders were recruited with non-probability sampling methods to identify participants with adequate subject expertise, but this may have introduced

recruitment biases (Marshall, 1996). For example, this method could have selected stakeholders with interest and positive opinions toward mWorks development. While the sample size was large and had a diverse range of stakeholders, only one employer was represented. Thus, data from this stakeholder group might have reduced transferability (Korstjens & Moser, 2018). It is vital to co-produce knowledge with a focal point on service users. Previously lived experiences are a missing component in much research (Ocloo & Matthews, 2016; Sangill et al., 2019). Inclusion of these stakeholders is crucial to develop digital solutions that will be acceptable, user and implementation friendly, and more importantly provide value to society and public health. Thus, these findings are relevant to inform the future development of mWorks, and readers can make their own inferences regarding transferability to other contexts.

During the co-design process, the research team met between the reference group meetings (*Iteration 2*) to compile the requirement list. The research team's previous knowledge and experiences could have biased selection of requirements. However, the research team compared individual summary texts until consensus was formed and a reference group member checked the requirement list at the subsequent meeting to ensure that the most important content features were realized. These activities likely reduced any threat to study credibility (Korstjens & Moser, 2018). Furthermore, the service users were directed to discuss predefined design notions based on the IES model and RTW process. As such, the initial agenda steered mWorks design and content, however, the continuous co-design with stakeholders allowed for ongoing refinement and assured that mWorks corresponded with service user needs, interests, and preferences.

During *Iterations 2* and *6* time constraints meant that stakeholders were only allowed to address parts of mWorks. This could have resulted in methodological limitations since understanding the overall RTW process was limited, makes it harder to reach saturation, and when presented with incomplete pieces and could result in inconsistency during data collection (Korstjens & Moser, 2018). The data collection would have benefitted from stakeholders being more familiar with the overall process throughout the research procedure.

Study IV

The quality of Study IV is strengthened by adhering to the guiding principles of the MRCs framework (Moore et al., 2015; Craig et al., 2008). Process evaluation during a feasibility stage, prior to conducting full-scale randomized controlled trials, can be valuable to discern uncertainties related to the quality of implementation, mechanisms of impact, and the contextual factors associated with variation in outcomes (Moore

et al., 2015). This framework provides a unitary framework for conducting process evaluations and makes comparing previous research and similar studies feasible. In addition, case study is a valuable design to underpin process evaluations to understand the complex dynamic of intervention, delivery, and context during implementation (Grant et al., 2020). The findings are related to the bounded ten weeks during which Study IV was conducted because of the need to evaluate the initial delivery phase, congruent with the IES models enabling phase (Bejerholm et al., 2017), and should be considered in light of this limited timeframe.

Only two primary MHS units agreed to participate in the mWorks intervention. This may be related to the ongoing COVID-19 pandemic but may also partly reflect the willingness and available resources to participate in digital RTW interventions. RTW professionals recruited participants to test mWorks during the initial ten-week delivery phase. That women are over-represented compared to men harms the generalizability of the findings. Participation in web-based self-management interventions for RTW may be more attractive to women but may also result from women having a higher prevalence of CMD than men (Skovlund, Kessing, Mørch, & Lidegaard, 2017).

Although positive trends were found, causal inferences cannot be made due to the small sample size in Study IV. The small scale is a limitation of Study IV and limits overall generalizability. On the other hand, the credibility of the findings is strengthened by triangulation and utilizing multiple participant groups, data sets, and researchers. Future research should focus on conducting more extensive studies with a more heterogeneous sample to assess the effect of the mWorks intervention on health, RTW outcomes, and accompanying mechanisms that generate change over a longer timeframe.

Conclusions and implications

This thesis contributes to the currently limited knowledge on development and evaluation of digital RTW solutions for persons with common mental disorders on sick leave.

- The accumulated findings, which show positive trajectories suggest that mWorks is a legitimate RTW intervention for persons with CMD in a primary MHS context.
- Initial tentative trends corroborate the assumptions that mWorks may increase service users' sense of control during the RTW process, and increase health-related outcomes such as empowerment, self-efficacy, quality of life, decreased personal stigma, and the severity of depression and anxiety, and increased occupational engagement.
- mWorks produces change by providing a creative space for reflection and documentation regarding motivations, goals, strengths, resources, and new strategies to be used in the RTW process. Service users and professionals benefit from mWorks by generating more active service users during the RTW process.
- mWorks provides a feasible pathway to deliver support with a focal point on supplementing the current RTW process with a person-centered and strength-based perspective.
- Hindering factors for implementation pertained to the recruitment of MHS units and participants. Once overcome, delivery of mWorks was successful with minimal need for adaptations but could benefit from more involvement by the primary MHS team.
- The co-design process, with a diverse set of stakeholder expertise and socio-demographic characteristics, informed the need for mWorks to take the form of a web-based self-management tool to empower service users during their RTW process.

- Digital RTW solutions that focus on participant strengths and resources, as opposed to diagnoses, functional disability, and activity limitations, are necessary to be regarded as acceptable to support service users' work return.
- In order to align with stakeholders' needs, preferences, and interests, digital RTW solutions must provide service users with a personal support tool during the entire RTW process and back at work.

Implications for future research

The development of the mWorks interventions was possible by adhering to the MRC framework and robust engagement with stakeholders throughout the research process. The co-production efforts helped to ensure the certainty that mWorks will be acceptable, usable, implementation friendly, and grounded in the interests, needs, and preferences of service users and other stakeholders.

Initial evaluation indicates that mWorks is feasible to deliver in a primary MHS context and shows positive trends in health-related outcomes, which may help facilitate service user RTW. These findings provide the impetus for progressing to the subsequent research stage of the MRC framework, which entails large-scale evaluation studies to make causal inferences regarding the effectiveness of mWorks.

mWorks was co-designed and evaluated in a Swedish context. Thus, studying implementation and evaluation of the intervention in other countries and cultures is warranted and potential adaptions may be useful.

Delivering and receiving the mWorks intervention may be an advantage in other MHS contexts and target groups. This requires further research, such as investigating whether persons with longer sick leave or severe mental disorders will benefit.

Future studies should focus on evaluating mWorks with a larger and more heterogeneous sample to obtain a broader perspective. Specifically, inclusion of more men and younger persons would be valuable.

Summary in Swedish/Svensk sammanfattning

Bakgrund

Lättare psykisk ohälsa, så som depression och ångest, är en av det vanligaste anledningarna till nedsatt hälsa och sjukskrivning. För den drabbade innebär det personligt lidande i form av minskad välbefinnandet, minskad ekonomisk trygghet och risk för social isolering. Dessutom bidrar depression och ångest till betydande samhällskostnader som en konsekvens av ökad sjukfrånvaro, hälso- och sjukvårdskostnader, samt förlorad produktivitet som OECD uppskattas kosta totalt 4 % av Europas samlade bruttonationalprodukten. Vidare visar forskning att den traditionella arbetsrehabiliteringsmodellen som råder idag levererar bristfälligt stöd under arbetsåtergångsprocess för personer med depression och ångest, vilket leder till längre sjukskrivningstid, brist på egenmakt och tilltro till att kunna återgå i arbete. I kontrast har Individual Enabling and Support (IES) modellen, som bygger på person-centrerat stöd med utgångspunkt i individens preferenser och tilltro till deras förmåga att kunna arbeta på den reguljära arbetsmarknaden, visat sig vara effektivare för återgång i arbete. Trots IES modellen har visat sig vara en framgångsrik intervention för personer med lättare psykisk ohälsa att återgå i arbete har den inte lyckats bli implementerad i större samhällsskala. Transformeringen av IES modellen till ett digitalt hjälpmedel förväntas tillgängliggöra effektiva interventioner för arbetsåtergång direkt till serviceanvändare. I gensvar skapades forskningsprojektet mWorks med intentionen att utveckla och utvärdera ett digitalt hjälpmedel för arbetsåtergång med utgångspunkt i att stärka serviceanvändares egenmakt. Dessvärre har forskning visat att digitala hjälpmedel sällan är acceptabla, användarvänliga eller grundade i intressenters behov eller preferenser vilket begränsar deras möjlighet att skapa samhällsnytta. Denna avhandling fokuserar således på att bidra med att öka kunskapen om att utveckla och utvärdera digitalt hjälpmedel för arbetsåtergång för personer med lättare psykisk ohälsa och sjukskrivning.

Studie I

Syfte: Att undersöka vilken roll och legitimitet ett digitalt hjälpmedel för arbetsåtergång har för personer med lättare psykisk ohälsa och sjukskrivning i en allmän- och specialistpsykiatri hälso- och sjukvårdskontext från tre olika intressentgruppers perspektiv. **Metod:** De tre intressentgrupper bestod av personer med erfarenhet av lättare psykisk ohälsa och sjukskrivning (n=18); professionella som arbetar med arbetsåtergång (n=20); makthavare och chefer inom Region Skåne (n=8) som rekryterades med hjälp av selektivt snöbollsurval. Data samlades in via semistrukturerade individuella intervjuer och fokusgruppsintervjuer, som sedan analyserades induktivt enligt kvalitativ innehållsanalys. **Resultat:** Huvudtemat som framkom av analysen representerade det centrala fyndet och visade att mWorks, ett digitalt hjälpmedel för arbetsåtergång, ansågs ha potential för personer med lättare psykisk ohälsa att ta kontroll över sin egen arbetsåtergångsprocess. För att detta skulle var möjligt var det viktigt att bemöta implementerings barriärer kopplat till professionellas attityd och anpassa verktyget efter omgivande lag och regelverk. Vidare var det kritiskt skapade en positiv användarupplevelse genom att utforma ett simplistiskt gränssnitt. Kritiskt innehåll ansågs vara hjälp att formulera en plan tillbaka till arbete, strategier för att hantera stress och ångest samt tillgängligt stöd via sitt rehabiliteringsnätverk. **Slutsats:** mWorks legitimitet och roll är associerade med att stärka personer med lättare psykisk ohälsas kontroll under deras arbetsåtergångsprocess och därigenom öka deras egenmakt. Ett digitalt hjälpmedel för arbetsåtergång kan potentiellt kringgå implementeringshinder förknippade med att introducera IES-modellen i en traditionell arbetsrehabiliteringskontext.

Studie II

Syfte: Att öka förståelsen för acceptans av ett digitalt hjälpmedel för arbetsåtergång utifrån personer med erfarenhet av lättare psykisk ohälsa och sjukskrivnings. **Metod:** Personer med erfarenhet av lättare psykisk ohälsa och sjukskrivning (n=18) rekryterades med hjälp av selektivt snöbollsurval. Data samlades in via semistrukturerade individuella intervjuer och fokusgruppsintervjuer. Materialet analyserades enligt deduktiv tematisk analys med hjälp av det teoretiska ramverket för acceptans (TFA). **Resultat**: Ett digitalt hjälpmedel uppfattades som acceptabelt av användarna och de uttryckte positiva attityder gentemot att ha tillgängligt stöd och en digital plattform där de kunde göra framsteg i sin arbetsåtergångsprocess, men det fick inte vara på bekostnad av ordinära stödinsatser. Deltagarna var säkra på sin förmåga att använda digitala hjälpmedel för arbetsåtergång, men de var tvungna att vara användarvänliga och begränsa behovet av för deras kognitiva resurser. Likaså var det viktigt att undvika en stressande design för att uppfattas som acceptabla. **Slutsats**: För att ett digitalt

hjälpmedel för arbetsåtergång ska vara acceptabelt måste det vara utformat som ett komplement till de traditionella arbetsinriktade interventionerna genom att tillhandahålla tillgängligt och personcentrerat stöd under hela arbetsåtergångsprocessen. Vidare är det kritiskt att i största möjliga mån minska den kognitiva belastningen vid användning av ett sådant hjälpmedel.

Studie III

Syfte: Att beskriva intressenternas erfarenhetsbaserade kunskap från den iterativa co-designprocessen av mWorks prototyputvecklingen. **Metod:** mWorks samproducerades i samråd med intressenter (n=86). Under designprocessen deltog fem olika intressentgrupper, däribland personer med erfarenhet av lättare psykisk ohälsa och sjukskrivning, professionella som arbetar med arbetsrehabilitering, arbetsgivare, mjukvaru- och systemutvecklare, och allmänheten i from av en gymnasieklass och brukarorganisationer (Fontänhuset). Data samlades in via flera olika datakällor från sju utvecklingsiterationer och analyserades med hjälp av kvalitativ innehållsanalys. **Resultat**: Huvudtemat som framkom visade vikten av att stärka personer med lättare psykisk ohälsas egenmakt genom att tillhandahålla ett personligt digitalt hjälpmedel som stärker och engagerar användare tillbaka till arbete. mWorks ansågs främja användares kontroll över sin egen arbetsåtergång genom att mobilisera personliga strategier och bryta en nedåtgående trend. Således utformades mWork som ett web-baserat verktyg för att facilitera användares egenhantering (self-management) tillbaka till arbete. **Slutsats**: Samproduceringsprocessen informerade utvecklingen av mWorks och framhävde behovet av att vara användarens egna hjälpmedel som stärker deras egenmakt. Genom att tillhandahålla ett digitalt hjälpmedel med stöd som går att anpassa efter individens personliga behov som utgår från deras styrkor och resurser, kan mWorks på ett meningsfullt sätt engagera användare till arbetsåtergång.

Studie IV

Syfte: Att utvärdera implementeringsprocessen av mWorks leverans i en mental hälso- och sjukvårdskontext för sjukskrivna personer med lättare psykisk ohälsa. **Metod:** Denna processutvärderingsstudie hade en fallstudiedesign. Fallet som undersöktes var leveransen av mWorks under en tio veckors period i en primärvårdskontext. Studiedeltagare var arbetsrehabiliteringspersonal (n=2) och personer med lättare psykisk ohälsa som var sjukskrivna (n=6). Både kvalitativ och kvantitativ metod användes för att samla in olika former av data från studiedeltagarna. Kvalitativa materialet analyserades med hjälp av kvalitativ innehållsanalys, medan deskriptiv och jämförande statistik användes för att analysera kvantitativa materialet. Triangulering av de olika dataklorna användes för att undersöka trender i hälsorelaterat utfallsmått.

Resultat I den initiala fasen av implementeringen fanns det kontextuella faktorer som var barriärer för att rekrytera enheter och studiedeltagare, vilket samtidigt försvårades av en pågående COVID-19 pandemin. Resultatet visade att den aktiva leveransen av mWorks gick att genomföra utan att behöva anpassas i någon större utsträckning. mWorks tillhandahöll arbetsrehabiliteringspersonal (professionella) med ett värdefullt verktyg som bidrog med ett person-centrerat arbetssätt och stöd till serviceanvändare. Kvantitativa resultaten visade positiva trender vad gäller engagemang, egenmakt, tilltro till egen förmåga, mental hälsa samt livskvalitet. Professionella beskrev samtidigt att studiedeltagarna blev mer aktiva in sin rehabiliteringsprocess. Både kvalitativa och kvantitativa data indikerade att mWorks ökade användarens kontroll över arbetsrehabiliteringsprocessen. **Slutsats:** Rekryterings fasen av implementerings-programmet presenterade kritiska kontextuella barriärer. När leveransstadiet väl inleddes var det möjligt att implementera mWorks enligt plan. mWorks kausala länk ansågs var associerat med att tillhandahålla en digital plattform där användare kunde reflektera och dokumentera tankar som var kopplat till deras motivation, mål, styrkor och nya strategier som kunde användas under deras arbetsåtergångs process. Vidare tycks användare dragit nytta av mWorks genom att få tillgång till person-centrerat stöd som bidrog till viktiga insikter under arbetsåtergångsprocessen.

Avhandlingens nyhetsvärde

Forskning som fokuserar på att utveckla och utvärdera ett digitalt hjälpmedel för att underlätta arbetsåtergång är inte vanligt förekommande, speciellt inte för personer som är sjukskrivna på grund av lättare psykisk ohälsa. Denna avhandling bidrar således med viktig kunskap om digital hjälpmedels roll och relevans, avgörande faktorer för dess acceptans, tillvägagångssätt för att samproducera, samt leveransen av ett sådant hjälpmedel. Resultatet visar på att mWorks är ett acceptabelt hjälpmedel att leverera i en primärvårdskontext som potentiellt kan komplettera de traditionella stödinsatserna vid arbetsåtergång. mWorks kan dessutom erbjuda ett person-centrerat stöd som i förlängningen stärker individens kontroll och egenmakt under processen.

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Study I

Original Paper

Role of a Digital Return-To-Work Solution for Individuals With Common Mental Disorders: Qualitative Study of the Perspectives of Three Stakeholder Groups

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Abstract

Background: Although effective return-to-work (RTW) interventions are not widely available for individuals with common mental disorders on sick leave, there is potential for transforming such interventions into a digital solution in an effort to make them more widely available. However, little is currently known about the viewpoints of different stakeholder groups, which are critical for successful development and implementation of a digital RTW intervention in health care services.

Objective: The aim of this study was to examine stakeholder groups' perspectives on the role and legitimacy of a digital RTW solution called mWorks for individuals with common mental disorders who are on sick leave.

Methods: A purposeful snowball sampling method was utilized to recruit respondents. Semistructured individual and focus group interviews were conducted for stakeholder groups of service users, RTW professionals, and influential managers regarding their experiences, needs, and preferences for mWorks. Content analysis generated themes and categories that constituted the main findings.

Results: The legitimacy of a digital RTW solution was high among all stakeholder groups since such a tool was perceived to enable service users to take control over their RTW process. This was mainly a product of accessible support and promotion of service user decision making, which had the potential to empower service users. All respondents stressed the importance of fostering a positive user experience with usability and emphasis on service user resources and strengths, as opposed to various limitations and shortcomings. Stakeholder groups highlighted critical content to facilitate RTW, such as the need to clarify a back-to-work plan, accompanied by an accessible RTW network and strategies for handling mental health problems. Implementation challenges primarily involved influential managers' concern of legislation incompatibility with innovative technology, and RTW professionals' concern of the possibility that digital solutions may replace them to a certain extent.

Conclusions: This formative research emphasizes the importance of shifting power from RTW professionals to service users. mWorks can play a role in mediating service user control over the RTW process, and thereby increase their empowerment. A digital RTW solution may facilitate the circumvention of implementation barriers associated with introducing evidence-based RTW interventions in a traditional RTW context.

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KEYWORDS

qualitative method; mental health; mHealth; quality improvement; vocational rehabilitation

Introduction

Employment is important for one's identity, financial security, and sense of involvement in society [1,2]. Common mental disorders (CMD) such as depression and general anxiety disorders are acknowledged as the current leading cause of sick leave and unemployment [3,4]. CMD are associated with an increased risk of extended sick leave (absenteeism), not working at full work capacity (presenteeism), and early retirement [5-9]. Unfortunately, effective return-to-work (RTW) interventions are not widely available for individuals with CMD [10].

RTW can be defined as both a process and an outcome connected to when an individual returns to work after sick leave [11]. In Sweden, RTW is endorsed by different welfare actors (ie, health services, social insurance agency, public employment service, social services, and employers) [12]. However, research has highlighted insufficient collaboration among these actors and employers, contributing to a service and knowledge gap in the RTW process [10,12,13]. Single interventions are performed in a stepwise "train-then-place" manner that are neither coordinated nor integrated into one overall solution to facilitate a person-centered RTW process for individuals with CMD [10,14]. The traditional stepwise approach results in prolonged periods of sick leave and unemployment [15], which in turn negatively impact mental health and well-being [2], empowerment, and the hope and belief that such individuals can work (ie, self-efficacy) [16,17]. During sick leave, individuals often get stuck between mental health services and the next RTW actor [18-20]. In addition to this service gap, there is also a knowledge gap among RTW professionals and employers about how to prevent, recognize, and manage mental health issues [13].

Supported Employment is recognized as the most effective RTW intervention to increase employment among those with severe mental disorders [21] and CMD [22,23], and is distinct from the traditional stepwise approach. Supported Employment is a person-centered, strength-based, and recovery-oriented RTW model characterized by the early introduction of job seeking and rapid placement in employment by a "place-then-train" approach. Thus, instead of performing single interventions in the stepwise and "train-then-place" tradition, Supported Employment is integrated into an overall RTW service corresponding to individual needs [24]. For individuals with CMD, cognitive strategies are included in the Supported Employment approach [22,23]. One Supported Employment intervention is the Individual Enabling and Support model. This model has proven to be more effective in achieving RTW, increasing quality of life, decreasing depression [22], and increasing empowerment [17]. However, effective RTW interventions are not widely available for individuals with CMD due to implementation difficulties, which are largely caused by conflicts between different rehabilitation paradigms when introducing a "place-then-train" RTW approach into a traditional "train-then-place" context [25,26]. In such circumstances, the use of digital interventions that fit the needs of users with CMD have the potential to make RTW interventions more accessible [27,28].

Digital mental health interventions enable service users to gain access to welfare services and interventions regardless of geographical circumstances, time, and place [29], resulting in encouraging user participation and empowerment [30,31]. Some efforts have been made to transform evidence-based, face-to-face interventions such as cognitive behavioral therapy into more accessible mental health interventions such as internet-based cognitive behavior therapy [32]. The effects of these transformations have shown good results in reducing mental health symptoms [33]. These findings motivated the development of a digital RTW intervention called mWorks. The overall mWorks project attempts to transform the Individual Enabling and Support model into a digital solution using mobile phones. To assure its usefulness and implementation, mWorks should be developed in close connection to the implementation context of primary and general mental health services. In particular, understanding of the legitimacy of a complex intervention among stakeholder groups (ie, whether it is recognized as right or acceptable) helps to identify implementation barriers and facilitators before embarking on a lengthy and expensive process of development and evaluations [34]. Therefore, it is critical to address the preferences, needs, and interests of different stakeholder groups at an early stage of development.

The majority of mobile health apps or interventions have not been developed and evaluated in connection to service users' needs, preferences, and interests [35]. Likewise, it is critical to address implementation challenges at the organization and delivery level of complex interventions [36]. Thus, consideration of the views of different stakeholder groups is important before development of the mWorks intervention to assure that it will become a user- and implementation-friendly digital solution [37]. As a first step, rigorous formative research on service users and other stakeholder groups is required to inform the mWorks design process based on service users' needs and preferences [35,38]. Second, elucidating potential barriers and success factors that are likely to impact usability, successful development, design, and implementation of mWorks is critical. Accordingly, the aim of this formative study was to gain insight into the role and legitimacy of mWorks, a proposed digital RTW solution for individuals with CMD on sick leave, from the viewpoint of different stakeholder groups, including service users, RTW professionals, and influential people in managerial positions, within the context of primary and general mental health services. A further aim was to inform the development of mWorks.

Methods

Design

Formative research helps to identify the needs, preferences, and interests of stakeholder groups that influence usage and delivery. A qualitative descriptive research design with an inductive approach [39] was used to acquire knowledge about the role and legitimacy of mWorks. Ethical approval for the overall mWorks project, of which this study is a part, was obtained from the regional ethics committee in Lund, Sweden (Dnr 2017/324).

Recruitment and Respondents

Three stakeholder groups were identified (see Table 1). The first group was service users, which include individuals with experience of being on sick leave and of having a CMD such as depression (including depression episodes in bipolar disorder) or an anxiety disorder. The second group was professionals who regularly provide care and support in the RTW process of individuals with CMD, including psychologists, rehabilitation coordinators, physiotherapists, supported employment specialists, occupational therapists, and medical doctors in primary care and mental health services. The last group was stakeholders who held influential, strategic, or managerial positions within the future implementation context. The inclusion criteria for all stakeholder groups were individuals of working age (18-65 years) and able to speak Swedish.

A purposeful snowball sampling method was utilized to find respondents [40]. This sampling method was chosen to find respondents with significant knowledge about the RTW process, the implementation context of primary care and general mental health service organizations, and their digital strategic planning. This allowed for ongoing accrual of new, information-rich respondents who were not known by the study researchers. Initially, the researchers identified stakeholders from each group who had broad connections within the RTW context. A health care strategist in the Skåne County Council was initially contacted by the last author (UB) to identify influential stakeholders. The health strategist was familiar with the RTW research field and knowledgeable about other influential respondents within the organization. Similarly, known RTW professionals within health services were initially contacted, and the first two service users were contacted by the RTW professionals. Each stakeholder was asked about other suitable people who might contribute to the study with valuable information. The snowball sampling method generated participants for both individual and focus group interviews. The choice of interview method was dependent on available resources (time) and existing group affiliation or constellation (eg, psychologists, employment specialists, or service user panel members with experience of CMD and being on sick leave).

Table 1. Respondent characteristics (N=46).

Stakeholder group	Age (years), mean (range)	Men/women (n)
Service users (n=18)		
Individual interviews (n=12)	30 (24-48)	7/5
Service users; one focus group interview (n=6)	55 (44-74)	4/2
RTW [a] professionals (n=20)		
Individual interviews (n=12)	44 (30-60)	3/9
Employment specialists; one focus group interview (n=4)	40 (26-61)	0/4
Psychologists; one focus group interview (n=4)	40 (38-47)	1/3
Influential managers in County Council (n=8)		
Individual interviews (n=8)	53 (39-59)	1/7

[a]RTW: return-to-work.

Data Collection

Data were gathered using semistructured individual interviews [41] and focus group interviews (see Table 1) [42]. The interviews aimed to identify stakeholder experiences, needs, and preferences for digital RTW solutions for people on sick leave due to CMD. Interviews were conducted at stakeholder workplaces or at the university of the researchers. The first (PE), third (AL), or last author (UB) conducted the interviews. The semistructured interview guide was based on the questions, structure, and content of a stakeholder study that was similar to the present study, which aimed to develop a digital service in a health service context [43]. The guide contained four topics: (1) earlier experience and interests of digital interventions in an RTW context, (2) perspectives on critical features and content of mWorks to meet the needs of service users, (3) possible obstacles for the implementation of mWorks, and (4) possible success factors. Additionally, probing questions connected to the RTW process were added [41]. The same guide was used for all interviews and stakeholder groups. Prior to the interviews, researchers informed the respondents about the study, and informed consent was obtained from each respondent. Individual interviews were performed by one interviewer (PE, AL, or UB), whereas the focus group interviews were performed by two interviewers with the last author (UB) as the moderator. Each interview was audio-recorded. After each interview, field notes were written by the interviewers, with the additional aim of storing information about the context and setting during the interview.

The intention of the individual interview was to generate a broad range of topics, whereas the intention of the focus group was to reveal additional insight about the respondents' more sensitive and personal disclosures that are likely to emerge and to allow for discussions about the respondents' experiences, needs, and preferences for a digital RTW solution. These revelations are more likely to occur in a focus group setting where respondents from a rather homogenous group have the opportunity to explore their group identity and challenge aspects inherent to their subculture, thereby exposing aspects that normally are out of reach in an individual interview setting [44]. Individual interviews lasted 30 to 45 minutes, and the focus group

interviews lasted between 45 and 60 minutes. Each transcript was assigned an anonymous code to safeguard respondent confidentiality. The data were stored on a USB drive secured in a fireproof locker at the research facility, with access restricted to the involved researchers.

Data Analyses

All interviews were transcribed verbatim in Microsoft Word by an independent professional transcriber. The transcribed interviews were initially analyzed inductively by the first author (PE), utilizing Graneheim and Lundman's [39] framework for conducting qualitative content analysis. The procedure initially involved reading the material several times to gain a sense of the whole content. In the next step, meaning units that corresponded with the overall aim of the study were identified. The meaning units were subsequently condensed into smaller meaning units that still represented the original statement. The condensed meaning units were then coded and organized into categories that illustrated the same phenomenon and represented the manifest content derived from the transcribed interviews. The coding procedure was performed until consensus was reached by three of the authors (PE, UB, AL). Finally, the categories were sorted into themes and a main theme based on knowledge from the literature and the researchers' professional experience, and these themes constituted the study results. All authors participated in the category sorting. In accordance with manifest content analysis, the level of interpretation and abstraction were kept to a minimum. Throughout the analysis, the focus was to describe the visible and obvious components from the transcripts to best represent what the respondents said in their own words, with exception of the process of establishing themes. The themes presented in Textbox 1 are at a higher level of abstraction than their accompanied categories. To further increase the credibility of the findings, the first author (PE) revisited the raw data in terms of audio files and field notes as well as the transcripts. It was also critical to include citations. Additionally, two different inquiry methods were used to support agreements in findings: individual and focus group interviews [39].

Textbox 1. Subthemes and categories of the main theme that a digital solution enables service users to take control over their return-to-work (RTW) process for individuals with common mental disorders.

Supporting service user empowerment

- Owning one's RTW process
- Promote decisions with user consent
- Accessible RTW chain

Addressing implementation challenges

- Professional attitudes and beliefs
- Legitimacy of digitalization
- Surrounding legislation and policy
- Unforeseen costs

Create a positive user experience

- Simplicity
- The importance of design
- Emphasis on resources and strengths
- Alternative communication approaches

Critical content for return to work

- Accessible rehabilitation network
- A clear plan
- Strategies for handling stress and anxiety

Results

Themes

A main theme and four connected subthemes with categories (Textbox 1) were identified. Overall, stakeholders viewed a digital RTW solution with optimism. The main theme was *a digital solution enables service users to take control over their RTW process.* This theme was derived from the themes indicating that *supporting service user empowerment* may have a positive impact on a digital RTW solution for the service users. Furthermore, respondent statements also elucidated the importance of *addressing implementation challenges* of a digital RTW solution. They perceived implementation barriers to involve personal attitudes among staff, surrounding legislation on a policy level within the organization, and unforeseen costs. Service users thought that it is important to *create a positive user experience* by designing a simple, low-threshold, usable digital RTW solution with an emphasis on service user resources

and strengths, and that service users should be able to choose alternative communication approaches. Furthermore, respondents voiced desire for *critical content for RTW,* highlighting the need for an accessible RTW network, clear RTW plan, and strategies for handling stress and anxiety. The findings are represented below by each theme and the accompanied categories (in italics).

Subthemes and Categories

Supporting Service User Empowerment

One of the main positive products of a digital RTW solution that emerged was *owning one's RTW process.* Respondents (ie, participants from all stakeholder groups) stated that a digital solution would benefit service users in gaining increased control and participation in their RTW process. Service users described the lack of support from mental health services for individuals who want to take control of their RTW process themselves, and believed that mWorks could fill that need. One service user stated:

> *Well, the mental health service is aimed at those people who are not self-sufficient, those who actually are [self-sufficient] don't get access to adequate support….But you are still forced to go there while getting worse and worse.*

Respondents described the positive aspects of having service users formulate their own authentic plans and goals to achieve RTW. This was thought to create ownership of the RTW process. Influential managers emphasized the potential and importance of a digital solution to empower the service user. By doing so, their own agencies were perceived as becoming more effective, flexible, and accessible. An RTW professional expressed that the service users themselves are the ones who are best informed about their preferences, needs, and interests in relation to RTW. However, some RTW professionals had reservations about a digital tool and cautioned that it could contribute to shifting the responsibility of becoming well or returning to work from the welfare professionals to the service users. They feared that the individual would be left to handle their situation on their own, without the aid of professionals to support them.

Furthermore, respondents thought that a digital solution should *promote decisions with user consent*. A digital RTW solution was perceived as empowering the service user with knowledge and information to prevent decisions made by authorities without service user consent. The ability of service users to lead and control their own RTW process was viewed as positive. The RTW process was described as becoming more transparent with a digital solution, and was otherwise perceived as difficult to grasp and coordinate in traditional services. A digital RTW solution could provide users with knowledge and a voice, while minimizing the potential for authorities to make decisions instead of or without the user, which was considered to be a common process at present. One influential manager of primary care stated: "You would own the process yourself, in the app, and have access to what is needed, and (you) do not have to think about whether something is going on behind your back."

Influential planners and managers also thought that digital RTW solutions would result in a more *accessible RTW chain*. The threshold for managing the RTW process was anticipated to be lower. Service users described that conventional modes of practice were perceived as rigid and too great of a threshold to overcome. Face-to-face meetings and phone calls were described as stressful to coordinate in a timely manner, but were described as the only viable option for the RTW process. The threshold for contacting the RTW network was described as being lower if there was an opportunity to choose the approach according to individual needs and preferences. Service users validated this perspective by stating that these barriers prevented them from doing anything about their situation. One service user said: "Calling the authorities is something I always try to avoid, because it's so complicated and difficult."

Addressing Implementation Challenges

The stakeholder groups of influential managers and RTW professionals voiced the need to address implementation challenges. They stated that clinicians or *professional personal attitudes and beliefs* toward digital solutions in general seem to play an important role in the adoption of a digital RTW solution. RTW professionals stated that some of their coworkers perceived challenges and were reluctant to implement new technology. They highlighted that using digital solutions might threaten their ability to keep their jobs, as new and effective work methods could make them redundant. One RTW professional said:

> *Say that you have a new method, because that means a lot of doubts, if you would create an app that is so good that my job is no longer needed. Then you would not like to support it, would you.*

Furthermore, respondents explained how some welfare actors lack the necessary technical skills to utilize new and innovative methods of practice. One service user explained:

> *The authorities can stand in your way. You have to get them to work together, especially when it comes to technology. I worked with the county council for a while, with their IT department… And that's terribly bad...So getting them to adapt to ... I believe is one of the biggest obstacles.*

The integration of digital solutions could be perceived as an extra workload for which RTW professionals did not have the resources or time. They reasoned that some of their coworkers lacked interest in learning about innovative technology. Individual factors such as attitudes, beliefs, interests, and age were described as important to consider when developing and adopting new technology and the role it might play in their organization. Early voluntary engagement with technology was a predictor for the future willingness to adopt digital solutions. The older coworkers were considered to be less familiar and experienced with technology and how to use it. In contrast, the younger generation was seen as being able to approach digital solutions with greater ease and willingness. The *legitimacy of digitalization* was high among the majority of the influential managers. They felt that a digital RTW solution holds great promise and highlighted the emergence of electronic health and digital solutions as positive, and something they would want to

continue to develop in their organization. Influential managers mentioned that the digitalization of welfare services are "the future," "knocking on the door," and waiting to be more widely utilized.

Influential managers and RTW professionals expressed that the *surrounding legislation and policy* regulation of privacy and confidentiality made it difficult to use innovative technology in the RTW process. Constant and rapid technological developments made it difficult for legislation and regulations to keep up with technology advances. This was seen as a barrier and one of the reasons potential digital solutions were not fully utilized in their organizations.

Unforeseen costs were perceived as a barrier for adopting a digital RTW solution. Service users were afraid that the software would cost money, and thus that they would not be able to afford the app. One service user stated: "That it might be…I don't know if it should be free of charge, but it would have been good, or at least that it doesn't cost that much."

Both service users and RTW professionals explained that most of the current mobile apps available were free of charge, and therefore it would be discouraging to pay for an app. RTW professionals noted that not every service user has access to a smartphone since they are expensive. One would need to pay for an internet connection to fully utilize a digital RTW solution, and this was considered to be an additional unforeseen cost for the service user. RTW professionals and influential respondents explained that service users are an economically disadvantaged group and were therefore afraid that expensive software would be a hindrance for adoption.

Create a Positive User Experience

The importance of *simplicity* in fostering a positive user experience emerged as an important factor. Respondents emphasized that a smooth, responsive, and fluid user experience, without software bugs, hiccups, and minimal buttons clicks, was important. One RTW professional proposed a "where am I now" function to guide and help the service user orientate and navigate in the app; one should never have to stop and wonder "where am I?" The importance of usability reemerged throughout the data as an important factor for adoption. Excessive information or overly complex configurations were described as cognitively demanding and able to contribute to service user loss of motivation. RTW professionals were concerned that service users would find an overly complex digital solution as overwhelming and an extra workload. They explained that lack of simplicity could generate a loss of interest and adherence, which eventually would result in "dropouts." Respondents thought that the spoken or written language must be easily understood or should even utilize emojis, symbols, and icons instead of text. This was particularly emphasized by RTW professionals and service users.

Respondents explained *the importance of design* within a digital RTW solution to facilitate continuity and avoid service users' immediate discontinuation of use. In a focus group discussion about design, an occupational specialist emphasized the value of creating a good first impression: "You have to make a good first impression, I see that as the key to making a successful application—how to make a good first impression."

Service users wished for universal commands and idioms, utilizing similar design patterns from well-known social media such as Facebook and Twitter. Furthermore, respondents highlighted the importance of being able to adjust the digital solution, in terms of esthetic design, mood, and cognitive ability, to foster individualization. One service user expanded upon the idea of the possibility to alter the degree of simplicity in relation to the capacity or affective state, which may alter from person to person and from day to day. For example, if the user was experiencing cognitive pressure and emotional overload due to stress or anxiety in a particular situation, the need to alter the app for cognitive effort would make it accessible at all times. Service users further explained that the degree of simplicity should vary depending on the stage of their RTW process. Those that were recently on sick leave were perceived as less likely to prefer a complicated app as compared to someone who was about to return to work. One service user explained:

> *What I feel, when I have been down, when everything is difficult, to go through a mobile with lots of,…lots of settings that I perhaps normally would like….So, when I am down I have no strength for that, …then I would almost like to have it baby-simple.*

Furthermore, respondents expressed the importance of *emphasis on resources and strengths* of service users, instead of their various shortcomings and limitations. The need to create a positive user experience with focus on the normality of service users' conditions, free from judgment and negative reinforcement that might impact the users' view of themselves, was expressed. One service user articulated the need for a digital RTW solution to be objective and normalizing:

> *Absolutely. It needs to be very normalizing, I really believe it, because,…because otherwise it is so,…"oh, how ill you are," so it needs be very like "yes, but this is nothing strange!"*

The need for providing *alternative communication approaches* emerged as important for promotion of a positive user experience. Service users observed that conventional means of communication (eg, phone calls and face-to-face meetings) were stressful and anxiety-provoking. The suggestion was that communication be accessible and supported through group chats, text messages, and digital meetings, and the respondents felt positively about these alternative communication approaches. In contrast, some RTW professionals had reservations about fewer face-to-face meetings. They warned that the loss of personal, face-to-face meetings would increase isolation and reduce the amount of social contact among service users. An operating manager from the public employment service stated that RTW professionals viewed face-to-face meetings as superior to alternative communication approaches: "We must be aware and reconciled about our overconfidence in face-to-face meetings, which we often believe to be superior in comparison to digital meetings."

Respondents highlighted the benefits of introducing more viable communication options within their RTW network and noted progress toward RTW in a manner that felt suitable and

comfortable to service users. They articulated the desire to be able to digitally record and retain documentation from RTW meetings. They often perceived meetings as stressful and indicated that it was difficult to register all of the information. Service users experienced being misinterpreted as lazy when they had difficulty understanding and remembering what was said during the meetings because of stress. As a consequence, one respondent explained being discharged by the psychiatrist:

> *People always assumed I didn't care, but I was just misunderstood. I've always cared, but they thought: "She doesn't care, why should we help her?"*

Critical Content for RTW

A wide variety of content was suggested as facilitating RTW for service users. An *accessible rehabilitation network* was considered to be paramount. Respondents explained that this network usually involved welfare actors who were assigned to support the service user until employment, such as occupational therapists and physiotherapists, supported employment specialists, social workers, medical doctors, handling officers at the national social insurance agency and public employment service, as well as family members, spouses, or friends. Service users proposed that contact information could be available to provide shortcuts in their RTW network. Having quick access to the rehabilitation network and to certain RTW professionals was perceived as an advantage that could prevent stress and anxiety-provoking scenarios. One service user said:

> *The reason why I think it must be as quick as possible, is...because of stress.…The cause of stress is, of course, that it does not go (away) fast enough. Another reason is that you do not have anything to do, but…if you are on sick leave for one or another reason, just waiting is the most dreadful thing that exists. That's another negative thing that can happen, and so you have to solve it immediately. It can occupy your thoughts a whole week until you have solved it.*

Respondents perceived that access to the RTW support network was limited and inefficient due to travel distances. An accessible RTW support network was described as fast, with efficient means of communication regardless of geographical circumstances. Service users conveyed that an accessible RTW support network contributes to a sense of safety, because they know that they have access to support if needed. However, a psychologist raised concerns about being available around the clock. They suggested that the RTW professional network should only be available during working hours.

To create *a clear plan* for the service users was commonly recommended regardless of the stakeholder group. The importance of a calendar, schedule, and reminder features was emphasized. The building blocks or strategies for back to work need to be clear. The service user position or stage in the RTW process needs to be located, and the important goals or steps that need to be taken, along with the appropriate strategies to carry out at each step must be well-defined. In conjunction, a "to do list" that illustrates needed actions was suggested. RTW professionals, especially psychologists, proposed these kinds of functions to enhance motivation by establishing feasible and meaningful milestones and goals. Thus, users could measure and monetarize their own progression through a clear RTW plan.

Strategies for handling stress and anxiety were proposed as important. Functions to support coping with anxiety and stress when such emotions arise at the workplace or everyday life were stressed, mainly by service users and RTW professionals. Features like mindfulness, cognitive behavior therapy strategies, and relaxation or recovery exercises were recommended. One influential manager for a primary health care facility proposed that the RTW solution could contain a "first-aid kit" with personalized strategies to cope with stressful and anxiety-imposed scenarios. Respondents thought that there should be interactive functions for access to fast and reliable information about service user symptoms and problems. Service users explicitly wished to understand their thoughts and emotions when stress and anxiety arose. They proposed links to external webpages with reliable sources of information.

Discussion

Principal Findings

These findings show that a digital RTW solution has a role to play in the RTW process, and has legitimacy among stakeholder groups. A wide variety of factors need to be considered as an important precursor of the development of mWorks. The primary finding is the importance and capacity for mWorks to foster service users' control of their RTW process. According to the themes, a digital RTW solution that can satisfy stakeholders and will enhance service user empowerment needs to be developed in relation to existing implementation challenges, while fostering a positive user experience and focusing on the different stages and parts of the RTW process.

All stakeholder groups favored empowering service users and agreed that the forthcoming mWorks should promote conditions for service user participation and ownership of their RTW process. This same theme emerged in recent qualitative research on digital solutions [45,46]. According to the respondents, regardless of group affiliation, one way of promoting such conditions would be to lower the threshold for service users to manage and control their RTW process, irrespective of their mental health. Our findings also suggest that mWorks needs to focus on making the user RTW support network accessible, regardless of time, place, or pace [29]. Previous research has identified having an overview of critical RTW actors and professionals as a critical RTW factor [47] that makes the service user more informed and in charge of the RTW process. Thus, mWorks has the potential of increasing service user empowerment along with their sense of control over the different RTW steps and the RTW support network, which has previously been inaccessible or difficult to comprehend. Our research elucidated several implementation barriers that might be encountered with a digital RTW intervention.

Although legitimacy was high among all stakeholder groups, managers raised concerns about the legislation and policy regulations of privacy and confidentiality. These circumstances are likely to impede implementation of novel digital

interventions if not accounted for during the design and implementation process. There are implementation challenges at several levels that influence the RTW process, not only aspects at the individual level but also those related to legal or organizational structures. In a systematic review, Powell and colleagues [48] stressed the importance of addressing barriers associated with implementing mental health service interventions at multiple levels within the implementation context. On an individual level, our findings suggest that stakeholder attitudes and beliefs toward digital RTW solutions may constitute a barrier. For instance, RTW professionals indicated negative biases toward digital RTW interventions because of a lack of time, resources, interest, and the potential threat of job loss. The latter has been found in earlier qualitative research, in which mental health service staff reported reluctant attitudes toward digital interventions due to the potential for them to replace clinical care [49]. Addressing professionals' views on digital solutions is important to foster successful adoption and implementation of such interventions [29,46]. These conservative stances suggest the need to highlight the added benefits (ie, increased effectiveness, and flexible and accessible support [30]) for both service users and RTW professionals when incentivizing digital RTW solutions. Rather than replacing face-to-face interventions in health care services, Berry et al [46] reported that a digital solution can enhance existing support. Therefore, a digital RTW solution should be understood as complementary to traditional support rather than replacing it.

Another implementation barrier pertains to reliance on access to a mobile device and internet connection. While it is true that service users are an economically disadvantaged group [50,51], research shows that individuals with severe mental disorders have almost as much access to mobile devices as the general adult population. Although it seems reasonable to assume that individuals with CMD may have a better financial situation than those with severe mental disorders, one of the most common barriers for mobile device ownership is the monthly subscription plan expenses [52]. Previous research had suggested discount programs to address the affordability of digital solutions for service users [53].

With regard to usability, our findings highlight the need to design a simple digital solution that fosters a positive user experience for individuals with CMD who may have a lack of motivation or difficulties in comprehending information. Some of the service users thought that complex digital interventions are likely to generate a lack of engagement. Our research emphasizes the importance of a focus on user strengths and resources rather than on problems and shortcomings. Comparable results were found in qualitative research when respondents stated that digital solutions need to foster positive feelings, without focusing on the negative aspects of CMD and symptoms that could lead to ruminating and catastrophizing [46]. To assure that mWorks promotes a positive user experience, service users must be included in the inquiry and design process. Users will not enjoy or adopt products that focus on their limitations, but they are capable of suggesting ways to reduce focus on the negative aspects of CMD [54]. User-centered research with a participatory, iterative design should be employed to ensure that mWorks is grounded in service user preferences that enhance their strengths and resources. Participatory design is compatible with the Individual Enabling and Support model, which focuses on individual preferences and needs [24], and further validates the need to make the Individual Enabling and Support model more accessible through a digital solution. To create a positive user experience, the introduction of mWorks should be paired with informational or educational efforts to help service users get started and thus minimize the risk of their immediate termination of use [55]. The app's digital pedagogical presentation, and how that is understood by the user, should also be considered. These findings highlight the importance of introducing digital solutions that are attuned to individual RTW needs and preferences, as well as the need for pedagogic structure and information on usage.

According to the stakeholders, the role and legitimacy of a digital RTW solution are associated with having access to adequate RTW support, regardless of time or place. In addition, the content should help service users gain a clear overview of the RTW environment. The development of mWorks might make the RTW steps more visible and tangible for service users. The opportunity to make a clear, individualized plan of how to get back to work, mediated through a schedule or "to do" list, can provide a setting with feasible goals. This kind of goal setting has been shown to generate increased levels of self-efficacy [56]. In turn, self-efficacy is one of the most important determinants for RTW [57,58]. Using goal-setting strategies to establish meaningful goals could help service users manage and prioritize their next appropriate step toward RTW.

Another way to help service users establish and reach their goals would be to borrow from motivational theories [59]. Similar suggestions have been mentioned in earlier research about how to help users set and reach goals through increased motivation and engagement [35,60-62]. Motivational interviewing can be successful in helping people identify their goals [63] and RTW [24]. Bakker et al [35] suggested the value of self-determination theory in the development of a digital solution that would increase service users' intrinsic motivation. Another proposal to enhance goal achievement would be to utilize game elements. The use of gamification has shown promising results in research that used goal setting theory to increase engagement [63-67].

Our findings highlight the importance of including cognitive strategies in mWorks to cope with stress and anxiety at work and in everyday life. Doing so would generate a sense of safety since users would have access to cognitive strategies and their RTW support network regardless of geographical circumstances. However, the service user group warrants a swift but reliable contact with professionals in their RTW network, as opposed to one psychologist who expressed concern about the need for psychologists to be available to service users around the clock. This concern emphasizes the importance of making cognitive strategies accessible outside of office hours. Internet-based cognitive behavioral therapy is an effective strategy to address stress and anxiety [32,33], and can be fully delivered as automated conversational apps that foster self-management [68]. These cognitive components can serve an important role

in promoting an mWorks service user who manages and controls their RTW process.

Methodological Considerations

We used the Consolidated Criteria for Reporting Qualitative Research guide [69], which is a 32-item checklist to ensure the quality of the study. Carrying out formative qualitative research with stakeholder groups throughout the design and development process has been identified as an important cornerstone to tailor digital interventions to service users' needs and preferences [70]. To enhance the transferability (ie, external validity) of the findings, we took field notes, which allowed for a more in-depth description of the research setting and data collection procedure [71]. Purposeful snowball sampling was considered to be a desirable method of recruiting interview respondents because the researchers had no previous insight into potential respondents. Nevertheless, the snowball sampling method can be criticized for skewing the sample in a specific direction [41]. To increase transferability, the researchers asked the respondents to suggest only one or two potential respondents per person per stakeholder group. The utilization of individual and focus group interviews was selected to allow for a wider variety of data to emerge so as to not rely on only one source of inquiry. This helped the researchers reach adequate saturation and enhance the credibility of the findings [71]. Individual interviews are highly effective at generating a broad range of topics, while focus group interviews are more likely to produce sensitive and personal disclosures [44]. The respondents did not get the opportunity to check the transcripts or the interpretations, which negatively affects the credibility and is a limitation of the current study [71].

The authors constitute an interdisciplinary research team with expertise in their respective research fields, including public health (PE); digital development and participatory research (PS); occupational therapy, CMD, and RTW in relation to service users, employers, and RTW professionals (AL, UB); and mental health services and implementation research (UB). UB created the project idea about translating the Individual Enabling and Support model into a digital format called mWorks. Additionally, the first author (PE) has knowledge of the RTW process through his own experience of sick leave and CMD. This contributed to a healthy mixture of perspectives during the analysis process, and minimized the chances of having personal biases influence the findings. This in turn enhanced the credibility (ie, internal validity) of the findings, and therefore increases the level of trustworthiness of the current study [39].

Conclusions

mWorks may facilitate the avoidance of conflict between different RTW paradigms. This conflict has been a major implementation barrier of introducing a "place-then-train" model in a "train-then-place" RTW context [25,26]. Shifting the power from health care professionals to the service users is a clear priority [72,73]. Service user empowerment is emerging as a focal point in mental health research and reforms, but the understanding of how to implement such a paradigm shift is still underdeveloped [74]. mWorks may have a role to play in such a paradigm shift. Further research should focus on conducting user-centered research with a participatory iterative design to best understand service user needs and preferences when developing digital RTW solutions.

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Conflicts of Interest

None declared.

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Abbreviations

CMD: common mental disorders
RTW: return-to-work

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Acceptability of a digital return-to-work intervention for common mental disorders: a qualitative study on service user perspectives

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Abstract

Background: There is an evident discrepancy between need and provision of evidence-based return-to-work (RTW) interventions in existing mental health services. Online dissemination of evidence-based interventions is presumed to reduce this gap. However, there is almost no knowledge available on perceived acceptability of digital RTW interventions among service users, which are factors that might influence the development and implementation of future interventions. The aim of this study was to develop knowledge of service user acceptability of mWorks, a proposed digital RTW solution.

Methods: Participants ($n = 18$) with experience of common mental disorder and sick leave were recruited with a purposive snowball sampling method. Semi-structured interviews ($n = 12$) and one focus group interview ($n = 6$) were conducted. A deductive thematic analysis was performed according to the Theoretical Framework of Acceptability.

Results: Digital RTW interventions were perceived as acceptable and aligned with participant value. Participants expressed positive attitudes toward having access to support, regardless of time and place. A certain ambiguity between a decline in social interactions and opportunities to RTW in a safe space was reported. Participants were confident in their ability to use digital RTW solutions, but reported the need to reduce stressful elements of using smartphones. Overly demanding digital solutions, i.e. ones requiring high cognitive effort, were described as burdensome.

Conclusions: For digital RTW solutions to be acceptable, they need to complement traditional services by providing accessible and person-centred support throughout the RTW process. They should be designed to reduce the need for cognitive effort. Future research should explore how to balance user autonomy with other support components in digital interventions.

Keywords: Return to work, Mental health, Depression, Anxiety, Digital solution, Vocational rehabilitation

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Background

Common mental disorders (CMD) such as depression and anxiety are increasing globally and constitute one of the most common causes of reduced health [1]. These illnesses are associated with substantial personal burdens, i.e. negative impact on well-being, lessened financial security, and risk of social isolation. In addition, mental illness contributes to a substantial societal cost in terms of sick leave, health care, and lost productivity estimated to cost €600 billion annually in Europe alone [2]. Many individuals with CMD are on long-term sick leave [3]. The societal cost of sick leave due to CMD is double that of individuals with physical conditions [4].

Few effective return-to-work (RTW) interventions exist for the target group of individuals with CMD [5]. Traditionally, RTW support is fragmented and follows a step-by-step approach, a medical model in which single interventions in health services, e.g. medication and cognitive behavioural therapy, constitute the first steps and there is little connection to other RTW welfare services or the workplace [5–9]. The Swedish welfare system is highly sectored and the responsibility and commitments of a service user's RTW process are scattered among Health Services, the Social Insurance Agency (SIA), the Public Employment Service (PES), and Social Services [7, 10]. Service and knowledge gaps create barriers to RTW and prolong periods of sick leave [6, 11–13]. In response to a dearth of effective RTW interventions, evidence-based supported employment (SE) for persons with severe mental disorders (SMD) [14] has been adapted with cognitive behavioural therapy (CBT) strategies to better fit the support needs of persons with CMD. This kind of intervention where SE and CBT strategies are integrated has been shown to be more effective than traditional services on RTW among persons with CMD in one Norwegian and one Swedish pragmatic, parallel randomized controlled trials [15–17]. However, recent implementation research highlights the discrepancy between the need and access to effective interventions [18]. This dilemma is largely caused by two conflicting RTW paradigms, one that fosters a person-centred, strength-based, and recovery-oriented SE approach, and one that holds traditional standards and focuses on diagnosis, functional disability, and activity limitations [7, 17, 18]. In addition, staff and employers engaged in the traditional approach have shown to have low mental health literacy, adding to the knowledge and service gap [13, 19, 20]. Digital solutions have sparked a new hope of making RTW interventions accessible to a broad audience [21]. Our aim was to develop a digital RTW intervention that covered the features of adapted SE intervention that include CBT strategies [15, 22]. Online delivery through smartphones may improve access to RTW interventions and play a role in reducing the service and knowledge gap.

As a precondition to evaluate effectiveness of interventions, the Medical Research Council has provided guidance on the need to test and refine such interventions to assure they are acceptable [23]. Acceptability is a multifactored construct that reflects the extent to which people perceive an intervention to be appropriate, i.e., anticipated or experiential cognitive and emotional responses to an intervention. Assessment of acceptability can take place before, during or after the intervention experience [24]. However, there is an absence of a clear and shared framework of acceptability, which has led to an insufficiently robust research corpus. To remedy this, Sekhon and colleagues [24] provided the Theoretical Framework of Acceptability (TFA), the first systematic approach to developing a common understanding of acceptability. Researchers have recently begun to apply the TFA to evaluate acceptability in different stages of complex interventions, including development, evaluation, and implementation. For example, the TFA was applied in evaluation of the experiences of community pharmacists working in a men's mental health program that helped to identify acceptability issues and inform changes in program design [25].

Previous research on acceptability in relation to CBT delivery formats shows a conflicting picture of whether face-to-face or digital interventions, with or without human support, are preferable. These inconsistent research results are likely due to comparisons of different formats [26, 27]. Two meta-analysis and a review showed that digital interventions with human support yield better outcomes than interventions without human support [26, 28, 29]. Lower acceptability would therefore be expected for digital interventions in unguided internet CBT (iCBT). However, this was surprisingly not found in a meta-analysis of delivery formats. One explanation may be that acceptability was operationalised as study dropouts, and not as experiential responses to an intervention [26]. Inconsistencies in the current research corpus suggest a need to investigate acceptable delivery formats according to a standardized framework and the role of professionals when determining whether a digital RTW intervention will be successful.

Poor engagement of service users in digital solutions in primary care contexts, as well as slow dissemination, suggest other acceptability barriers [30, 31]. Acceptability has been explored during transformation of evidence-based interventions (e.g., CBT) to digital solutions (e.g., iCBT). A qualitative meta-synthesis concluded that acceptability relies on the sensitivity of the digital intervention to individual needs and preferences [32]. In a feasibility study, evaluating the acceptability of a digital solution that aimed to decrease depressive symptoms and increase well-being at the workplace, it was reported that engagement issues constituted an acceptability

barrier. This was attributed to the fluctuation of service users' mental health, and that they did not have enough time for app usage which resulted in disengagement [33]. However, little is known about the acceptability of digital RTW interventions from the perspectives of service users. Thus, there was a need to understand prospective acceptability, i.e., anticipated acceptability of mWorks, a proposed digital RTW intervention to be delivered by RTW professionals and used by persons on sick leave due to CMD throughout the RTW process. This understanding will serve to modify aspects prior to implementation, and thus inform the content of the proposed intervention.

While some research lessen the importance of digital intervention characteristics, other highlights the need to address these characteristics for service user acceptability. The latter are associated with emotional state, attitude, and the severity of depression, each of which affects service user acceptability of an intervention [24, 34]. Insights from a previous acceptability study on digital positive psychology intervention for persons with CMD add that factor such as a persuasive design, easy accessibility, a credible reputation, and not requiring too much effort for interaction, personality and symptom severity were important to consider when creating an acceptable digital solution [34]. Symptom severity is associated with low levels of engagement, mediated by decreased levels of motivation and interest in previously enjoyable tasks [35]. Therefore, it is vital to establish how digital interventions such as mWorks can be designed to meet potentially decreased engagement levels of service users with CMD.

A lack of conclusive knowledge hampers the ability to design acceptable digital interventions for this target group. Qualitative methods are well suited to investigate anticipated acceptability of the intended audience [24, 34, 36]. No research has previously examined perceived acceptability of a digital RTW intervention with a standardized framework of acceptability. Thus, by conducting a qualitative thematic analysis we aimed to decrease the knowledge gap and increase the understanding of service user acceptability of mWorks, a proposed digital return-to-work solution for persons with experience of CMD and sick leave using the TFA.

Methods

Design

A qualitative research design with a deductive thematic approach [37] was used in order to analyse participant perceptions of acceptability of mWorks. A top-down thematic analysis method was chosen because it tends to generate detailed information about specific aspects of the data, in this instance, information related to the seven acceptability attributes of the TFA [20]. This is in contrast to a bottom-up thematic analysis which tends to yield richer descriptions from the entire data corpus [37].

This study is part of a larger project in the southern region of Sweden with the aim or developing and evaluating a digital RTW intervention, mWorks, for persons with CMD [22]. It is in accordance with the 2008 revision of the Helsinki Declaration has been approved by the Ethical Review Board in Lund, Reg. No 2017/324. This study was guided by consolidated criteria for reporting qualitative research, COREQ [38].

Recruitment and participants

Inclusion criteria included being of working age, 18–65 years, having current or lived experience of sick leave and the RTW process, self-reported diagnosis of a CMD, (i.e., depression, including depressive episodes inherent in bipolar disorder and/or anxiety disorder) and able to communicate in Swedish.

A purposeful snowball sampling method was utilized where initial participants nominate other potential participants using their network [39]. This recruitment method enabled us to find information-rich participants that otherwise are difficult for researchers to access, who belong to a vulnerable group in various care or RTW support programs for persons with CMD [40]. Initially, the first author (PE) contacted four previously known mental health and RTW professionals who had regular contact with potential participants during the course of their daily work at social services, Fountain House clubhouses (non-profit mental health service where members are provided with opportunities for RTW support), primary care, and mental health services. The professionals were asked to nominate individuals who met the inclusion criteria. The nominated individuals were contacted via email or face-to-face by the professionals and asked to participate. They received oral and written information about the study. To verify the inclusion criteria, nominated participants were asked by the first author (phone, email) if they recently had been sick-listed due to CMD (according to medical certificate for sick leave), if they currently were involved in a RTW process, or had prior experience of being on sick-leave due to CMD and involved in a RTW process. The initial two individuals agreed to participate. These two participants then nominated additional individuals, and asked if they wanted to participate. If the additional individuals were interested in participating, they were contacted by the first author (PE) and further informed about the study. All participants gave written informed consent prior to the interview.

Data collection

Individual ($n = 12$) and focus-group ($n = 6$) interviews were conducted between April 2017 and January 2018.

The individual interviews were intended to generate a broad range of topics. The focus group interview aimed to reveal additional insights about more sensitive and personal viewpoints. These revelations are more frequently occurring in a focus group context where participants from a homogeneous group can explore their group identity, challenge aspects inherent to their subculture, and thereby exposing aspects that ordinarily are out of reach in an individual interview context [41]. The interviews were semi-structured [42] and focused on generation of information about participant experiences, needs and preferences concerning the mWorks intervention. Prior to the interviews, participants had accessed verbal and written information about the purpose and design in connection to informed consent. In addition, brief and standardized verbal information about the project and proposed digital RTW solution was written at the top of the interview guide to be easily introduced. The interview guide was the same for both types of interviews and derived from a similar study that aimed to develop a digital service for childhood cancer survivors within a health service context [43]. The interview guide was adjusted to fit the current target group by addition of probing questions regarding the RTW context. According to the preferences of the participants, interviews took place at participant homes or at the university research facilities (Lund University). The first author (PE) conducted most individual interviews, while the last author (UB) conducted the first individual interview and moderated the focus group interview with an assisting researcher who took field notes and posed probing questions when needed. Each interview was audio-recorded and supplemented with field notes to capture additional observations that added meaning and understanding to the interview. Individual interviews lasted approximately 30 to 45 min, and the focus group interview lasted about 60 min. To protect participant confidentiality, each transcript was stripped of identifiable details, assigned an anonymous code, and stored securely.

Data analysis

The recorded interview material was transcribed verbatim. The material was subjected to a "top-down" thematic analysis [37] and the themes were driven by a theoretical framework of acceptability (TFA) [24]. The framework entails seven constructs (Fig. 1) and can be used to understand how people consider a healthcare intervention to be appropriate, based on expected or experienced cognitive and emotional responses to an intervention [24]. This could be done before (prospective acceptability), whilst (concurrent acceptability) or after (retrospective acceptability) participating in an intervention. In our study we investigate prospective acceptability.

The analysis procedure initially involved reading through the field notes and transcripts. A software tool specifically developed to analyse qualitative data, OpenCode version 4.03, was used to organize and gain an overview of the data. Content from the transcripts was identified that corresponded with the acceptability attributes and initial coding into themes was performed by

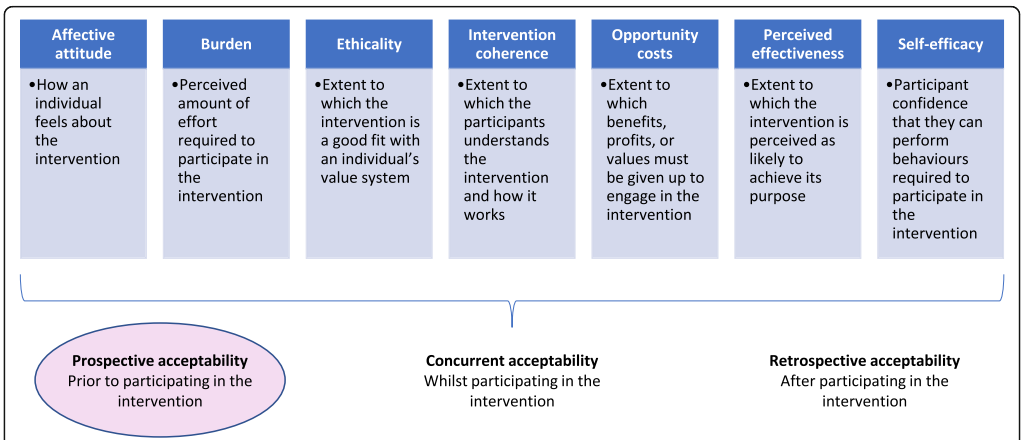

Fig. 1 Theoretical Framework of Acceptability (TFA), developed by Sekhon and colleagues. TFA is a multi-faceted framework that reflects the extent to which people delivering or receiving a healthcare intervention consider it to be appropriate, based on anticipated or experiential cognitive and emotional responses to the interventions [24]

the first author (PE). The themes were then collapsed to smaller components to clarify distinctions in the material. Next, UB scrutinized the first author's (PE) interpretation of the data, which was an iterative process, to ensure that the interpretations of the themes were credible. Subsequently, all three authors worked together iteratively to ensure that the narrative represented the data, which helped to form consensus. For example, one participant explained how digital solutions may provide a sense of security and safety since mWorks makes the RTW support accessible. This was assigned the acceptability construct of *affective attitude* and assigned to the theme *creates a sense of safety*.

Results

In total, eighteen individuals agreed to participate. There were twelve individual interviews and one focus-group interview with six participants. In this sample, the distribution between the genders were favourable towards men ($n = 11$) in comparison to women ($n = 7$), with a mean age of 41 years (range 25–74). Participants reported having a mean experience of CMD 5 years (range 1–40). Depression (75%) was the most frequently reported diagnosis, followed by bipolar disorder (17%) and general anxiety disorders (8%). 22% of the participants were currently on sick-leave due to CMD ($n = 4$), 22% were currently involved in a RTW process (n = 4), and 56% had prior experience of being on sick-leave due to CMD and RTW ($n = 10$). With regards to educational level, 58% reported having completed a University degree, 33% Upper secondary school, or 8% reported of nine-year compulsory school, or lower. All participants were of ethnic origin in Sweden and spoke Swedish.

The findings presented below are based on the seven constructs of the TFA. The most commonly raised construct in our analysis was burden, followed by affective attitude, ethicality, perceived effectiveness, opportunity costs, self-efficacy, and last intervention coherence (Table 1).

Affective attitude

Participants stated that mWorks needed to *avoid feelings of being judged*. They expressed difficulty in facing family and professionals due to being negatively judged in the context of their shortcomings and not following through on their responsibilities. This was explained as producing feelings of guilt. In order for mWorks to be acceptable, a judgmental tone needed to be avoided.

> "It should not be interpreted as judgmental if you miss certain meetings and such. Well, you can get a reminder that now you have missed this and that many, but not like a red flashing app." [Individual interview 3]

Participants felt that mWorks should not make service users feel any different from others, regardless of their mental health problem. Otherwise, such an application would be perceived as offensive and judgmental. Furthermore, participants cautioned against designing mWorks as too childish because this would come across as stigmatizing.

mWorks needed to *create a sense of safety*. Digital solutions were thought to need to be capable of delivering support regardless of time, pace and place. Knowing that they had access to support available through their mobile device provided participants with a sense of security. In contrast frustrations about the inadequacy of traditional vocational rehabilitation services in terms of continuity and long-term sustainability were described. Not

Table 1 Acceptability of a digital return-to-work solution, mWorks, based on the Theoretical Framework of Acceptability

Construct (%)	Theme
Affective attitude (18.9)	Avoids feelings of being judged Creates a sense of safety Creates a harmonious feeling
Burden (28.2)	Need for flexibility regarding feedback Motivational difficulties Cognitive strain
Ethicality (14.8)	Increase service user control Reduced clinical and deficit-oriented approach
Intervention coherence (4.9)	Counteracts evasive behaviours
Opportunity costs (11.2)	Complement to traditional RTW support, not a substitute Safe digital space to progress
Perceived effectiveness (13.3)	Involves the entire RTW process Support regardless of place and time Enables a proactive RTW process
Self-efficacy (8.4)	Confidence in using digital platform Increase stress levels Dependent on age and earlier digital experiences

knowing if support would be available when it was most needed produced a sense of insecurity. One service user expressed frustration at being abandoned without adequate RTW support during relapse.

> "But three weeks later, you are back at square one anyway...they felt that you were done there, somehow." [Individual interview 10]

Participants described the need to *create a harmonious feeling* when they signed in to mWorks for the first time. This was regarded as important to arrive in a space that were pleasant and free from annoyances. Likewise, a focus on positives instead of negatives would facilitate a harmonious atmosphere. In contrast, too many required actions, software bugs, and unresponsive tactile sensation (i.e. input delay when touching the mobile screen) could contribute to the elimination of a harmonious impression.

Burden

Participants explained the *need for flexibility regarding feedback* to reduce the perceived burden of using a digital platform. There were contradictory statements in relation to feedback, making it clear that feedback is a double-edged sword. The use of feedback was perceived as both a facilitator and a barrier for RTW. On the one hand, feedback was a powerful tool to increase motivation through rewarding the completion of tasks, showing user progress and return-to-work trajectory. On the other hand, feedback could be burdensome, since negative patterns would become apparent and could reinforce negative emotions, thoughts and behaviours. Participants recommended that feedback should not be mandatory and should be used with caution. The suggestion was for mWorks to foster individualized options of how to use and approach feedback functions.

Motivational difficulties were described as an engagement barrier for mWorks. According to the participants, this was predominantly a product of depressive symptoms that may make it burdensome to engage with a proposed digital intervention. Participants anticipated that engagement with mWorks would be difficult during more severe periods of depression or anxiety. They all shared experiences of having problems with getting out of bed and wondered how they would have the energy and mental fortitude to participate in the intervention.

> "It is hard enough to do things at all, because you are so terribly exhausted or depressed. So why does it make sense to do it? ... You do not see that much meaning in doing things. You do not think that it will help anyway." [Individual interview 10]

One participant suggested the importance of providing the user with the why(s) for using mWorks, i.e., why this specific activity would be useful for the RTW process. Such understanding could provide smaller activities or subtasks with meaning.

Participants recommended that mWorks limit the *cognitive strain* required to interact with the support tool. Their depression and anxiety contributed to high cognitive strain, and this made it burdensome to interact with cognitively demanding devices. Therefore, the cognitive barrier needs to be sufficiently low that service users are able to intuitively understand mWorks in terms of use, orientation, and where to start. Ideas were elaborated to make mWorks less cognitive demanding, including limiting the initial number of actions and choices, while gradually introducing more functionality. Participants suggested that a large amount of text should be limited, and symbols and colours should be used in a systematic way to facilitate a sense of order and structure. This was assumed to make mWorks easier to use. As an example, one participant explained how different colours for different care organizations could help:

> "That there may be different colours for when it is about work, when it concerns the municipality, and when it is (health) care. Then you get a brief overview... Okay, now I have some municipal meetings there, some care meetings there, and some meetings at work there." [Individual interview 1]

Ethicality

The participants valued *increased service user control* over the use and access to their own data and progress. They explained that no one but service users themselves should dictate how to use mWorks. Rather, autonomy regarding how much and what parts of mWorks to use was valued. Self-determined involvement was perceived to foster ownership of their RTW process. Although most participants valued the ability for service user control, one participant did not think user control was preferable. On the contrary, leaving the responsibility to the professionals was a relief. Furthermore, data generated by the service user must be secure, with access restricted to the user. Taking adequate safety measures were described as paramount in order to guarantee the safety of personal information.

> "It should be very clear that it is you alone who governs this. That it is you who are the focus. It is you that this is about. So, if you don't want A, B, or C to get some information or know that you have missed these meetings ... they shouldn't be able to do that either. They shouldn't be able to go in the back way somehow. [That] you should feel safe." [Individual interview 3]

Participants wanted to share their data with other RTW actors, under the condition that the service user had full authority to decide who would have access to their data.

A *reduced clinical and deficit-oriented approach* suited participant values. Having a clinical approach or focus was felt to place emphasis on negative aspects and problems.

> "I think it shouldn't be too clinical. It shouldn't say 'the County Council of Scania' on it." [Individual interview 7]

Participants wanted mWorks to promote positivity and focus on the recovery process and problem-solving. A clinical focus was felt to contribute to reinforcement of the individual's self-stigma for being on sick-leave and having a mental illness.

Intervention coherence

Participant understanding of mWorks indicated that the intervention *counteracts evasive behaviour*. The use of calendars and notifications were explicitly mentioned as tools to mentally prepare for daily tasks and behaviours required to progress toward RTW. Mental preparation was described as counteracting evasive behaviour since the intervention strengthened the individual by planning and strategizing about future events, such as meetings with rehabilitation actors.

> "If it turns out that in two hours I'll have to go to this meeting and I wasn't mentally prepared, then it might be that I don't go at all." [Individual interview 1]

Seeking family member approval in relation to the participants and their life situation was described as a constant challenge. mWorks was perceived to legitimize their actions towards RTW, concerning their family members, or other persons in their social network. They could be transparent about what they were working on, their progress, and what rehabilitation actors were involved in the process. Participants reported that displaying where they were in their RTW process to family members provided them with a feeling of accountability, and made them more likely to follow through on their commitments.

Opportunity costs

Participants cautioned about the potential danger of replacing human contact with a digital interaction. Therefore, in order to be acceptable, a digital intervention must be designed as *a complement to traditional RTW support, not a substitute*. Some participants valued the social interaction with rehabilitation actors. This benefit was thought less likely to occur if human interaction was replaced with digital contact. However, some individuals prefer to manage their contact with RTW actors through digital means, and it was highlighted that individual preferences should dictate the levels of human interaction. The cost of reducing human contact was compensated for by mWorks making it possible to have a *safe digital space to progress*. Participants valued a digital space where service users could process RTW related issues and progress towards RTW in a safe space, free from external stressors, in an environment of their choosing.

Perceived effectiveness

For participants to accept mWorks as an effective RTW intervention, it must *involve the entire RTW process*. The advantage of using mWorks was the ability to gather everything related to the RTW process in one place. mWorks needed to have a holistic view of the service user and not focus blindly on the RTW outcome alone. To focus on everyday needs such as food, medication, and general well-being was also important.

Participants had confidence that digital strategies could reduce stress and anxiety. For example, internet-delivered Cognitive Behaviour Therapy (iCBT) and other digital meditation practices were mentioned as effective treatments because users can access *support regardless of place and time*. Some scepticism arose regarding the mindfulness intervention practice because the general public is perceived to harbour negative preconceptions toward it.

> "Because I believe many people think it's (mindfulness) hocus-pocus... But I think CBT works if used in combination with returning to work." [Individual interview 10]

mWorks was thought to *enable a proactive rehabilitation process*, where service users could be intercepted before a relapse. mWorks facilitated preventive and early interventions. These attributes were explained as important advantages of digital solutions, and made participants consider mWorks as a potentially effective RTW solution.

Self-efficacy

Participants were *confident in their ability to use digital platforms* as a tool for RTW. They attributed their confidence to feeling comfortable with handling mobile devices in their everyday life. Participants explained that such social media is an integral part of smartphone usage. However, the use of additional applications such as mWorks on their smartphones could inhibit participant self-efficacy because the use of too many digital

solutions can *increase the stress level* of an individual. They feared that their confidence in performing the required tasks in mWorks would be inhibited. They noted that smartphones were distracting because they are always prompting for attention. Participants explained the need to "take a break" from the phone. One participant explained:

> "The mobile device has also become stressful, because as soon as I open it, there would be SMS and stuff … So, that is why I had to put it away for a while." [Individual interview 7]

Another participant suggested that it was important to be able to turn of notifications or adjust notifications to the individual's liking.

> "Only the most essential should reach you. If Facebook and such things, notices should be on, … it can ruin a lot. You get distracted." [Individual interview 3]

Participants perceived that the acceptability of digital solutions were especially *dependent on age and earlier digital experiences*. Older individuals were not believed to be as confident as the younger users, but could make up for it if they had prior experience of using digital tools on a more frequent basis.

Discussion

The present study demonstrates that the expectations of mWorks as a digital RTW solutions are acceptable to service users with CMD. In essence, acceptability was present when mWorks focused on producing a positive affective attitude and fostering a stress and judgment free environment, where users can progress toward RTW to in a safe space. To increase perceived effectiveness, a digital solution needs to be designed to complement traditional RTW services and reflect an integrated and recovery-oriented approach. This contrasts to the stepwise, diagnosis and deficit-oriented approach that was deemed problematic. Attending to the perceived burden of usage is critical since this is related to motivational difficulties and cognitive strain among persons with CMD. Simultaneous user autonomy on approach and use of mWorks is necessary to avoid increased stress levels that risk reducing self-efficacy, and thus negatively impacting engagement levels.

Although there is ambiguity about the importance of human support for acceptance of digital solutions [26, 27], our findings indicate that the service user needs to be given the opportunity to direct the level of human interaction. Service users value the potential to complement traditional RTW services with access to fast and reliable human support, as well as the opportunity to progress towards RTW in a safe space with minimal amount of human interaction. That service users deem ordinary contact with RTW actors as too stressful has been observed elsewhere [44], and it is therefore crucial to consider the type, frequency, and duration of human support in order to optimize the delivery format [29]. This is imperative because the removal of human support might jeopardize positive effects on outcomes and the greater retention noted in previous research [28, 45, 46]. A way forward may be to use AI-directed chatbots that can serve to mimic human support and increase engagement and attrition rates of digital solutions [44]. In a recent trial it was concluded that these AI-directed conversational agents appear to be an engaging and effective way to deliver CBT for persons with CMD [47]. If similar effects can be derived for digital RTW solutions remains a subject for future research prospect.

The importance for service users to experience hope, power, and meet professionals who apply a person-centred and holistic approach during the RTW process are demonstrated to be critical RTW factors for persons with CMD [17]. Our findings suggest that mWorks must involve the entire RTW process to be perceived as effective. Service users described frustrations about traditional RTW services lack of sustainable support, and absence of a holistic approach throughout their RTW process. This fragmented process is hard to manage, and produces a sense of insecurity. Incorporation of important constituent elements in the RTW process through a digital solution can address this problem. One such element is inclusion of strategies to increase well-being and mental health, such as digital cognitive strategies, that has demonstrated to improve such outcomes [48, 49]. Another important element is the ability to plan and strategize RTW actions, as this is an important cornerstone in supported employment interventions [15, 16]. Thus, mWorks needs to incorporate a broad range of content in order to encompass the entire RTW process, when returning to and remaining at work, and be perceived as effective, and thereby acceptable.

mWorks was considered ethically acceptable if service users had the opportunity to control how to use and approach the digital solution. Research on developing digital solutions for health-related behavioural change indicates that offering too many choices or complete navigational control can be overwhelming and result in lower use. This points out the tension between supporting user autonomy and clear guidance on how to best engage with the intervention to change behaviours [36]. The more choices and actions service users are exposed to, the more cognitive strain is increased, and this could negatively affect acceptability. Indeed, too much freedom of use can be perceived as burdensome and result in

lower levels of engagement compared to exposure to a coherent presentation of essential intervention components [50, 51]. The need to find a balance between dichotomies such as clear guidance or complete freedom in use of digital interventions has been noted elsewhere. Research is vital during the development phase in order to establish what services users prefer to do on their own and when clear directives are needed [32, 36]. Further research should investigate which activities users prefer to do without those activities becoming burdensome, and how to provide a system that allows independence and control.

Research has shown that symptom severity in depression is associated with lower levels of engagement [35]. This may constitute an acceptability barrier and impede engagement with mWorks if not addressed during development. Engagement barriers are one of the bigger barriers for implementation of digital innovations in European health care systems [46], since the average user spends 5 min or less on learning a digital solution [52]. Consideration of factors that ameliorate user deficits in engagement is crucial and could improve retention during digital RTW solutions. Future research on adequate strategies to increase motivation and provide users with tasks they find feasible and meaningful is needed. Positive feedback should be considered during development, as it can be a powerful tool to enhance motivation but must fit the needs of service users. RTW professionals have an important role when delivering mWorks. They have the opportunity to discuss and tailor feedback according to service user needs and preferences, in a way that is not possible in a digital context [34]. Similar to previous research [34], our findings further instantiate that service users' fluctuation in symptom severity, and thus perceived burden, is a prominent acceptability barrier. This indicates that service users may be less likely to interact with cognitively demanding tools and that variability in symptoms needs to be accounted for in the development of digital solutions. Moreover, future research inquiries should investigate how digital solutions can account for this variability.

Methodological considerations

The theoretical framework for acceptability provided a useful model as the accompanying components analyse specific aspects of the data corpus that are associated with service user perceived acceptability of a digital RTW solution. An unclear understanding of acceptability in previous literature resulted in an inadequately robust research corpus, and that interventions often fail to be embedded in practice [20, 53]. This situation reduced transferability of research findings, which the TFA framework can help to remedy. Co-production has been stressed as a main important factor to understand, reach and engage users that are going to use the digital solution in practice [45, 54, 55]. Thus, investigating acceptability prior to participation of mWorks was essential to increase the understanding of how the digital solution could be aligned with the users' perspectives of acceptability in order to be integrated into practice. However, some constructs were challenging to employ in this setting because the intervention was in a formative stage, and intervention components were not fully determined. For example, it was not clear how the construct *intervention coherence* could help anticipate acceptability. Consequently, explaining the overarching intervention components to participants was essential. The framework would benefit from added clarification and development on how to analyse anticipated acceptability when the intervention still is in a formative stage.

Qualitative methods do not provide generalizable evidence. Therefore, generalized claims should be made with caution and finding herein might not be generalized to other contexts. However, the use of TFA and COREQ has improved research description and quality. In that sense, transferability becomes possible for readers, who can make own inferences [56]. Findings may further be interpreted as relevant to inform future development of the mWorks.

Although purposive snowball sampling was used since it yielded information-rich participants of a hard-to-find target group, the participants might not be representative of the entire group of persons with CMD and RTW experience. Although data saturation appeared to be met, with no additional insights arising in the final interview, it is possible that a wider range of participants (such as inclusion of younger people) would have provided additional aspects of acceptability. Future research should investigate needs and preferences of these subgroups to uncover all features of acceptability.

The authors have been or are currently involved in the development of mWorks and have preconceptions of what would be acceptable to the service users. This might have contributed to bias in the interpretation of the data. However, the analyses were conducted within a multidisciplinary research team with expertise in their respective research fields, including public health (PE), digital development and participatory research (PS), and research on SE and critical factors for RTW, and implementation (UB). This mixture of perspectives may have minimized personal biases and helped to ensure credibility of the findings. In addition, the deductive analysis according to the TFA model provided researchers with a common understanding of acceptability, which helps to mitigate biases, improves transferability, and thereby increases the trustworthiness of our study. Participants did not get the opportunity to member check our findings, which is a limitation of this study.

Conclusions

This study sheds much-needed light on the acceptability of mWorks, and will help to inform future development of digital RTW interventions that are engaging and appealing to service users with CMD who are on sick leave. To create a positive user experience was addressed as vital. This entailed providing a safe digital space and a stress and judgment-free environment where service users have an opportunity to progress toward RTW. Perceived effectiveness was linked to the ability of mWorks to complement traditional RTW services with access to the entire RTW process according to user needs and resources. Participants found this a desirable departure from a diagnosis and deficit-oriented approach. Reducing the cognitive burden was perceived as critical for acceptability. High cognitive burden can jeopardize service user self-efficacy and negatively impact engagement levels. Future research should more fully explore perceived burden in order to understand the balance between user autonomy and other support components in digital solutions.

Abbreviations

CBT: Cognitive behavioural therapy; CMD: Common mental disorder; iCBT: Internet cognitive behavioural therapy; MRC: Medical Research Council; PES: Public Employment Service; RTW: Return to work; SIA: Social Insurance Agency; SMD: Severe mental disorders; TFA: Theoretical Framework of Acceptability

Supplementary Information

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Additional file 1.

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Authors' contributions

UB and PE contributed to the design of the study. PE collected most of the data, incorporated the TFA framework, performed the initial deductive analysis, and drafted the manuscript in several steps. UB and PS contributed with detailed feedback and suggested edits. Each author contributed substantially to the writing, interpretation of the findings, conclusions, and review process, and approved the final version of the manuscript.

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Availability of data and materials

The interview guide is provided as Supplementary file 1. Original quotations from the data corpus are used to support the analysis procedure. A substantive, pseudo-anonymous collection of extracts from each participant interview is available from the corresponding author upon reasonable request.

Declarations

Ethics approval and consent to participate

This study is part of a larger mWorks research project for which ethical approval was provided by Lund University from the Regional Ethics Committee, Sweden (application number 2017/324). Participants gave written informed consent and the study was performed in accordance with the ethical principles of the Helsinki Declaration of medical subjects including humans.

Consent for publication

Not applicable.

Competing interests

The authors declare that they have no competing interests.

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Publisher's Note

Study III

Co-design process of a digital return-to-work solution for people with common mental disorders: a qualitative study

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Abstract

Background: To the detriment of service users, stakeholders have not previously had the opportunity to influence the design of their healthcare or be involved in mental health and return-to-work (RTW) research. Co-design of digital RTW solutions is thus vital to create acceptable and engaging interventions that are useful for those receiving or providing them. mWorks is a digital RTW solution for people with common mental disorders.

Aim: To describe stakeholder perceptions of a co-design process during prototype development of mWorks.

Methods: A co-design approach was used in the development of mWorks. Eighty-six stakeholders participated in the iterative co-design process, including service users, RTW professionals, employers, digital design and system developers, the public, and researchers. Multiple data sources from seven iterations were analyzed with content analysis.

Results: Stakeholders highlighted the importance of enabling service users to self-manage by delivering supplementary support to traditional services and a place to identify the surrounding RTW support network. This is reflected by the categories. Additional crucial aspects included development of strategies of empowerment (to aid against self-stigma and mental health issues), foster control, identify strengths, and formulate a positive self-narrative to disrupt negative mindsets. While testing the alpha and beta prototypes, stakeholders stressed that mWorks needs to be warm and

welcoming, understandable and intuitive, offer clear guidance, and provide motivational and goal setting strategies.

Conclusions: Stakeholder experience-based knowledge asserts that mWorks needs to empower service users by providing them with a personal support tool. To enhance RTW prospects, a digital tool should engage users in a meaningful manner while focusing on their strengths and available resources.

Key words: co-design, mental health, mobile health, return to work

Introduction

The digital age has sparked a new hope that healthcare services users can be more involved and empowered in the delivery of their healthcare services [1]. Digital activities have become more common in primary healthcare and mental health services [2]. Drawing knowledge from the experiences of living with mental health problems is vital if digital initiatives are to have utility for users [3]. Leveraging the users' ingenuity by co-design has gained momentum in research, and has proven to be effective in promotion of well-being, alleviating illness, burdens, and healthcare costs [4, 5]. User involvement in the co-design of healthcare services can generate numerous benefits, such as improvement in patient choices, self-care, and positive effects on service delivery and patient outcomes [6]. Design planning of healthcare is criticized for promoting exclusivity, and service users are not traditionally involved [4, 7-10]. This is especially conspicuous in mental health services [3]. Return-to-work (RTW) research has also been slow to adopt co-design principles in the development of interventions, and accelerated adoption is expected to result in accompanying benefits. Most digital mental health solutions have not been researched or co-designed with users or other stakeholders [3, 11]. Meeting the requirements of stakeholders who deliver and those who use the digital solutions is critical.

Converting RTW interventions into digital solutions holds the promise of overcoming existing implementation barriers with regard to the structural complexity of welfare services and its lack of coherent support to users during the entire RTW process [12, 13]. One such digital initiative is mWorks, intended to increase empowerment and control during the RTW process for persons with common mental disorders [12]. mWorks is based on a strength-based perspective and grounded in the Individual Enabling and Support (IES) model for persons with common mental disorders [14-17]. The IES model builds on an integration of supported employment (i.e., evidence-based RTW intervention) and cognitive behavioral therapy (CBT) and is delivered by RTW professionals. The IES model is effective for RTW [18],

empowerment, and depression [19], and users report that it is a holistic and person-centered service that provides them with hope and power [20]. Supported employment has not been translated into a digital solution, but CBT has been accessible online as Internet-delivered CBT (iCBT) for the past two decades. Guided iCBT has equivalent effectiveness to face-to-face CBT for reducing depression [21-24]. Furthermore, different self-management psychological interventions delivered through digital solutions are also effective in ameliorating depression and anxiety symptoms [25-27]. Unfortunately, the majority of digital solutions have not been co-designed with stakeholders and have failed to meet their requirements [11]. In mental health services, digital solutions vary in user acceptability, engagement, and adherence [28]. Our formative research shows that there is acceptability for mWorks development [12, 13]. Thus, entering a collaborative enterprise with stakeholders is crucial for digital solutions to be acceptable, satisfactory, and grounded in the needs and values of service users [12, 13, 29].

The traditional RTW model entails receiving support from various welfare services, e.g., the social insurance agency (SIA), public employment service (PES), and workplace [30-32]. This model focuses on diagnosis, functional disability, and activity limitations, which tend to generate a passive role and prolonged sick-leave [32-34]. Such a RTW model provides few opportunities to tailor interventions to individual needs [4]. While evidence outlines the importance of providing person-centered and integrated RTW services, no comprehensive solution exists for facilitation of the RTW process for service users [30]. The fragmentation of services reveals a service gap that negatively affects service users' outlook in terms of hope and belief they will return to work [31, 35]. This encompasses a transition of focus in RTW support, from being fragmented to coherent, and from seeing patients as passive recipients to becoming valuable actors in their RTW process [18-20]. Service users benefit from a strength-based and person-centered service. mWorks has the potential to fill the service gap by complementing traditional RTW services through empowerment of service users during the RTW process [12, 13].

In order for mWorks is to be realized in practice, developing the digital solution *with* (rather than *for*) users with common mental disorders is important [36]. Service users have not traditionally been allowed to influence the production of their healthcare [4, 7, 9]. Consequently, there is scarce research outlining the co-design process of digital solutions in the mental health field [3]. Even when different concepts, theories and approaches describing the co-production process have emerged [7], researchers still struggle to apply this knowledge to implement co-production activities in their research practice. Co-production involves a partnership between the researcher and stake-holders [1, 4]. Co-production ranges from consultation, engagement, and participation to partnership, co-production, and shared decision-making [10, 37] where, for example, users have influence on the decision-making processes. Adoption of co-design approaches is warranted in mental health research to avoid tokenism and create digital solutions that have utility [3]. We wanted service users and other stakeholders to have

a significant role in the research development process of mWorks so that it would be usable and correspond with user needs and preferences. A co-designed strategy and related research activities were developed for translation of the IES model (an integrated supported employment and cognitive behavioral approach as described above) into the digital solution mWorks. The aim of this study was to describe stakeholder perceptions of a co-design process during prototype development of mWorks.

Methods

Design

A co-design approach [36] was used for the translation of the IES model during the development of mWorks. Co-design in research is based on a core philosophy of human rights involvement, democracy, equality [38], and the value of participatory efforts between researchers and stakeholders with the goal of developing interventions that empower service users. Co-design also intends to identify a diverse range of needs and preferences, and lay the groundwork for successful implementation [1, 4]. In this study, stakeholder participants acted as informants, co-designers, and evaluators and provided their perspectives and feedback during the research process. This collaborative effort helps to promote the stakeholders' active involvement in the co-design process. The mWorks prototype development included seven iterative cycles of stakeholder involvement. These iterations included the initial pre-prototype, paper prototype, alpha prototype, and beta prototype. The study took place between March 2018 and November 2020.

Research context

This study was part of the research project *Work support in your pocket: Development and evaluation of mWorks, a digital mental health intervention for return-to-work* [14] and designed for persons on sick leave due to common mental disorders. The project started with two formative studies that investigated stakeholder needs and preferences [12], and service user acceptability of a digital RTW solution [13]. The current co-design study helped to inform the development of mWorks, while the next step will be a testing phase where feasibility will be investigated with established process evaluation methods [39, 40] before proceeding to a randomized controlled study design [41]. This described research process conforms to the Medical Research Council (MRC)

framework of developing, testing, evaluating and implementing complex interventions [29].

Stakeholder group participants

Eighty-six stakeholders participated in the iterative co-design process. Five stakeholder groups were involved: 1) service users (*n*=25; 29%) with experience of sick leave and common mental disorders (e.g., depression, including depressive episodes inherent in bipolar disorder and/or anxiety disorders). Three also had experience as professionals with digital system development (e.g., software and gaming designers, app development in the private sector), 2) RTW professionals (*n*=19; 22%) representing CBT psychologists, occupational therapists or reha-bilitation coordinators, Supportive employment specialists, 3) employers (*n*=1; 1%), 4) digital design and system developers at the regional or national level of the healthcare (*n*=4; 5%), and 5) public involvement (*n*=37; 43%) consisting of young adults (*n*=22) from a secondary school class who are frequent users of digital tools, and clubhouse members and mentors from the "Fontänhuset" (*n*=15), an organization with supportive employment as part of their social program. The age range was 18-65 years with a mean age of 37 years, a gender distribution of 46% men and 56% women. All participants had adequate Swedish literacy skills.

Research group

The interdisciplinary research group consisted of junior and senior researchers. The authors had expertise in public health (PE), mental health (UB, AL, PE, PS), clinical psychology and primary care (CS), occupational therapy (UB, AL, CT), the IES model (SE/CBT) for persons with common mental disorders (UB), participatory and co-design approaches (UB, AL, PS, CT), development of digital solutions (UB, PE, PS), and implementation research (UB, AL, PS). PE made the first draft and contributed to the administrative part and data collection of the co-design and iterative development process, together with authors AL and CT. PE and AL recruited participants. UB (PI) and PS outlined the design of the research study. UB was responsible for the co-ordination and synthesizing of the iteration content in relation to IES during the prototype development process, helped to identify typical frustrations embedded in the RTW process, and produced pedagogic material (personas, requirement lists, intermediate and emerging content) that was used and altered by stakeholders and authors in the co-design process. PS supervised overall performance of the co-design, and think aloud interviews [42]. The layout and material production of the eight redemption scenarios (Figure 1), and personas (handouts) used during iterations were performed by UB, AL, and CT, where CT functioned as a creative director. AL, together with UB, facilitated the processes and coordinated

interactions with software developers. CS had an expert role in content development of motivational and cognitive strategies that was derived from the IES model.

Recruitment, procedure, and data collection

An overview of the purpose, stakeholders, and data collection of the seven iterative steps and the co-design process are presented in Table 1. The recruitment and study procedures are described below. During initial pre-prototype development, *Iteration 1*, there was a workshop with stakeholder groups on the national, regional, and local levels. *Iteration 2* involved four cycles with two reference groups that elicited content features, function ideas, and materials that were iterated by a user group between each cycle. This rich material was condensed during *Iteration 3*, and a downsizing workshop among stakeholder groups helped to identify key content features and functions for the paper prototype using a decision-making process. This paper prototype version was used to translate the co-produced material into software development. In *Iteration 4* a downsized reference group who tried the alpha prototype to provide feedback on needed refinements. Public involvement with young adults, clubhouse members and mentors helped to inform and broaden the understanding of usability and further needed refinements in *Iteration 5*. As a result of these, mWorks evolved into a beta prototype that was further developed and refined through think aloud interviews in *Iteration 6*. Lastly, a downsized reference group provided further feedback in *Iteration 7*. Researchers (UB, PE, AL) did further iterations with the strategic management of the County Council of Region Skåne, LU Innovation, (i.e., Lund University innovation department), and through them the software companies finalized the beta prototype.

Pedagogic materials

The pre-prototype pedagogic material was produced in the present study (by UB) and involved synthesized material from the RTW process of the IES model [18], the mapping of typical frustrations with the RTW process (as reflected by individual interviews of persons with common mental disorders, n=60), previous research on critical factors for the RTW process [20], and formative research on stakeholder preferences, needs and acceptability of mWorks [12, 13]. Identified typical frustrations with the RTW process were: 1) “I see no way forward”, 2) “I don't believe in myself and have no energy”, 3) “There is no support available”, 4) “Talking about my mental health is difficult”, 5) “I do not know where to start”, 6) I” don't have any strategies that work”, and 7) “I keep feeling bad at work (when I returned to work)”. Two personas, Max and Sara, were developed and can be understood as archetypical representations of service users. Personas may help RTW-stakeholders incorporate

diverse aspects of demographic factors, diagnoses, gender identity, delivery context, job type, psychosocial workplace environment, and typical frustrations. They were used to personalize the service users' needs and preferences in *Iterations 1-5*, and *7* [43].

Table 1. Overview of data-collection procedures and iterations performed during the mWorks co-designed prototype development.

	Iteration 1 Pre-prototype	**Iteration 2 Pre-prototype**	**Iteration 3 Paper-prototype**	**Iteration 4 Alpha-prototype**	**Iteration 5 Alpha-prototype**	**Iteration 6 Beta-prototype**	**Iteration 7 Beta-prototype**
					Change of software company		
Data collection methods	Workshop with stakeholders	Reference and user groups	Downsizing workshop	Downsized reference group	Public involvement of young adults and clubhouse members/ mentors	Think-out-loud interviews	Downsized reference group
Purpose	To inform the pre-prototype draft in relation to legitimacy, relevance, and content features	To inform the development of content and features in relation to typical RTW frustrations (four cycles)	To inform decision making to identify and prioritize the most critical content features, format and functions needed to condense the material into a paper-prototype, to support software development	To test the alpha-prototype to inform what needed to be refined during software development	To inform the alpha prototype in relation to public terms of content features and format, and clubhouse members in terms of acceptability	To inform usability dilemmas during software development of the beta-prototype (users verbalized thoughts while using mWorks).	To test the beta-prototype during software development to refine content and optimize function and usability

Table 1, cont

Participants, recruitment	Stakeholder groups (n=11) 1) User, n=3 2) RTW, n=4 4) Digital, n=4	Stakeholder groups (n=16) 1) User, n=10 2) RTW, n=5 3) Empl, n=1	Stakeholder groups (n=6) 1) User, n=2 2) RTW, n=4	Stakeholder groups (n=5) 1) User, n=2 2) RTW, n=3	Stakeholder groups (n=37) 5) Public, n=37	Stakeholder groups (n=6) 1) User, n=6	Stakeholder groups (n=5) 1) User, n=2 2) RTW, n=3
Types of data	Audio recordings; field notes; mock-ups; photographs	Audio and video recordings; photographs; scribblings; field notes (fours sessions)	Audio recordings; photographs; scribblings; field notes	Feedback sheets (Word document), comments and bullet points together with screen-shots of digital content and features	Audio and video recordings; photographs of mock-ups; field notes	Audio and video recordings; fieldnotes; open-ended interview questions, e.g. Did you understand how to use mWorks?, Was something easier or more difficult to do?, What would you change?	Feedback sheets (Word document) with bullet points and related screenshots of digital content and features

Recruitment

Purposeful sampling was used to recruit participants throughout the development process [44]. Initial contact was initiated by e-mail with previously known stakeholders. The exception was involvement of the public (*Iteration 5*), where convenience sampling was used due to stakeholder availability. A secondary school teacher and personnel at clubhouses were contacted by e-mail and informed about the study. The contacted personnel informed researchers which stakeholders agreed to participate and suggested a time and date for meeting. During *Iteration 6*, four service users from previous formative research [12, 13] took part in the think aloud interview; three were represented in the user group. In addition, one service user was recruited via a flyer published in the general campus area (Lund University), and one used via a non-profit user organization where personnel asked potential participants about their interest participation. They were then contacted by phone or email. Among the invited stakeholders, one employer in the reference group and one service user in the think aloud interviews declined participation.

Prior to participating, study participants received oral and written information about the overarching research project and the implications of their involvement in the current study. Prior to any data collection, each participant was informed about the purpose of the current iteration session and provided informed written consent in accordance with the ethical principles of the Helsinki Declaration of 1975, as revised in 2000 [45]. Ethical research approval for the mWorks project and the present study was obtained from the Regional Ethics Committee in Lund, Sweden (Dnr 2017/324).

Iteration procedures

During iterations, PE had first-hand knowledge of the collected data, through writing field notes, performing recordings, photographing visual and verbal narratives, and drafting text summaries. Between iterations, the data synthesis process was led by UB and iterated among authors (PE, AL, CT). This data collection procedure allowed us to feed-forward information during the refinement prototype development.

Pre-prototype

The co-design procedures began with a preparatory meeting with Inera AB, a national organization responsible for coordinating and supporting digital business development of municipalities and regions. A representative from Inera AB was present at *Iteration 1*, the stakeholder workshop (Table 1). Initially, stakeholders were introduced to the research project, the pre-prototype, initial design ideas, the two personas (Max and Sara) and the identified typical frustrations by PowerPoint presentation. Stakeholders were then divided into two representative groups and provided with post-its, different colored pens, large writing papers, and posters of Max and Sara. They were prompted

to discuss an open-ended question about frustrations with the RTW process and what features were needed to support users return to work. To facilitate the discussion, different features of mWorks were highlighted one at the time (i.e., design, content, usability, and potential needs of the service user), and post-it notes were used to prompt, stimulate, and generate ideas. The sessions lasted 90 minutes.

Iteration 2 was performed with a reference group and user group. This co-design phase involved four subsequent cycles; each represented two of the seven typical frustrations. The reference group acted as a design partner, and the user group provided feedback on the PowerPoint materials that were developed between each workshop. The research group produced a requirement list between these sessions to merge the pre-prototype and evolving co-design ideas. These cycles allowed us to oscillate between ideation (reference group) and validation (user group) to inform the paper prototype version so that it matched stakeholders' needs, values, and requirements. During each of the four cycles, the reference group met at the beginning and end of each workshop. The beginning meeting was to introduce the co-design session, and at the end meetings was to discuss and merge the main elicited co-design ideas. During the main part of the workshop, participants split into the same reference groups and were encouraged to discuss problems and frustrations through the use of redemption scenarios [46, 47]. As seen in Figure 1, the first box portrays frustration, and the last box captures the solution. The reference groups were encouraged to find relevant content and design features needed to solve the situation. Max and Sara were used to prompt the personalization of ideas. After each session, the research group compiled a requirement list that the user group was given the opportunity to validate and provide feedback on. These validations allowed the research group to iterate and make further refinements to the requirements list that was eventually merged with the pre-prototype content and design [14]. Reference group sessions lasted 120 minutes and user group sessions were 60 minutes for each cycle.

Paper prototype

The 90-minute downsizing workshop with stakeholders, *Iteration 3*, was critical for the decision-making process and determining what in the list was critical in relation to the IES and RTW process (Table 1). The session started with a PowerPoint presentation of the merger of the pre-prototype and co-design materials from *Iteration 1 and 2,* and highlighted Max and Sara. The workshop was audio-recorded, and stakeholders' scribblings and drawings were photographed. In addition, field notes were used to support interpretations of the findings. The final paper prototype PowerPoint presentation was then shown to LU Innovation and the software company that developed the alpha prototype.

Alpha prototype

For *Iteration 4*, a downsized reference group of stakeholders was consulted to provide feedback on mWorks usability and content features, formats and functions for the

actual programming process (Table 1). The procedure started with stakeholder access to the alpha prototype. They were then asked to complete certain tasks, to provide written comments and bullet points on usability aspects of effectiveness (ability to complete a task in a specified context), efficiency (ability to complete a task with accuracy), and satisfaction (perceived comfort and pleasantness during interaction) [48]. The written comments were summarized on feedback sheets (word documents) with related screenshots of digital content and features. Stakeholders' individual comments and feedback sheets were compiled and processed by the research group. This allowed further refinement in parallel to the prototype development. Each individual response took approximately 45 minutes.

Public involvement was the main purpose of Iteration 5 and comprised workshops with young adults from a secondary school class and members and mentors of a clubhouse who were familiar with supported employment. The students were divided into three groups. Initially, they were given tabletop devices to interact with the alpha prototype. Each group discussed a series of topics, such as aesthetic design, content features, formats and function, motivation to use the prototype, and navigation. They were prompted to place post-it notes on a mock-up that represented the different aspects of interest. The workshop took 90 minutes. The clubhouse workshop was conducted by a service user and a researcher that began with a PowerPoint presentation about the project, project development, and the alpha prototype. Members and mentors were familiar with the RTW process of supportive employment and were prompted to determine critical implementation factors for real world usage through an open discussion.

Beta prototype

Iteration 6 included think aloud interviews with six users with experience of common mental disorders and sick leave (Table 1). Users were evenly distributed among three subgroups that tested different sections of mWorks. They were asked to do various predefined tasks and verbalize their thoughts, feelings, and experiences during use according to the think aloud method [42]. During the think aloud session, each user was asked a series of open-ended questions about their experiences, and these were accompanied by probing questions. See Table 1. About 85% of all usability errors were found among 5-6 participants [49]. This was a critical usability test since a new software company in Malmö drafted the beta prototype.

For the last step, *Iteration 7*, the same downsized reference group and procedure from *Iteration 4* was used, but this time the focus was on final refinements of alpha prototype programming. Stakeholder comments were again compiled and processed by researchers, and this allowed refinement before having a prototype for testing in a real intervention delivery.

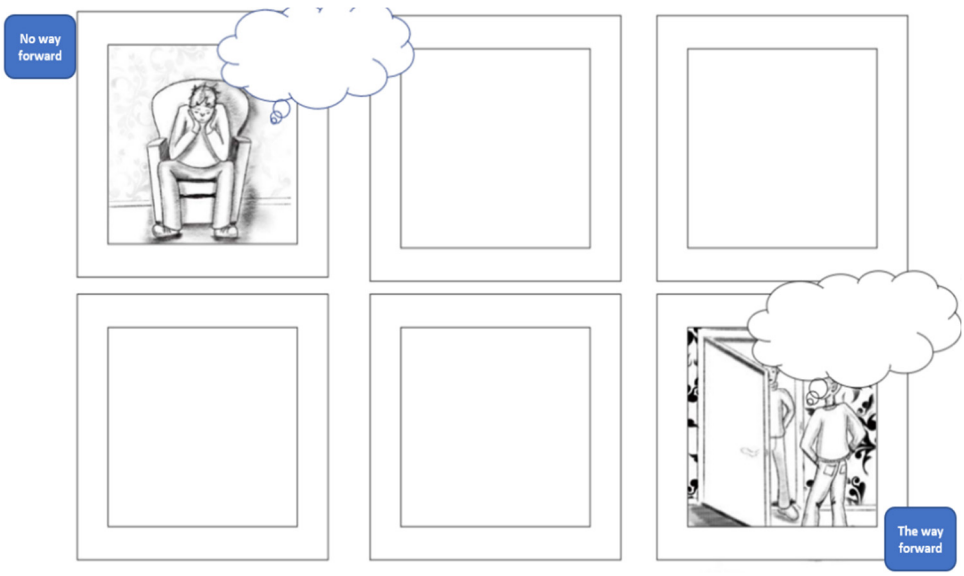

Figure 1. Example of a redemption story worksheet used to extract stakeholder ideas and solutions to the predetermined "No way forward" frustration of the RTW process.

Data analysis

All data from the iterative development process were analyzed according to qualitative content analysis, inspired by Graneheim and Lundman [50]. This analysis method is preferable for capture of a variety of data sources and patterns when dealing with a large data corpus [51]. The initial analysis process involved listening and watching recordings, studying visual data (i.e., photographs, scribblings, and mock-ups), and reading the field notes to gain a comprehensive understanding of the data. Next, recordings were transcribed verbatim and visual data were observed and described in words for merging into sections with other text portions. This data treatment was performed by PE and made it possible to identify units and sub-units of meaning associated with delivery and content features, functions and formats that were ascertained during the co-production process. The condensed meaning units were given numerical codes and then assembled into categories as assessed by PE, UB and PS. Finally, the categories were assigned to themes to allow for higher degrees of abstraction and interpretation. Meaning units, codes, categories, and themes were processed until consensus was achieved among all authors.

Results

The stakeholders' experience-based knowledge and perceptions from the co-design process include the knowledge derived at each iteration as a response to the iteration aim (Table 1), information material (from the IES model), and provided pedagogic material. The results are presented as themes and their accompanying categories (Table 2). The main theme indicates the importance of *Empowering service users with a personal digital support solution that engages them back to work.*

Table 2. Subthemes, categories, and subcategories of the man theme: Empowering service users with own personal digital support solution that engages them back to work.

Empowering the service user back to work	Enabling self-management back to work
	Supplementing traditional RTW and health care services
	Providing a comprehensible overview of the RTW process
	Coordinating the support network to facilitate RTW
	Resolving the ambivalence regarding mental health disclosure
	Fostering service user control
	Breaking the downward spiral
	Assisting device that identifies strengths and resources
	Helping to reshape a positive self-narrative
	Permeating a positive, hopeful and stigma free impression
	Perceiving the encounter as warm and welcoming
Providing service users with own personal support tool	Mobilizing own strategies
	Coping with thoughts and feelings during work return
	Helping to identify cognitive strategies
	Suggesting a variety of content features
	Helping users to plan for their RTW process
	Improving data privacy
	Implementing safety measures to safeguard personal data
	Requesting options to interact with self-selected support persons
Improving service user engagement	Facilitating comprehension of mWorks
	Needing to understand mWorks content intuitively
	Explaining the significance of mWorks content in relation to RTW
	Reducing the amount of text-based content
	Reducing the need for recall
	Needing accessible chat-support
	Providing motivation and goal-setting strategies
	Addressing service users jaded motivation
	Presenting a time-bound, measurable, and concrete development process
	Premiering the importance of a goal and reward-oriented design
	Advising for a more engaging design

Empowering the service user back to work

One of the most critical design choices during pre-prototype development (Table 1) was to consider the role of mWorks as the service user's own self-management solution. Because of legal barriers to information exchange between service users and RTW actors on the same digital platform, self-management has been identified in a related national project by one of the included national stakeholders [52]. Consequently, mWorks needed to be solely a self-management tool, focused on strengthening and empowering the individual, centered on the service user's capabilities, providing accessible information, and supporting engagement in the RTW process. In addition, secondary requirement was that the mWorks design needed to meet the needs of a broad audience in order to enhance adoption. For these reasons, we iteratively tweaked the interface's color scheme to be more aesthetically pleasing.

Enabling self-management back to work

Supplementing traditional RTW and healthcare services by providing a self-management tool with accessible information and support was a crucial role for mWorks from initial pre-prototype development, *Iteration 1* (Table 1). By filling the service gap of personalized RTW support, mWorks enables service users to self-manage by strengthening and empowering them. During later iterations, one stakeholder validated that mWorks could supplement traditional RTW services and assist them in their daily work.

> …(mWorks is) a complement to healthcare. So what I think you should do is sell this (mWorks) to all outpatient clinics, because I think it can be a very good aid for us. [Iteration 6, service user]

During the development of the pre- and paper prototypes (Table 1), the importance of *providing a comprehensive overview of the RTW process* was emphasized. Stakeholders explained that this could serve the purpose of 1) aiding understanding and use of mWorks, and 2) providing factual information about the RTW process, including what it entails and key events that were important for the service users. Service users suggested that this overview information be delivered by the professional who delivers mWorks and/or in written format as an integral or external (i.e. written manual) part of mWorks. They advocated for mWorks to cover all vital steps of the RTW process and not only single aspects. Providing comprehensive information was anticipated to provide a safe space where service users could think and strategize about RTW and what it may entail. During the think aloud interviews, one stakeholder validated this idea and emphasized the advantages of including *everything* related to RTW in one comprehensible digital solution.

> What I have seen seems very good. It includes all the essentials and leaves room for some special adaptation – Iteration 6, service user

During pre- and paper prototype development, *coordinating the support network to facilitate RTW* was commonly expressed as being vital (Table 1). Reference group stakeholders (*Iteration 2*) remarked that service users sometimes experience frustration over the uncertainty of not knowing what and from whom they can receive RTW support. To solve this, they unanimously suggested content features that provide an opportunity to mind-map and identify crucial persons, e.g. RTW professionals or related parties of their social network, who understood the service user's unique needs and preferences, and represented their mental health and sick leave situation. By aiding the identification of crucial persons, users could recognize and define the support they could provide.

> I see it in front of me, like a mind-map. Who is connected with whom. A network-map. [Iteration 1, RTW professional]

> Define the network…. Who do I have around me, and what is everyone's function? [Iteration 2, service users]

By allowing comments as a reminder when an interaction took place, this content feature could also aid service users in evaluation of adequacy of support in relation to needs. Ideally, an interactive communication function is necessary that allows the service user to invite different RTW professionals to communicate with them. In a previous national project by Inera AB, called *Samverkansytan*, this was not feasible because of legal restrictions [52]. Therefore, allowing service users to compile their network themselves would enable them to get a better understanding and overview of who and what these related parties or professionals could assist with and then share with these individuals.

Disclosing mental health problems at work can be challenging due to internalized and public stigma related to mental illness. For this reason, disclosure is part of informed decision making. For many individuals, disclosure may be a sensitive topic and not everyone wants to share with everybody. Thus, *resolving ambivalence regarding mental health disclosure* was discussed during the pre-prototype development and it was thought important that the service user feel in control of the RTW process. Disclosing mental health issues was suggested to facilitate managerial and collegial support, which in turn would allow colleagues and managers to increase their mental health literacy and understanding of the service user's workplace support needs. With assistance from a content feature about making decisions on disclosure, mWorks could be used preventively and as an early intervention if their concerns were verbalized and communicated early. During pre-prototype development (*Iteration 2)*, stakeholders validated the need to provide this disclosure decision-making tool, so that users could reflect and document their decisions on questions such as to whom, what, and how to share about their mental health information. For example, identification of which

colleague they could confide in was perceived as critical, and this is a feature that could be included in mWorks.

> It is important how one can get decision-support about whether to tell (about own mental health), by hearing the stories of others, but also to ask some questions that might prepare me, so I can get an idea of what they (managers and colleagues) are interested in knowing. [Iteration 2, employer]

However, showing positive examples (infographics) of what others had found helpful was preferable in answering these questions and providing adequate solutions.

> …it is crucial that the support not only illustrates the risks,… but also shows that this has been positive for others in this different way, in some narrative format. That this is built into the app—what others have perceived was preferable to tell. It is important that the app can provide what others have thought was positive to tell. [Iteration 2, psychologist/researcher]

These positive examples were suggested to be presented as success stories of peers talking about their mental health in a digital video format. This would inform users of the pros and cons of self-disclosure and what doing so may entail. Videos were felt to provide instructions about what mWorks could help with, and why it was important in the RTW process. Stakeholders had mixed thoughts about the need for videos that provided education about depression and anxiety since these were perceived as burdensome to view alone and without a trained therapist.

Fostering service user control on use of and approach to mWorks was generally viewed as positive and something to aspire for throughout the development process. While some individuals preferred being tutored on use of mWorks, others were in favor of using it independently. Therefore, it seemed reasonable for users to choose if, and to what extent, they received human guidance or how much they wanted to control themselves. Some stakeholders thought that required steps and forcing users in certain directions might be associated to external control and result in retention loss. Others emphasized the need for an open design with a clear framework and guiding steps to maintain control. One stakeholder in the user group (*Iteration 2*) opposed the idea of being able to use all of the features at once. They feared that this would be overwhelming, difficult to understand and use, and result in immediate cessation of use. Gating content in a step-by-step manner and eventually unlocking more content was suggested as the user's progress towards RTW.

Breaking the downward spiral

One frustration that was commonly discussed during pre-prototype development (*Iteration 1 and 2*) was the absence of belief and confidence that service users had about their ability to return to work (i.e., self-efficacy). Turning these negative thoughts into a positive sense of self and learning about their situation and resources were considered critical steps in facilitating RTW. Therefore, mWorks needed to be an *assisting device that identifies strengths and resources* to help service users understand their capabilities.

Asking users to list past and present strengths and resources was an appreciated idea. Documentation of these strengths and resources could be used in dialogue with RTW professionals and employers, e.g. curriculum vitae, work profile, work abilities. Stakeholders in the reference group (*Iteration 2*) proposed that mWorks could regularly ask questions to help service users identify their resources.

> If you have different questions, which you answer, you can then have a list of all the resources that you have answered for the past three weeks… "What have you done today that worked?", "I baked a cake." Yes, then organization and planning; the application sums that up for you. "I'm good at planning." [Iteration 2, RTW professional]

Identifying strengths and resources would effectively enrich the dialogue with the employer, be used to identify workplace strategies, and match work tasks. The user group (*Iteration 2)* validated this suggestion but said that it might be difficult to identify strengths if you felt down and were self-critical. Therefore, RTW professionals, employers, and related parties could help users identify strengths, and jointly build a work profile.

Helping to reshape a positive self-narrative was considered vital to enable the RTW process. It was thought that changing one's self-view would prompt service users to address their motivation to RTW and the goals this would entail. Motivational, cognitive, and behavioral strategies to prepare for change and goal-setting, also present in the IES model, were recognized as important initial tasks during pre- and paper prototype development (Table 1). Asking service users: (1) what has happened in relation to the workplace and sick leave in the past, (2) where am I now, and (3) how and where I am going when returning to work? These questions would help structure a more accurate self-narrative, motivate the user, and help them find meaning in RTW on their own terms. Success stories of peers could help them identify steps in their journey. These narratives might provide service users with a positive identity, a sense of normalcy, understanding of their mental health, and hope for the future.

Stakeholders in the reference group (*Iteration 2*) validated service users' frustration with the normal experience of lack of hope for the future and that they "see no way forward" during the sick leave period. Many agreed that service users typically have a negative outlook on the RTW process, and experience a lack of hope for the future. This was described as crucial in *permeating a positive, hopeful, and stigma free impression* when interacting with mWorks. Stakeholders explained that a strength-based and empowering approach to user needs could be accomplished by the RTW professional delivering mWorks, but is also inherent in mWorks' software content and design.

Throughout development, and most often during pre-and alpha prototype development (*Iteration 2 and 5)*, stakeholders agreed on the importance of *perceiving the encounter as warm and welcoming* if users were to stay engaged with mWorks. They described how small things such as mWorks greeting the users by saying "Hello

'Name'," or having a pop-up window as how the day had been could make an important difference. The experience of being understood, seen, and taken seriously was essential. By promoting positivity through value-based language, stakeholders believed that service users' negative reflections could be alleviated. During alpha prototype development, young adults reported that instilling hope, warmth and empowerment were important ingredients to promote a positive mindset.

> That it (mWorks) is positive, when you enter the app. So that it's not like, "I cannot do what I should do'', and I just click through it quickly, without it being useful. [Iteration 5, service users]

Providing service users with own personal support tool

In summary, mWorks should be focused on an individual's personal needs and preferences. Helping service users manage their mental health, identify and adopt cognitive strategies, cope with difficult thoughts and feelings, and plan for eventual work return were developed as key features of mWorks.

Mobilizing own strategies

During pre-prototype development (*Iteration 1-2*), stakeholders agreed that mWorks should help service users find useful strategies to *cope with thoughts and feelings during work return* and when at work. mWorks could be used to help identify and map stressful emotions in relation to past and present experiences, and then to understand their triggers and how to cope with them. In addition, stressful emotions needed to be linked to ways of thinking and solutions with specified strategies. For example, one stakeholder suggested "to remind the user to take a walk or do physical activity before the workday in order to feel calm and more positive." In contrast, a stakeholder from the service user group rejected a feature that mapped stressful situations. They stated that having to confront one's feelings and emotions can be frightening and overwhelming.

A common hurdle in managing RTW is the absence of adequate strategies for work and everyday life. In response, reference group members (*Iteration 2*) believed that a central task of mWorks should be *helping to identify cognitive strategies* attuned to user needs and preferences. They explained that service users should have access to a toolbox for dealing with difficult thoughts and emotions associated with their mental health. They explained that CBT strategies could be used to cope with negative thoughts and feelings. These strategies could help adjust behaviors such as avoiding difficult activities or situations by finding workable solutions. mWorks could prompt users to ask a friend, relative, or co-worker about good strategies. The user group agreed with the necessity to access to adequate strategies but stated that these should be individual and voluntary, to be shared with whomever they preferred.

> CBT accompanies me to work, and I do not have to share it to my employer… Sharing with employers should be voluntary. [Iteration 2, service users]

Strategy storage and reminders were recognized as an essential feature. Reminders could improve adherence to the exercises, and help maintain behaviors and habits that served the user in their RTW process and mental health. During pre-prototype development (*Iteration 1 and 2) suggesting a variety of content features* that support the RTW process that could be individualized according to needs and preferences (e.g. adjust the order for content completion) was suggested by the stakeholders. For these reasons, mWorks was developed to employ a person-centered approach.

> The possibility of adapting the modules individually, because that may not be the case. As an example, I might not want to work on my anxiety right now, but instead I may want to work on something else. That there is a smorgasbord in some way, that I can choose from, to work with these parts because they are important to me right now. This is also a motivating factor. [Iteration 1, researcher]

Among the plethora of suggested content features was a "first-aid" button. This button would function as an early intervention when service users experience a stressful situation. They could use the function of voice control when experiencing fatigue or preferring to talk (rather than writing). Stakeholders wanted external links to other useful tools that could supplement mWorks content. This idea was not incorporated since stakeholders in the service users group advocated for mWorks to be easy to use, learn and understand. They feared that links to external applications would sidetrack users from that goal.

During the think aloud interview (*Iteration 6*), stakeholders endorsed the idea that mWorks should provide an overview of the progress of service users' journeys back to work. They considered it an important feature for improving RTW prospects. Stakeholders explained the importance of providing a clear structure by *helping users to plan for their RTW process*. This was consistent with previous solutions suggested during pre-prototype development (*Iteration 2*). mWorks could help service users plan, prioritize, and manage their time via a to-do list and schedule, and thereby help them structure their everyday life. Scheduling time for recreation between activities related to RTW was equally important. The suggestion was made that mWorks reward small steps and goals towards RTW.

> Wouldn't it be a great feature to have a scheduler that helps you to specify your time… If you have not planned a break, that is a warning sign that you are quite stressed and have gotten stuck in the to-do list swamp, which is only suffering, and one gets no help. [Iteration 2, psychologist]

Improving data privacy

Stakeholders frequently pointed out that all registered information on mWorks must be securely stored and there must be secure login features, such as a two-step verification process. Thus, *implementing safety measures to safeguard personal data* was important because mental health information was considered sensitive. Except for the service user, no one should have access to their information in mWorks. Assuring data privacy would maximize servicer user trust and adoption. Even though service users prioritized the safety of their personal data, options to *interact with self-selected support persons* was desired. To be able to share some data via mail, chat, or forum formats in order to discuss dilemmas and procure support from a select group of people (such as a mentor, peer, or professional therapist) was recommended.

Improving service user engagement

From the first iterations it was apparent that facilitating understanding of mWorks content, and its purpose in relation to RTW, was important for service user engagement. To reduce the cognitive demand, a chatbot was designed that delivered the content in bite sizes and explained why completing certain features could advance the RTW process. In addition, the design of mWorks needed to meet the requirements of a broad audience to improve adoption. We also iteratively tweaked the interface color scheme to be more aesthetically pleasing.

Facilitating comprehension of mWorks

During *Iterations 4-5*, the mWorks alpha prototype was viewed as easy to learn to use and maneuver. Even so, stakeholders explained the importance of *needing to intuitively understand mWorks content*. When stakeholders logged into mWorks for the first time, they had trouble grasping the "five steps to work". As a result, the purpose of the app itself was vague and unclear to the user. Implementing a tutorial that explained the overarching content and goal was suggested to set the stage, provide a quick guide to use and navigate, and to address meaning and motivation of progressing back to work. Superfluous graphical content was removed to clarify the first landing page, as suggested during public involvement.

> Can't you then have, when you start the app, a quick overview that appears in a small bubble at each step?…. This is how it should be: here you will find your resources, here comes your network, and here you can view a person in the same situation as you. Then, you get a small summary… And it must look sickly nice, otherwise you will just zip past it. [Iteration 5, service user]

Likewise, *explaining the significance of mWorks content in relation to RTW* was considered important for user engagement. Stakeholders in the think aloud interview (*Iteration 6*) asked themselves *why* the content was meaningful for RTW, e.g., why reflecting about one's lived experience of previous and current work situations could

increase RTW prospects. Not knowing exactly what to do contributed to a sense of meaninglessness toward task completion and prioritization as users went through the content features. One stakeholder commented:

> There is no clear idea, about…[the] purpose. Why should I use this [mWorks], and what can it provide for me. Some info about the different steps [would be useful]. Here it only says "What it helps with—'this leads to what you can [do].'" Well, if we take My Resources, 'it helps you to highlight your resources and formulate a work profile.' Why? [Iteration 6, service users]

They further explained the importance of *reducing the amount of text-based content* during the think aloud interview (*Iteration 6*). During the limited time they had to familiarize themselves with mWorks, service users felt overwhelmed because they had to read and write a lot. They found this to be cumbersome and it inhibited users from learning and completing individual tasks in mWorks. Therefore, service users requested that information be presented in a "bite-sized manner" and have predefined answers to choose from.

> It's a lot of empty boxes. When you see that, you're just like…yeah. These are all things I need to do (sigh). Do I really need to fill in more?... I'll find "My strengths" more appealing. There you can see examples in the boxes themselves. [Iteration 6, service users]

During the think aloud interviews (*Iteration 6*), *reducing the need for recall* was thought to be important to lower the cognitive load. This was emphasized when users had to write something and simultaneously remember the information box and examples tied to the same feature. The reduced reference group agreed that there were many empty text boxes for the user to fill in in the beta prototype and worried that the workload would be too great and result in loss of engagement.

> The threshold and energy it takes to motivate myself is too great. Feel free to explore ways that make it easier for me to start filling in information. [Iteration 7, service users/game designer]

Needing accessible chat support was important to avoid frustration related to use when bugs and errors emerged. Stakeholders throughout the development process explained that persons with depression and anxiety will stop using mWorks if support is not readily available.

Providing motivation and goal-setting strategies

During the development of the pre-prototype*, addressing service users' jaded motivation* was perceived as a prerequisite to facilitate RTW. To alleviate lack of motivation, stakeholders agreed that asking simple questions about what would motivate service users to go back to work were a promising solution and in accordance with motivational interviewing communication techniques. Once service users had started their RTW

process, feedback through diagrams or visible steps forward needed to be included so they could see they were making progress and maintain momentum.

> Some sort of overview of what I have succeeded with [is needed].… That you fill in what you have actually done. Because sometimes you can feel that you haven't done anything. But when you can look at it [mWorks], and see that I actually did this, this, and this, it may not be what I set out to do, but I did a lot anyway. So, it's some kind of progress list. [Iteration 2, service user]

Stakeholders in pre-prototype development (*Iteration 1 and 2)* explained the importance of *presenting a time-bound, measurable and concrete development process*. This would ideally be presented in a step-by-step manner to condense larger goals into feasible sub-goals while providing service users with a direction to move towards RTW. Otherwise, stakeholders feared that service user motivation would suffer because of no foreseeable end to their journey, and this would contributing to a sense of meaninglessness.

Stakeholders were *prioritizing the importance of a goal and reward-oriented design* throughout the development process to provide opportunities for users to experience an increased sense of motivation. Condensing large steps into smaller sub-steps were proposed as more manageable. Small steps enabled service users to act and implement the steps. In addition, mWorks could reward service users on completion of a step(s), and provide a roadmap to illustrate their progress and trajectory towards RTW.

The stakeholders considering young adults' futures during alpha prototype development (*Iteration 5)* explained conflicting ideas about how to design mWorks. While some thought the color scheme was bright and warm and produced a calm and positive feeling, others perceived the colors to be numb and boring. For example, the 5-steps-to-work that took the shape of a flower in the alpha-prototype was regarded as childish and derogatory to a younger audience.

> And not directly a flower… It's too childish. If it had been a kid who goes into this app, they would have thought it was a game. [Iteration 5, service users]

Young adults were *advising for a more engaging design* and requested options to choose different color schemes and patterns. They thought that the challenge lies in finding a design that provides the same positive feelings without a belittling feeling.

Discussion

Involvement of stakeholders in the co-design process permitted accumulation of vital experienced-based knowledge for consideration during development of mWorks and for future development endeavors. All stakeholders confirmed the importance of

mWorks empowering service users with personal support solutions in a manner that engages them to go back to work. The importance of providing a digital solution that strengthens service user control during the entire RTW process was frequently raised during pre- and paper prototypes; this was identified as one of the main strengths of mWorks. When iterations for development of the digital alpha and beta prototypes were linked with the software development team, some of the suggestions were challenging to implement. This was partly because of knowledge transformation challenges between researchers and programmers, and partly because of financial resources and creative programming challenges in the software team. Stakeholders were unable to evaluate mWorks over time for the entire RTW process, but this is the essence of supported employment. We were limited to having stakeholders evaluate mWorks with different snapshots of section content features of the alpha and beta prototypes or evaluate all process-oriented content at once. Interpreting the results in light of the shortcomings in the evaluation context is essential, but many of the findings have provided us with vital information of the initial prototype and process evaluation research to address long term use is necessary.

One key finding is the ability of mWorks to serve as supplementary support to traditional RTW services. Service user empowerment is increased by providing a plethora of content features during the entire RTW process. A systematic review on digital mental health applications highlights the benefit of improving the service user's locus of control by developing self-management skills [28]. During the reference group workshops (*Iteration 2*), stakeholders commonly described the RTW process as a nonlinear process during which the service user might not need nor want to use all content features. Forcing service users to work through all content features in a given order might jeopardize the acceptability of mWorks. This idea gave a rationale for designing mWorks with all features available from the initial login session. service users are nudged to work through the content features in a stepwise manner but are free to use mWorks according to preferences, just as happens in the Individual Enabling and Support model [18]. A potential drawback to this option is the risk of feeling cognitively overwhelmed at the onset and could negatively impact service user engagement [12, 13]. Other studies have similarly remarked on the inherent tension between user autonomy and when clear guidance is needed to optimize service user engagement [28, 53]. A recent systematic review on digital mental health applications emphasizes that human guidance is more often effective for ameliorating symptoms and improving engagement than self-guided treatments [24]. For this reason, inclusion of human support is a crucial component of mWorks delivery. Reliance on human support can limit the broad dissemination and scalability of digital interventions because of the limited number of people who can be served by the professionals.

Stakeholder involvement illustrates the importance of ensuring service user engagement when they start using mWorks. By providing a clear understanding of mWorks content with regard to the overall purpose of achieving RTW over a longer period. However, data indicate that service users spend approximately five minutes trying to understand

new digital solutions prior to discontinuation [54]. Therefore, it is vital to facilitate the meaning-making process to produce enough engagement and reduce attrition levels. Similar to formative research on mWorks, other mobile app co-design efforts to improve mental health and wellbeing highlight the importance of providing a clear purpose [12, 13, 55]. The current study further explains the necessity of specifying *why* a specific sub-task is meaningful for the overall goal of RTW. The literature suggests that AI-directed conversational agents, i.e. chatbots, and tutorials can enhance understanding and engagement levels and are promising automated alternatives to human support [56]. Our solution to facilitate comprehension of mWorks' purpose was to provide sub-tasks with additional context via a chatbot. The chatbot serves the double purpose of providing bite-sized information to the user (identified as crucial to reduce cognitive strain), and during the first login session a tutorial is presented to set the stage, provide instructions, and clarify the overall purpose. Whether these alternatives to human support provide the same level of engagement and positive outcomes needs to be further investigated. Continued progress in these areas are especially valuable for increasing the scalability of digital solutions [24].

To their detriment, service users and other stakeholders have not typically had the opportunity to influence the production of their health care or be involved in mental health and RTW research [3, 4, 7, 9]. Co-design efforts with genuine stakeholder involvement are anticipated to generate more acceptable and engaging interventions with greater utility for those receiving and delivering them [41]. We intended to enter a partnership with stakeholders to develop mWorks *with* rather than *for* stakeholders [35]. However, even if different concepts, models, and theories of co-design generally corroborate that higher levels of stakeholder involvement are desirable [7, 10, 35, 36], there remains ambiguity on how to achieve sufficient involvement during the entirety of a research project. This is especially true since the prototype development involved translation of the IES model into a digital format rather than designing the prototype from scratch. Smith and colleagues suggest the importance of cementing anticipated roles and expectations of stakeholders and researchers to form an authentic and sustainable partnership throughout the research process [10]. As Nygren and colleagues explain, this places great emphasis on enabling stakeholders to stay involved over time to achieve an appropriate degree of involvement [36]. Although desirable, it is seldom feasible for stakeholders to stay engaged during the entirety of a research project since such endeavors are usually long processes that takes place over several years. A pragmatic solution would be to recognize the diverse form of involvement that can be manifested throughout the different stages of the co-design process [10]. In fact, relying on diverse and innovative forms of involvement that go beyond traditional methods has been identified as a prominent factor in overcoming involvement barriers during co-design research [7]. Our work shows that it is possible to leverage the ingenuity of stakeholders during research procedures and allow them to influence intervention development [4, 5].

Methodological considerations

Our work shows that it is possible to co-design a digital solution for work return, based on evidence-based methods such as CBT and SE, to promote service users' influence over their RTW process. This study provides novel guidance for researchers who seek to co-produce digital solutions with stakeholders as co-design partners. However, there remain some limitations that should be considered.

Stakeholder difficulties in comprehending mWorks during the testing phases of the iterative development process were partly a consequence of methodological limitations. Stakeholders had a limited timeframe to familiarize themselves and were only subject to specific parts of mWorks. The frustrations that stakeholders experienced were thus likely to occur when they were expected to understand the overall RTW process presented as partial aspects during a limited timeframe. In addition, the onboarding procedure is planned to last for ten weeks, with continued usage for up to a year. As such, data collection would benefit from stakeholders being present during the entire research procedure because they would become more familiar with the overall process.

We recruited stakeholders in accordance with non-probability sampling methods throughout the study. This can be criticized for being less stringent than probability sampling methods [44]. However, the chosen sampling methods were most time-efficient and allowed us to find participants with adequate subject expertise. Even though we had a large sample size with a diverse range of stakeholders represented, only one employer was present in the entire sample. Insights from the employer stakeholder group are limited, and this affects the transferability of our findings [57]. It is a subject for future research. Our findings are still relevant to inform further development of mWorks, and readers can make their own judgments regarding transferability to their context.

As alluded to in the methods section, the research group met in between each reference group workshop and compiled a requirement list. This may have contributed to biased interpretations. To remedy this threat to credibility (i.e., internal validity), each researcher synthesized the data separately, compared summary texts and worked out the most important factors until consensus was achieved. Sequentially, the requirement lists were presented to the reference group during an upcoming workshop to allow them to check our interpretations [57]. This allowed the research group to eradicate any biased interpretations and strengthen the credibility of the findings. We recognize that study participants were prompted to discuss a predefined design concept, based on the IES model and parts of the RTW process. Thus, researchers directed the initial agenda of mWorks design and content. However, our co-design approach involved the collaboration between researchers and stakeholders throughout the development process. This allowed for continuous iteration and refinement of mWorks to assure that content and design corresponded with service users' needs and preferences.

Conclusions

By leveraging the ingenuity of stakeholders, this co-design study provided direction on how and what to include in the prototype development process of a digital RTW solution for persons with common mental disorders. Stakeholders' experience-based knowledge informed mWorks development and showed the need for an empowering digital solution that provides service users with their personal support tools and focuses on their strengths and resources while engaging them in a meaningful way in order to achieve RTW potentials. Our co-design approach may inspire future development projects that further enhance stakeholder participation in the design of their healthcare.

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Declaration of interest

The authors declare that they have no competing interests.

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Study IV

A web-based self-management intervention for return-to-work among persons with common mental disorder on sick leave: A process evaluation study

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Abstract

Background: mWorks is a co-designed web-based self-management intervention developed to empower persons with common mental disorders on sick leave during their return-to-work process. However, lack of knowledge on how delivery and receipt of mWorks work out in practice impedes further advancements. It is suggested that process evaluations according to the Medical Research Council framework provide a format for studying complex intervention pathways.

Aim: To evaluate the process of implementing the delivery of mWorks. More specifically, we attempted to evaluate the intervention delivery in relation to the context, implementation process, and mechanism of impact.

Method: This process evaluation study is limited to a single case-study design. The case was bounded by the delivery period of 10-weeks in a primary and specialist mental health service context. During this period, return-to-work professionals and service users collaborated to initiate mWorks usage. Both qualitative and quantitative methods were used to triangulate multiple data sources gathered from two return-to-work professionals and six service users.

Results: The pandemic and mental health problems constituted contextual barriers, in particular during the recruitment stage of both contexts and participants, while the legitimacy of mWorks facilitated implementation overall. The delivery was performed according to plan with minimal adaptions. All users followed through, and dialogue

meetings (human support) were much appreciated. mWorks was used flexibly according to users' needs, both during sick leave and at work. Possible impacts concerned a change process among users, by revealing authentic insights about personal return-to-work prospects, involving a process of acceptance, self-esteem and self-compassion with the potential to increase their sense of control. Usage could further prevent mental ill-health from unfolding, turn negatives into positives, help to disclose mental health to others, and support goal setting. Quantitative measures of empowerment, engagement, self-efficacy, depression stigma, and quality of life were feasible to use and supported the assumptions made and quantitative direction of results.

Conclusions: The recruitment stage of the implementation program presented critical contextual barriers. Once the delivery stage was initiated it was feasible to implement mWorks. Although the present study is limited to a case of few participants, triangulation of data indicates that both users and professionals benefited from mWorks.

Key words: mental health, mobile health, supported employment, vocational rehabilitation

Introduction

Common mental disorders (CMD) constitute one of the most significant contributors to global health loss. In addition, CMDs are one of the most common reasons for sick leave (OECD, 2013; WHO, 2017). Despite strong evidence suggesting that employment is vital for good mental health (OECD, 2012), there remains a discrepancy between the need and provision of effective return-to-work (RTW) interventions. In response to this, a digital RTW-solution called mWorks was developed (Engdahl, Svedberg, & Bejerholm, 2021; Engdahl, Svedberg, Lexén, & Bejerholm, 2020). Stakeholder participants in previous research have emphasized that mWorks may enhance the control of the RTW process among the service users with CMD who are on sick leave (Engdahl et al., 2021; Engdahl et al., 2020). mWorks is built on previous supported employment model adapted for persons with CMD (Bejerholm, Larsson, & Johanson, 2017), including motivational, cognitive and time use strategies (Bejerholm et al, 2017; Johanson, Markström, & Bejerholm, 2019). The model has been found to be effective in terms of RTW (Bejerholm et al, 2017), decreased depression and increased empowerment (Porter & Bejerholm, 2018). Supported employment However, implementing individualized and person-centered RTW model such as supported employment in a highly sectored and disintegrated

welfare system, i.e., primary and specialist Mental Health Services (MHSs), Social Insurance Agency, Public Employment Service, and employers, has proven challenging (Bejerholm, Larsson, & Hofgren, C; Bergmark, Bejerholm & Markström, 2018; Johanson et al., 2019). Individuals with CMD often experience the RTW process and the encounter with RTW professionals from various organizations, where no one is taking the lead and responsibility, as not supportive (Porter, Lexén, Johanson, & Bejerholm, 2018). In addition, RTW professionals and employers tend to focus on the diagnosis, functional disability and activity limitations rather than users' mental health, resources and strengths in connection to work (Lexén, et al., 2019; Porter, Lexén, & Bejerholm, 2019a; 2019). Service users have voiced that this traditional kind of support generates a loss of hope and power, and little belief in their work abilities (self-efficacy) and that RTW professionals can support them (Porter et al., 2018). Users' lack of hope and control as well as overview of the RTW process have provided us with the impetus to develop mWorks and more broadly make available supported employment delivered as a web-based self-management intervention.

Digital interventions have gained interest since it may provide avenues for accessible welfare services regardless of geographical circumstances, time, and pace (Hollis et al., 2015). The transformation of Cognitive Behavioral Therapy (CBT) into Internet CBT (ICBT) has proven to be successful in terms of decreased symptom severity (Strid, Andersson, Forsell, Öjehagen, & Lundh, 2016), and is the most delivered mental health intervention online (Burger, Neerincx, & Brinkman, 2020). Furthermore, face-to-face CBT therapy and ICBT with human support have been found equally effective for persons with mental health and somatic disorders (Carlbring, Andersson, Cuijpers, Riper, & Hedman-Lagerlöf, 2018). During the last decade, RTW researchers have emphasized the importance of streamlining RTW interventions as well (Bejerholm, Sundquist, et al., 2017; Cederberg et al., 2022; Engdahl et al., 2021; Engdahl et al., 2020; Lord et al., 2014). However, it remains uncertain whether digital RTW solutions may be implemented in clinical settings. Process evaluations have the potential to study intervention pathways during the feasibility stage of the MRC guidance (Craig et al., 2008; Moore et al., 2015). Previous co-production research e.g., eHealth intervention to increase children's voice in paediatric care (Svedberg, Arvidsson, Larsson, Carlsson, & Nygren, 2019), shared decision-making solutions in MHSs (Schön, Grim, Wallin, Rosenberg, & Svedberg, 2018), and Recovery Guide in inpatient MHSs (Bejerholm, Allaskog, Andersson, Nordström, & Roe, 2022), have been critical for highlighting contextual factors that affect implementation, plausible impact of an intervention, and what requirements and lessons for future evaluations are needed.

The web-based self-management tool has been iteratively co-designed with service users and other stakeholders (Engdahl et al, submitted). Despite the potential of digital RTW solutions in MHSs, considerable knowledge gaps exist on how to optimally implement them in the targeted context and which mechanism produces change to add value to users and RTW professionals. Implementation research has shown that an unclear

understanding of how novel interventions operate in a specific context often hampers the ability to embed such interventions in practice (Eldh et al., 2017). The Medical Research Council (MRC) has warranted sufficient feasibility and implementation process evaluation studies prior to conducting full-scale randomized controlled trials (Craig et al., 2008). Accordingly, there is a knowledge gap on implementing mWorks optimally. Process evaluation during a feasibility stage can be valuable and used to understand the quality of implementation, mechanisms of impact, and the contextual factors associated with variation in outcomes (Moore et al., 2015). This knowledge can inform uncertainties associated with implementation of mWorks in a real-life context. As such, it is crucial to explore the delivery by primary and specialist MHS organizations that provide users with their medical certificate for sick leave and initial RTW support. It has previously been emphasized that a case study is a favourable research design to underlay process evaluations to capture complex dynamics and relationships between intervention, delivery, and context during implementation (Grant, Bugge, & Wells, 2020).

Methods

Aim

The aim of this study was to evaluate the process of implementing the delivery of mWorks, a web-based self-management RTW solution for persons on sick leave due to common mental disorders. More specifically, we attempted to evaluate mWorks in relation to the context, the implementation process and the mechanism of impact.

Study design

This process evaluation study resides in the feasibility stage of complex interventions according to the MRC framework (Grant et al, 2020; Moore et al., 2015). The study was bounded by a single case which in this study regarded the implementation of mWorks delivery over a period of 10 weeks, using both qualitative and quantitative methods (Yin, 2013). The 10-week period resembles the enabling phase of the previously mentioned supported employment model during which period a relationship between the user and RTW professional is established, and when the engagement in the RTW process is initiated (Bejerholm et al, 2017;

Johanson et al, 2020). To increase our understanding of the barriers and facilitators that can affect the implementation process in a given context and the possible mechanism of impact mWorks may have is critical in order to advance the research area and practice further. This study took place between the years 2019 and 2022.

Context and setting

The case or central phenomena that constitute the unit of analysis focuses on the delivery process of mWorks during which 10-week-period. RTW professionals and service users have three standardized dialogue meetings to facilitate their engagement and usage of the mWorks, a digital self-management tool for RTW. The case was bounded by the context of the primary MHS organization in the County Council of Region Skåne with the authority to bestow medical sick leave certificates.

Participants in this study refer to both RTW professionals and service users. The inclusion criteria for the RTW professionals working in primary MHS and having regular RTW assignments of facilitating and coordinating the RTW process for service users within or in connection to the team. In Sweden, this position is typically called rehabilitation coordinators (RC) or employment specialists and could be held by occupational therapists, nurses, social workers, or psychologists. The County Council of Region Skåne gives the assignment of being an RC, and an employment specialist gets the role by providing supported employment. Purposeful sampling was used to recruit the RTW professionals. In 2019, information about mWorks and the present study (and connected randomized controlled trial) was given by the first (PE) and last author (UB) to managers of primary MHSs who were also invited to inform the network of RC in the County Council of Region Skåne four times 2019-2021. The last author (UB) also presented the study to the regional and national network of primary MHS and a national RTW network with practitioners, researchers, and service users. Notices in national papers and social media were published in 2021. In 2019, three primary MHS centers entered the study. The first author (PE) provided information meetings at the respective MHS unit, after which UB educated RTW professionals in January 2020 to start recruiting and delivering mWorks in February-March 2020, attempts that ended due to pandemic restrictions shortly thereafter. The primary MHS re-directed their attention and resources elsewhere due to the ongoing covid pandemic. Two units, two RTW professionals, stayed positive during shut down and entered the study in the fall of 2021 when social restrictions had eased, and PE once more trained them.

The inclusion criteria for service users to participate were being of an age 18-65 and having CMD, i.e., depression episodes and recurrent depression disorder (F32-F32.2, F33.0-F33.2), including depressive episodes inherent in bipolar disorder (F31.3, F31.4) without psychosis, and/or anxiety disorders (F40-41) according to the ICD-10 code classification (WHO, 2004), being on sick leave (<2 years). The RTW

professionals recruited service user participants. They identified sick-listed persons with CMD that corresponded with the inclusion criteria and provided and collected both oral and written informed consent from seven service user participants, while six participants followed through with the intervention.

The RTW professionals (n=2) were employed as rehabilitation coordinators for 20-25 percent at two separate primary MHS units in the south region of Sweden. They were 29 respective 39 years. Both were women and had university degrees. The sociodemographic characteristics of the service users (=6) revealed a mean age of 53 years, with a range of 44-64 years. All identified as women. The country of origin was Sweden (n=4), Germany (n=1), or Iraq (n=1). Four service users had a university degree, and the remaining two had an upper secondary educational level. All had children, were married (n=3) or currently divorced (n=3). Four were on full-time sick leave and two part-time. Mean sick leave days were 264, ranging from 80-365 days. All were sick-listed and recruited according to inclusion criteria. According to their self-reported diagnosis, service user 1 reported anxiety and other diagnosis (exhaustion) (n=1), while users 2, 3, and 5 exclusively reported depression (n=3), user 4 had depression and reported other diagnosis (exhaustion), and user 6 reported comorbidity of depression, bipolar and anxiety disorder (n=1).

The mWorks intervention

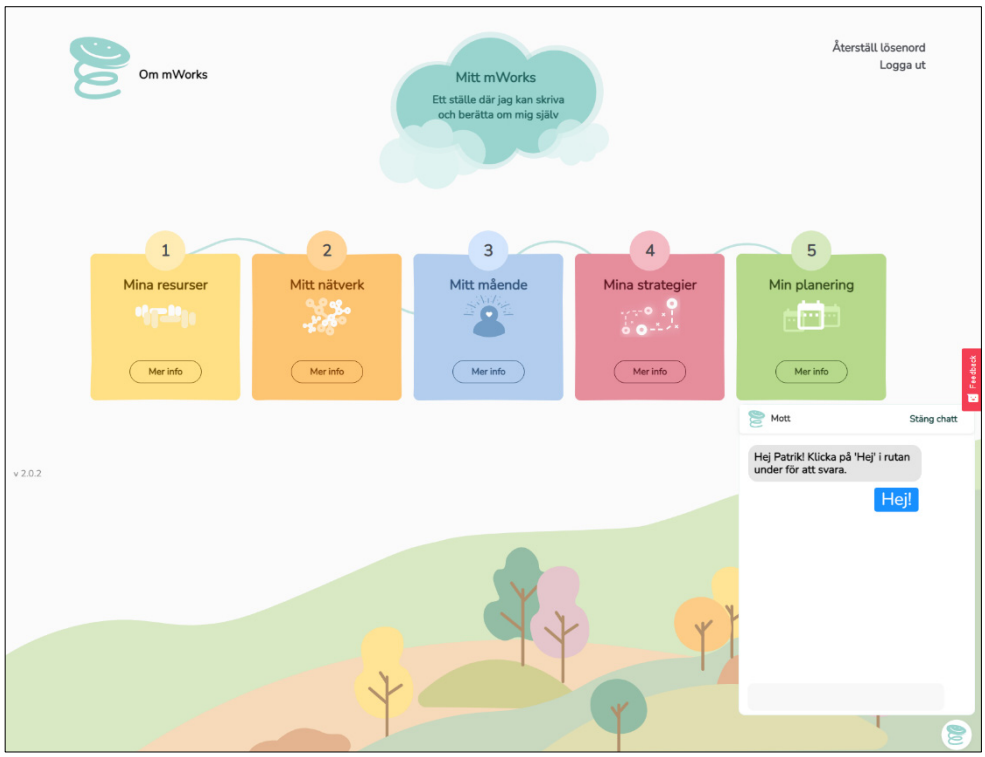
The following intervention description is according to the TIDIERs checklist for describing clinical interventions (Hoffmann et al., 2014). The implementation program describes the preparatory and delivery stages of mWorks intervention of the present case (Table 1)

mWorks is designed as a web-based self-management tool to support persons with CMD back to work and is compatible with smartphone devices, tablets, and computers. mWorks takes inspiration from SE and CBT according to the Individual Enabling and Support model (IES) (Bejerholm et al, 2017), and was co-produced with stakeholders described elsewhere (Engdahl et al, submitted). During the first login session, the service user is presented with a tutorial to provide context, explaining that mWorks is their support tool for RTW and should be used according to their own pace and preference. In addition, "Mott", an AI-directed conversational agent, accompanies service users. Mott presents the service user with bit-sized information through text dialogue to initiate the usage pedagogically. Figure 1 provides a picture of the computer interface once you enter mWorks after the tutorial. The service users are nudged to start at My mWorks to facilitate the use of mWorks in a safe and pleasant digital space. This part allows for a transformation of their self-narrative in relation to past and present

experiences, taking notes of anything they feel matters, and using a motivational interviewing ruler and pros and cons questions to explore intrinsic drives. In order to create a positive user experience, mWorks permeates a positive language usage, with an absence of limitations, diagnosis, and medical orientation. Service users may then work through the five-steps, but are completely free to navigate and use mWorks at their discretion. These steps are (1) My Resources helps service users identify their strengths and resources, and compile a work profile that could be used in different occupational settings to effectively communicate their resources, (2) My Network makes it possible to map, gather, and clarify the meaning and function of important others and their contact information, (3) My Well-being helps to identify thoughts, emotions and behaviours that affect their well-being at work, questions also supports decision making about disclosing their mental health to others, and psycho-educative digital film clips of fictional stories to decrease personal stigma, (4) My Strategies identifies what difficult thought-emotion-behaviour situations that needs to be addressed at work, an example list of work-health balance and cognitive strategies to support coping with these situations, and compiling a list of preferred strategies to use, (5) My Planning helps to pragmatically plan the RTW process, using goal-setting strategies, a to-do list, and a schedule to do so.

mWorks is a person-centered tool designed to foster ongoing self-management during the RTW process and at work, and content features are updated as the individuals move on. The present study is bounded to the delivery and engagement phase of mWorks intervention. The RTW professionals may freely navigate in an administrative version but do not have access to the user's self-management tool. Both professionals and users have their own manual, while RTW actors, employers, and other parties involved may use brief but directed information for them, all available online with or without password.

The assumption is that mWorks may facilitate service users' individual RTW process, reflect on their own experiences and strengths, and discern what matters to them during the sick leave process and when they work. This is presumed to provide service users with informed decisions, a view and own belief on strengths, recognition of important others, well-being, and related strategies to be used and planned in relation to sick leave and at work. Thus, mWorks may generate increased user control during their RTW process and is assumed to increase empowerment, self-efficacy, own attitudes towards depression (stigma), decreased symptoms, and, hopefully, increased engagement in everyday life, quality of life and global health, which are likely to precede reduced sick-leave days. In the present study we explore the feasibility of using questionnaires related to these constructs by discerning their sensitivity for change and tentative statistical trends in line with the assumptions made.



Note. mWorks=About mWorks, Mitt mWorks= My mWorks. The five-steps: 1) My Resources, 2) My Network, 3) My Well-being, 4) My Strategies, 5) My Planning.

Figure 1. Overview of web-based self-management tool mWorks.

The implementation program

The implementation program describes the plan of the mWorks implementation. The context in which sick leave certificate is issued in Sweden regards primary- and specialist MHSs, and occupational health care. The implementation program concerns preparatory planning which forms a critical part of implementation and is followed by education and delivery phases of implementation (Table 1).

Table 1. Description of mWorks implementation program.

Implementation step	Components	Content	Time
(1). Preparation	Designing material for communication and delivery	Design of written and digital manuals for RTW professionals and service users Creation of mWorks website	6-5 months prior to baseline
	Initiating contact	Creation of mailing list Introduce mWorks broadly to stakeholder gathering Anchoring via telephone, email and physical meetings	4-3 months prior to baseline
	Introducing concept	Introduces unit managers and RTW professionals to the project: 1) Introduce the mWorks concept with PPT via zoom 2) Take part in written information about the project	1-3 months prior to baseline
	Mental health service unit responds yes or no to participation in the project		
	RTW professionals initiate recruitment of service users	Recruiting service users by purposeful sampling according to inclusion criteria. Informing service users about mWorks and study participation with the aid of flyers and website	
(2). Education	mWorks training during half-day workshop with RTW professionals	Information about the evidence behind mWorks Presentation of the role of the staff Information regarding the delivery of mWorks Training of user administration and learning to navigate in mWorks	2-4 weeks prior to baseline

Table 1, cont

(3). Intervention start	Dialogue meeting 1: Introduction	RTW Professionals deliver mWorks and user manual Service-users use mWorks for 10 weeks	Baseline
(4). Continuous guidance	Dialogue meeting 2: follow-up	RTW professional's follow-up on service users	2 weeks
	Continuous supervision	RTW professionals continuous support on service users Continuous supervision of implementation using MEMOS (fidelity / dose / reach) Supervision from university to support RTW professionals regarding the implementation of intervention	0-10 weeks continuously
(5). Follow-up activities	Dialogue meeting 3: completion	RTW professional follow-up users experience of mWorks Follow-up dialogue with RTW professionals about their experiences of implementation, contextual differences, barriers / facilitators and need for adaptation	2 weeks post intervention

Note. RTW=Return-to-work

The process evaluation plan

Process evaluation guidelines according to MRC (Moore et al., 2015) and Saunders and colleagues' framework were used (2005). A blueprint of our study can be viewed in Table 2. Both qualitative and quantitative data was collected during the 10-week delivery period, predominantly through online questionnaires representing the constructs of interest, SMS-questionnaire on usage, group and individual interviews. In addition, mWorks web-based platform monitored frequency and duration of usage. Service users' and professionals' responses and reflections about mWorks, as addressed in My Memos questionnaire and interviews, provided a preliminary picture of the possible impact mWorks had for the participants.

Table 2. Blueprint of process evaluation components

Process evaluation components	**Description**	**Process evaluation questions**	**Data sources**
Context	Contextual factors that affect implementation, intervention, mechanism of impact	What contextual barriers and facilitators affect implementation of delivery?	Follow-up interviews, online questionnaire, documentation, field-notes
Implementation	What and how was delivery achieved	Was mWorks delivered according to plan?	Follow-up interviews, online questionnaire, documentation, field-notes
		What adaptions were made to fit the context?	Follow-up interviews, documentation, field-notes
		What dose did service users receive, and RTW professionals deliver?	Online questionnaire, log data
Mechanism of impact	What are service users and professionals' response to interacting with the intervention	What were service users' and professionals' experience of mWorks?	Follow-up interviews, online questionnaire, documentation, field-notes
		How does mWorks produce change?	Follow-up interviews, online questionnaire, documentation, field-notes

Note: RTW=Return-to-work

Service users received a 7-item SMS-text questionnaire bi-weekly until the end of the study period. The questionnaire aimed to gain insight into service users' perceived usability, and the dosage received and delivered. The usability items were inspired by constructs from the PACMAD usability model (Harrison, Flood, & Duce, 2013).

RTW professionals were prompted to register their delivery throughout the study period. We provided RTW professionals with a document "My Memos" that was developed by the last author (UB). My Memos has 8 items, with a mix of both free-text answers and Likert scales (1-10). The question areas take inspiration by Saunders and MRC framework (Moore et al., 2015; Saunders et al., 2005) and concern fidelity, dose delivered and received, reach and recruitment. To mitigate recollection bias, RTW professionals were encouraged to respond to the questions in connection to each dialogue meeting and content feature that the service users used. Finally, they were asked to summarize their answers at the end of 10-week.

RTW professionals and service users were interviewed at 10 weeks. The interview guides emanated from the questions in My Memos. The interviews were semi-structured (Kvale & Brinkmann, 2009) and conducted to capture greater in-depth knowledge and understanding of the implementation. The first author (PE) conducted the follow-up interviews. Each interview was audio-recorded and lasted between 25-60 minutes. Field notes were conducted to capture additional information regarding context, the implementation process, and impact mechanisms (Moore et al., 2015).

Lastly, service users were provided with a link to the online questionnaire (RedCap version 9.3.1), at baseline (T1) and at the end of the 10-week period (T2). The idea of gathering quantitative data was to discern the feasibility and acceptability for using the questionnaires and the extent of 130 questions (30-40 minutes to complete). To validate the constructs of interest in relation to the target group and in that process discern whether questionnaires were sensitive enough to discern tentative direction of results, adding to the broader picture of change and the possibility of triangulating qualitative data. The following psychometrically sound instruments that related to the assumptions made (see The mWorks intervention) were administrated: Empowerment Scale (ES) (Rogers, Chamberlin, & Ellison, 1997), General Self-Efficacy Scale (GSE) (Schwarzer & Jerusalem, 1995), Depression Stigma Scale (DSS) (Griffiths, Batterham, Barney, & Parsons, 2011), Montgomery-Åsberg Depression Self Rating Scale (MADRS-S) (Svanborg & Asberg, 2001), Generalized Anxiety Disorder (GAD-7) (Spitzer, Kroenke, Williams, & Löwe, 2006), Profiles of Occupational Engagement Scale (POES) (Bejerholm, Hansson, & Eklund, 2006; Bejerholm & Lundgren-Nilsson, 2015), and EuroQol 5-dimensions (EQ-5D) (TheEuroQolGroup, 1990).

Data analysis

The qualitative data were transcribed verbatim by the first author (PE). The analysis procedure was performed by the first (PE) and last author (UB) and was inspired by previous process evaluations (Bejerholm et al, 2022; Svedberg et al, 2019). It involved reading through the field notes, memos and transcripts. The different data sources were subsequently triangulated to compare similarities and differences between data sets. Content that corresponded with process evaluation components: contextual factors, implementation process, and mechanism of impact (Moore et al., 2015) were deductively organized. For example, one service user explained how mWorks provided them with meaningful insights about themselves and was attributed to the mechanism of change construct. Subsequently, content from the material that illustrated a similar pattern was coded to clarify nuances in the material according to inductive content analysis (Graneheim & Lundman, 2004). The final step involved transforming the analysis into a coherent narrative representation. All authors critically scrutinized data analysis to mitigate interpretation bias and increase the trustworthiness and rigor.

Descriptive statistics was used to calculate socio-demographics characteristics of service users as well as to validate the feasibility and acceptability of the questionnaires, and to explore the tentative direction of the impact mWorks may have had on users' ratings between T1 and T2. Non-parametric and parametric paired-sample statistics were further used to corroborate the tentative direction of ratings, using Wilcoxon Signed Rank Test and Paired Samples t-Test. The level of significance was set at $p>0.05$, with a 95% confidence interval. Data was analyzed using IBM SPSS version 28.0.

The data from the SMS-questionnaire were not included in this article due to an unacceptably low response rate.

The present study is part of a randomized controlled trial project with ethical approval from the ethics committee at Lunds University, Sweden (application number 2017/324) and was performed in accordance with the ethical principles of the Helsinki Declaration of medical subjects including humans (WMA, 2000). All study participants provided written informed consent before study enrolment.

Results

Contextual Factors

RTW professionals' attitude towards mWorks was generally positive since it targeted the entire RTW process and that they could offer service users the opportunity to work with a support tool that could be used on their own and in between sessions.

> I thought it was nice that I would get some kind of tool to be able to give patients to work with as homework almost. And I thought it would be fun to start using mWorks. [RTW professional 1]

The Covid pandemic was the most prominent contextual barrier to implementation during recruitment of both contexts and thus participants. Many primary MHS units had to adjust in a variety of ways as a consequence of the covid-pandemic. Their priorities shifted from general primary care towards preventing and treating covid patients and performing vaccinations for the public. Also, the social restrictions that came with the pandemic were perceived as considerable barriers to recruiting MHS units, RTW professionals, and thus service users. Professionals rarely met with service users face-to-face to the same extent as prior to the pandemic.

> Before, I had the patients here on site. Now I do not have this because of covid, because I cannot see patients anymore(...). You almost have to be some kind of telemarketer. You must have one, what to say, outreach activities, and you cannot really show exactly what it (mWorks) is made of [RTW professional 1]

Another contextual barrier to implementation regarded the characteristics and fit of the target group, which constituted a barrier of entry. For instance, during recruitment, the RTW professionals meant that it was sometimes challenging to engage presumptive service users as they were anticipated to be too exhausted, lack interest, or low in energy to engage in new things. Professionals also mentioned that some service users would be reluctant to sit in front of a screen and make an effort when they get back home. In contrast, some participants were active and fully engaged and already had too many activities that limited their commitment. Another perception that one professional had regarded one user's view on mWorks, is that it could be understood as a tool to push people toward RTW. The specific service users similarly elucidated that mWorks had been created by 'society' to force people back to work.

> This (mWorks) presupposes that everyone wants to return to work quickly. Then you forget the cause of brain exhaustion. This is what I may have reacted to the most, it (mWorks) being too pushy. [Service users 1]

With regard to contextual factors such as staffing, the RTW professionals corroborated that their work assignment as rehabilitation coordinators was tailored to coordinate and provide administrative support to the service users and thus fitted mWorks delivery. However, some implementation barriers were present. For instance, they sometimes experienced that although their commitment was restricted to the delivery of mWorks, introducing mWorks could elicit questions about mental health, well-being, and life in general, which was not believed to be part of their role or work assignments. Thus, professionals suggested that mWorks might also fit other professions in their units, such as an occupational therapist or educated psychiatric staff in the team.

> Helpful support, especially parts that are probably best used with a therapeutic component… It would probably have been more helpful if I had the participant in therapeutic contact. [RTW professional 2]

Furthermore, the professionals worked 20% and 25% respectively of their full-time position as rehabilitation coordinators. They did not meet all MHS users on sick leave, which strengthened the idea that mWorks could be delivered by other professionals. One RTW professional suggested that since they did not have therapeutic contact with presumptive participants, it impacted their possibility to recruit more efficiently.

Furthermore, it was not entirely easy for professionals to grasp that mWorks was the user's own tool. One professional felt that their administrative role in coordinating services made it difficult for them to respond to all reflections that mWorks elicited. At the same time, however, they talked with users to bring up matters with other professionals at the unit. In the beginning, they also addressed the need for mWorks to be connected to the Social Insurance Agency.

> Wish it (mWorks) had a tab with some info about sick leave, because they (users) find it difficult and complicated. As you said with the rehab chain with the days and stuff, it would be perfect to have as a module as well [RTW professional 2]

mWorks as an intervention, the web-based self-management tool and standardized delivery had legitimacy among all participants, that it was perceived as helpful and right. Its design and content features were believed to facilitate implementation, and the user interface was perceived as pedagogic, well explained, with a good structure. One service user's overall perception was that mWorks was easy and pleasant to use, 'pedagogical and optically nice'. RTW professionals appreciated a tool to put in the hands of the users, to help them become active agents in their own rehabilitation and work return.

Implementation Process

While Covid-19 did not restrict the initial preparation phase of creating delivery material, the pandemic became a severe contextual implementation barrier for Initiating contact and the Introduction of mWorks (Table 1). The implementation suffered from little involvement of one MHS team. Due to the pandemic, the information meeting was held by one RTW professional and was limited to a brief staff meeting during a 5-minute slot. The professional meant that the risk of forgetting about it directly afterward was probable. Nevertheless, team engagement was perceived as valuable by both professionals and users service users. Moreover, the recruitment period of participants overarched two years instead of six months as planned. Once the MHS unit had agreed to participate, the subsequent education step worked according to plan. Similarly, the active delivery and reception of mWorks functioned according to program (Table 1). Adaptions to the implementation concepts concerned introducing additional contacts between Dialogue meetings 1 and 2. Another adaption concerned involving other team professionals from the primary MHS. Neither were viewed to negatively impact service users' engagement in mWorks and the RTW process.

The extent to which mWorks was perceived to be implemented in relation to program expectations was rated by professionals as 7 and 8 on a 10-point Likert scale. Implementation barriers such as targeting the right group and not being able to meet up with presumptive users to introduce mWorks during the pandemic limited ratings. Recruitment of service users was stated as challenging but to be expected in relation to the group of interest with little energy and engagement, especially those with exhaustion symptoms.

Although RTW professionals were supported by introductions, support meetings and an extensive manual, they did not have resources to learn about the material by heart in order to deliver mWorks to service users with confidence. They simultaneously emphasized that it was not an intricate system and only required a little to become familiar with mWorks.

Dose delivered

The delivery of mWorks was possible to complete for all users. It was delivered in accordance with the delivery plan (e.g., all dialogue meetings were conducted) and preserved users' needs. RTW professionals and users perceived that the dialogue meetings were ideal and valuable and that the time frame for delivery was adequate. The extent to which professionals believed that the delivery was in line with the plan was rated as 7 on a 10 (10-point Likert scale). Professionals meant that the pandemic was not decisive for delivery but limited feasibility to deliver the dialogue meetings and

agreed to the superiority of on-site and face-to-face meetings. It was neither beneficial to implement mWorks during holidays, since this disrupted delivery.

The RTW professionals delivered mWorks slightly differently. One professional perceived that some users had trouble initiating usage of mWorks. Therefore, she preferred more frequent follow-up sessions prior to Dialogue meeting 2 and thus adapted the delivery process in the initial stage by adding follow-up meetings via telephone to ensure that users had begun using mWorks.

> In the beginning, I had more frequent follow-ups with the participant, which I experienced to be better. Then I had brief telephone follow-ups every week. But overall, I have experienced that it has worked well. Sometimes the patients have not got started until the subsequent follow-up, and then it might be good to have a closer contact in the beginning to just try to make sure that they get going. [RTW professional 1]

In line with delivery recommendations, support was adjusted to service users' needs, preferences and interests. All users rated the quality of the delivery by professionals at 10 out of 10 (Likert scale). Even so, users stated the importance of communication during delivery. mWorks was not perceived as 'a quick-fix', but an own tool that they can control and alter themselves, and it provides real help.

> She has done it really great. I think it is nice because she's swamped, and still, she told me, I will talk to Patrik (…) and she gave me an introduction when we started. We watched all the features, I cannot wish for anything better or more. [Service users 1]

According to service users, the timing of delivery in relation to their sick leave status was best addressed individually. The users advised against delivery during the first few months of sick leave since cognitive exhaustion play a key role.

> No, but if I had access to it (mWorks) for the first three or four months, it would not have worked. I do not believe in that. [Service user 5]

According to service users, the dialogue meetings with RTW professionals and all human support from other team professionals were critical for delivery. It was emphasized that the combination of mWorks and human support is equally important.

> These two complements, mWorks and psychiatric nurse. Unbeatable combination! I do not think you should choose one or the other, but you should combine them. A CBT therapist with this (mWorks), because then you would get the optimal fit. [Service user 1]

The dosage of human support in relation to delivery was adequate for users getting started with mWorks. One professional mentioned that some users were positive about using mWorks without designated human support beyond dialogue meetings, while others were reluctant to end the contact.

Dose received

The *overall usage* of mWorks was diverse but aligned to individual user's interests, needs, and preferences. All service users (n=6) logged into mWorks and participated in the dialogue meetings (ca. 5 hours). As monitored from the mWorks' web-based system, the login frequency ranged from 4 to 20 during the study period, with a mean frequency of use of 9.8 (SD 6.18). The sum of logins was 49 for all service users (n=6), Notice, however, that the estimate is conservative since the monitoring was flawed for the two first users during the first couple of weeks. To complement the web-data, interviewees also made an approximation of their login frequency, which was estimated to range from 8 to 40, and the frequency of minutes per login ranged from 7 to 30 minutes. In sum, usage in terms of frequency and duration varied among users during the engagement period of 10-weeks.

> So it is not that I go to her (therapist) and get one dose and then another dose, but there is an active work going on (process). The space in between (meetings) is very useful to me. [Service user 1]

> Did not use it on a daily basis but repeated the steps in order for the content and what was elicited from and which knowledge got internalized. Because, yes, for it to get stuck in my head. [Service user 5].

While one user utilized mWorks to engage in and moderate the entire RTW process, from sick leave and back to work, another started by getting to know the app during her three months of full-time sick leave but started to actively use mWorks when she returned to work. Yet another user focused on performing and processing all content features twice within a couple of weeks, to internalize insights and strategies that were helpful to apply to the parallel real-life RTW process. Service users rated their satisfaction with mWorks from 6 to 8. One user said, "*I have to say an 8, because when I have needed to, I have used what I needed, like" (service user 3)*. RTW professionals corroborated users' perceptions and estimated users' satisfaction with mWorks at 7 on a 10-point Likert scale. The combination and consecutive order of content features to provide a more accurate and clear view of factors contributing to their RTW process.

Similar to the overall usage, usage of different content features or steps varied significantly, as both users and professionals stated. '*My Wellbeing I used the most'* was a reply, and the feature helped break the vicious cycle of not prioritizing health and well-being during sick leave and at work. It was also evident that My mWorks played a central role as a self-narrative for two of the users, '*It was mostly about this with the story, to clarify this for oneself and others'* (service user 5). On the contrary, user 3 did not utilize My mWorks, and stated no need to reflect on past and present experiences. She thought that addressing motivations was counterproductive since she was already strongly motivated to RTW, '*I don't want to be there, I want to move forward'* (service

user 3). She neither used My Wellbeing and stated, '*I know exactly how I am (…) I do not need to concretize it further'*. On the whole she preferred to utilize mWorks to cope when she worked, and used My Network to increase her chances of asking for help from others, My Resources to pep herself, My Strategies to increase work capacity, and My Planning to follow up advancements. Furthermore, according to professionals' satisfaction ratings with the different features, they rated My Strategies the highest (8 and 10) and My Plan the lowest (3 and 5).

> The patients talked a lot about this and then you could support and help the patients how to use the strategies at work. [RTW professional 1]

One professional added that My mWorks, My Resources and My Strategies were the most helpful features for her users, and the consecutive order of in particular My mWorks and My Resources made a good start.

The dialogue meetings were also received differently. One service user benefitted from each face-to-face meeting while another preferred one initial meeting and subsequently only some telephone support. The AI support Mott was not used by two of the three users interviewed (service users 1 and 3), who did not find it challenging to navigate the tool independently. One user neither watched the psycho-educative films in My Well-being.

Reach

According to the RTW professionals, the users reached were those who benefitted the most, who in some way already had initiated their RTW process and perceived that work was within reach. One professional stated that "*preferably those with a 25% range of sick leave status, but also at the 50 and 75%*" (RTW professional 1). Furthermore, users reached were motivated to some extent and warranted a self-management digital solution. "*I watched and read it (flyer), then I thought I absolutely wanted to do that. And so I got to*" (Service users 1). Professionals stated that the reach was dependent on the MD's diagnosis related to the sick leave. Even if the diagnosis was depression, those with exhaustion who hardly managed their current life situation were believed to have the most difficulties engaging in mWorks and evaluation activities. This standpoint was corroborated by user 3, that persons with outright depression benefitted the most. Recruitment of the intended target group was addressed as challenging by all interviewees. It was considered a contradictory situation since persons with depression often experience insufficient capacity to take initiative and avoid situations.

> So this whole thing to get into something (new). For me personally, it just came last on the list, so even if I knew it (mWorks) might help me, I did not have the ability and motivation, 'I don't care', that you only exist. In the beginning, you just try to deal with your anxiety and depression, like everything else just comes last on the list. [Service users 3]

One user emphasized that mWorks needs to be described as 'not something huge' at the recruitment stage, that it is not obligatory but builds on user preferences, control and strengths.

Mechanisms of impact

Service users' reflections and responses of mWorks related to its impact are presented The interview results of the RTW professionals (n=2) and service user 1, 3 and 5 provided a series of quotations that illustrate impacts that mWorks may have had, which are present in Table 3. mWorks benefitted users with their own private space to turn to for reflection and documentation related to life events, sick leave, and work. Similarly, users felt relieved that mWorks was available regardless of time and place. By providing the opportunity for own reflection and overview of the RTW process, mWorks helped users reveal authentic insights about themselves and their residence concerning the entire RTW process. It further helped users to recognize unhealthy thinking and behavioral patterns and identify helpful strategies and pathways to progress towards RTW. In this process, what mattered for their well-being before sick leave and new strategies became more apparent and could prevent mental ill-health from unfolding in the future. Users expressed that they did not see any positives about themselves and RTW during the start of intervention delivery. Thus, users were able to turn negatives into positives. Furthermore, it was possible to recognize their support network, but most importantly, it became possible to explain circumstances about mental health and RTW to others who did not understand their predicament. In addition, mWorks could be an essential platform for supporting goals and following them through as it became more likely to pursue their commitments. In sum, service users explained that the accrued insight produced beliefs about themselves which generated experiences of having 'self-esteem', 'acceptance', and 'self-compassion'. By virtue, RTW professionals perceived that mWorks generated user control and agency, which users corroborated (Table 3).

Table 3. Quotations from service users related to mechanisms of impact.

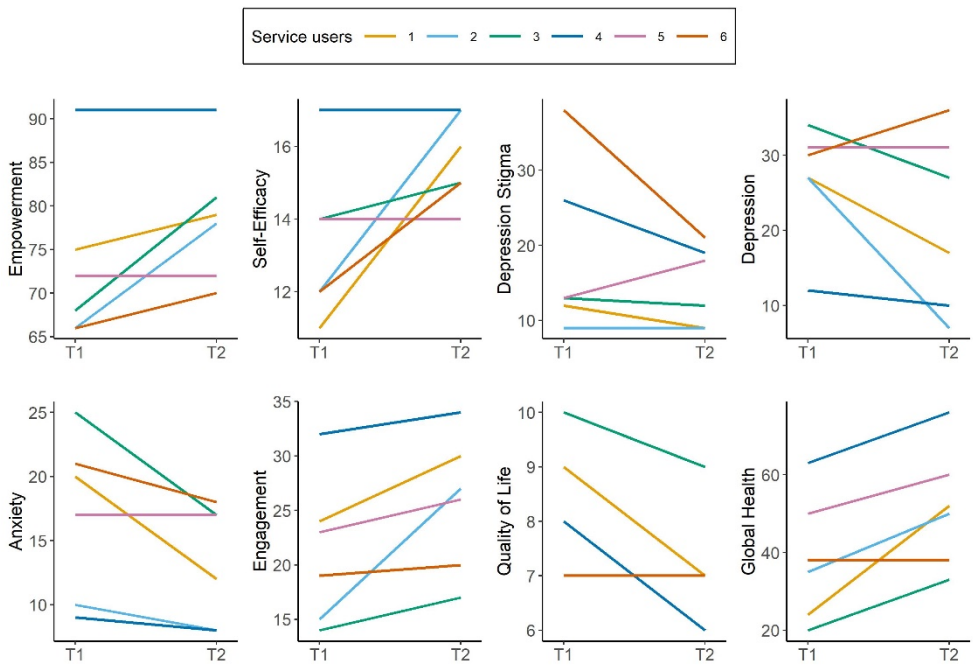
Content	Service user 1	Service user 3	Service user 5
Provides with own private space to turn to for reflection and documentation	It helps me to reflect during the time between the sessions (…). It helps me see patterns and see more clearly. I am using this (mWorks) as a very important diary for myself. Because everything is here, I know how I should insert when I have a thought, it can be a simple word like "acceptance" that didn't exist for me in the beginning	It is really like that actually, that one has a place to go. When you have had those thoughts, exactly (…) It is nice with a tool about how it all has worked for me (…) where it becomes concrete.	Also for myself, that when you see what has come to, and that you have managed so far, it was quite interesting (…) To process and conclude what has happened (…) and what to think about.
Reveals authentic insights about oneself and their residence concerning the entire RTW process	Being in a process is what is important to me, and that is why I say, I am halfway there. This about returning to work do not have the same meaning as when I crashed. Then it was just like going back on track as soon as possible. And that is not where I am now, but right now I have gained another insight about myself and have picked up some pieces of who I am and want to be.	You do not think about it (RTW support) concretely, but if something tells you that maybe you should think about this. So, it has probably also made me more aware that it might be something I should start considering.	

	It (My mWorks) was good and clear for me to understand how I end up where I end up. So I think it has been great, this time (…) That you learn to clarify in a written form which makes it easier to find strategies as well, as how not to do it.		
Prevents mental ill-health from unfolding	My Wellbeing (…) it is very focused on this in relation to returning to work. If you are not present there (thinking about wellbeing), because you have been locked inside a downward spiral, that the job goes before life (…) I will make it work. If you break this cycle, and have time to land (…) if I havn't worked things through, I will only be back on the same track again without having learnt anything about this.	Now is the first time that I have accepted that life is not nail straight (…) I have to accept. I do not need to like it, now it is like this and I cannot compare to how it was before (…) and then I figure out how to do it, how I can manage if I have 35% of my energy, how it will last until I get home(after work)	The story that has reached closure, and at the same time a continuation, about how you, that with strategy (My Strategies), and what one should attend to. Not to revisit certain behaviours that are not that helpful, for example, or ways of thinking.

Turns negatives into positives	Here I can list my strengths (My Resources) (…) I chose: thoughtful, kind-hearted, and creative. That's me, throughout, and I also want to be that way in my work situation. Before I was boundless, overambitious, and worked past life. That role must not be so dominant that your other real qualities are toned down, lost, or pushed away (…). You can be kind-hearted in the workplace. You can be creative. You can be thoughtful.	When you are in a dark place, to be able to just sit and think about good things about you (…) Makes it easier to let go of intruding thoughts that is part of diagnosis and making it possible to get it out, black on white. Now I have thought about that. I do not need to dwell on it more today (…) I need to get rid of it and I write in my phone, I need it off my system (…) but for the moment it blows off some steam	
Makes it possible to explain circumstances (mental health, RTW) to others	I wrote to my employer today that I will see how I feel after leaving here and if i work this afternoon or have flextime (…) much clearer now and much more honest.	At the same time, I also think it (mWorks) was helpful in how I explain it to others who do not understand or who do not know, so those were the two things that I thought were great.	It was mostly about this with the story (My Mworks), to clarify this for oneself and in the long run also to others why you end up there.
Supports goals and following them through		I then had the goals that I would start working on, and I wrote them down. It is also good and... Having a platform where you can easily make it concrete and also follow them up. The connection to mWorks (what happened), but at my job when I have been there it has become concrete for me.	

		Something to attach it (thoughts) to. To sort it out. It just goes around in your head, like over and over again, but now you have, through mWorks, somehow put it (thoughts) into compartments. That's nice! You can kind of sort it out, but in mWorks you have put it in that compartment. You can put it in that compartment and that's a relief! Then you can think about everything else.	
Generates user control and agency	It has helped me to be persistent, that it is important that I heal during the process. It might have been these questions that have been a little further ahead, but I am not there yet, perhaps this that has strengthened me? "Yes, that sounds really nice, but not right now" (…) strengthened my self-esteem; because I have somehow accepted that I can play a role and believe that I can do all that. But that's not what I want, so be genuine and real.		And when you see your own history, you understand and also get, what should I say, self-compassion because you realize and wonder how long you have actually managed, and understand why you are in this situation. So, it has a good learning-effect as well.

The procedural feasibility of using questionnaires was acceptable since all service users (n=6) completed the survey at both T1 and T2. The tentative direction of results according to users' experiences rated in the questionnaires further validated the sensitivity of constructs chosen (Figure 2).



Note: Low Quality of life scores indicate higher quality of life.

Figure 2. Service users' individual trajectories of sum scores between T1 and T2 in relation to different measurements using spaghetti plots.

The mean and median changed for all measures between T1 and T2 which corroborated the assumptions made: *Empowerment* (T1, *M*=73/*SD* 9.51, *Mdn*=70, min-max 66-91; T2, *M*=78/*SD* 7.45, *Mdn*=78, min-max 70-91), *Self-efficacy* (T1, *M*=13/*SD* 2.16, *Mdn*=13, min-max 11-17; T2, *M*=16/SD 1.21, *Mdn*=16, min-max 14-17), *Depression stigma (personal)* (T1, *M*=18/SD 11.22, *Mdn*=13, min-max 9-38; T2, *M*=15/*SD* 5.32, *Mdn*=15, min-max 9-21) *Anxiety* (T1, *M*=17/*SD* 6.36, *Mdn*=18, min-max 9-25; T2, *M*=13/*SD* 4.63, *Mdn*=14, min-max 8-18), *Depression* (T1, *M*=27/*SD* 7.73, *Mdn*=28, min-max 12-34; T2, *M*=21/*SD* 11.78, *Mdn*=22, min-max 7-36), *Engagement in everyday life* (T1, *M*=21/*SD* 6.68, *Mdn*=21, min-max 14-32; T2, *M*=26/*SD* 6.3, *Mdn*=26, min-max 17-34), *Quality of Life* (T1, *M*=8/*SD* 1.17, *Mdn*=8, min-max 7-10; T2, *M*=7/SD 1.09, *Mdn*=7, min-max 6-9), *Global Health* (T1, *M*=38/*SD* 16.11, *Mdn*=36, min-max 20-63; T2, *M*=51/*SD* 15.49, *Mdn*=51, min-max 33-76).

Paired sample statistics corroborated some positive trends: *Empowerment* (Z=–1.841, p=0.057; t=-2.356, p=0.65, d=20), *Self-efficacy* (Z=–1.841, p=0.066; t=-2.445, p=0.058, d=39), *Depression stigma (personal)* (Z=–1.214, p=0.225; t=-1.244, p=0.269, d=84), *Anxiety* (Z=–2.032, p=0.42; t=2.564, p=0.05, d=50), *Depression* (Z=–1.483, p=0.138; t=1.407, p=0.219, d=1.03), *Engagement in everyday life* (Z=–2.207, p= 0.027; t=-2.730, p=0.041, d=45), *Quality of Life* (Z=–1.890, p=0.059; t=2.907, p=0.034, d=0.20), *Global Health* (Z=–2.032, p=0.042; t=-3.575, p=0.016, d=9.02).

Notably, sensitivity analysis of *Empowerment* showed that sub-scale ratings of *Optimism and control* changed the most, *Self-esteem* (Z=–1.225, p=0.221; t=-1.467, p=0.202), *Power (*Z=–0.631, p=0.528; t=-0.500, p=0.638), *Activism (*Z=–0.816, p=0.414; t=-0.791, p=0.465), *Optimism and control (*Z=–2.032, p=0.042; t=–2.739, p=0.0.41), *Righteous Anger* (Z=–0.552, p=0.581; t=-0.500, p=0.638).

Discussion

This process evaluation case study showed that it was feasible to deliver mWorks as a web-based self-management intervention to service users with CMD who are sick-listed within a primary MHS context. Both qualitative and quantitative findings supported the assumptions made about mWorks, that it may enhance control and benefit users during the RTW process and at work. When initial contextual barriers related to recruitment of MHS units and participants have been overcome, mWorks may provide RTW professionals with a valuable tool to deliver to service users that complement a person-centered practice. Consequently, the delivery of mWorks seemingly benefited RTW professionals by generating service users who gained critical insights and seemed to become more engaged, empowered and active agents in their own RTW process. The quantitative data similarly indicated positive trends in engagement, empowerment, self-efficacy, mental health, and quality of life after the ten-week study period. Sensitivity analysis of Empowerment showed that sub-scale ratings of Optimism and control changed the most notably, which further substantiate the casual assumptions that mWorks may generate increased user control during their RTW process and by virtue increase their empowerment (see The mWorks intervention, p.6).

The most critical contextual barrier was inherent during the initial phases of implementation (Table 1), and it was difficult to reach and recruit the intended contexts and target group. The pandemic severely mitigated the recruitment of contexts. However, during the recruitment of service users, several were perceived as lacking energy and/or not having the anticipated resources to process the information

about mWorks, or were already too busy. Earlier research highlights that the current target groups' hesitance to participate in evaluations of digital interventions might be due to a lack of readiness to partake in research and may constitute a barrier to recruitment (Volker, Zijlstra-Vlasveld, Brouwers, & Van der Feltz-Cornelis, 2017). A recent scoping review of digital mental health interventions underlines the utility of recruiting via mass media web-based advertisements (e.g., Facebook and the organizations' intranet). Another strategy entails providing attractive incentives for participation in research and can be a successful avenue to increase service user recruitment rates (Bernard et al., 2022). Yet a Swedish RTW trial, PROMISE, invited all sick-listed to partake the first 30 days of sick leave, which required a commitment from the primary MHS units (Cederberg et al., 2022). Such commitment was sought for also in the present research context. The County Council of Region Skåne were part of the steering group for implementation, and the PI (last author) made several attempts to address the project at strategic regional and national levels which parties were too occupied with immediate organizational matters, mostly in relation to the pandemic. A mWorks website was also created to further communicate the project and allowed interested parties to submit an interest and meet researchers. Based on ca 50 one-hour online meetings that was documented by a research administrator, there was an interest for using mWorks in both private companies and workplaces in the HR department, but also within primary, specialist and community MHSs, and by private individuals. However, very few wanted to be part of research studies. To continue, a clinical and research implication with regard to recruitment on the unit level, based on interview results on dose delivered and received, is that the entire primary MHS team needs to become involved, especially since the role of the RTW professionals may be limited to part-time work and co-ordination of the RTW.

With regard to the timing of delivery, it was suggested that professionals need to wait until the first few months of sick leave to approach users, or perhaps even longer if comorbidity of exhaustion is present with depression and anxiety diagnoses, and they should meet presumptive users face-to-face and show them around in mWorks. Furthermore, as concluded by a user, RTW professionals need to highlight that mWorks is the user's own tool, that it is not obligatory or "something huge" but builds on their preferences, resources, strengths, and control. Thus, mWorks is not a 'quick-fix' to be finished in 10 weeks with an end purpose. Instead, it involves an engagement process of mWorks a tool that evidently were used flexibly and functioned as a support along the RTW process and at work. It should be noted, however, that manuals bring up such use and purposes, but professionals stressed that they lack the resources to learn it thoroughly. Thus, future education to RTW professionals should highlight critical ingredients for recruitment and delivery to ease learning among professionals with limited resources at hand. Process evaluation on web-based intervention for RTW suggested that professionals within the MHS lacked motivation to work with digital solutions (Cederberg et al., 2022; Volker et al., 2017), which might reflect the hesitancy for enrolment. Thus, elucidating barriers and facilitators

for engaging and recruiting professionals and organizations for web-based interventions is vital.

It was evident that mWorks was delivered and received according to expectations of professionals and users, but also in relation to the implementation program of delivery. During active delivery, one RTW professional adapted and increased the frequency of follow-up meetings prior to dialogue meeting 2 (two weeks from baseline) (Table 1). It is plausible that increasing the frequency of follow-up if needed during the first two weeks of active delivery process facilitates implementation. However, it became evident that service users who reported exhaustion were 'slow starters' and may be the ones who needed more frequent support in the beginning. Symptom severity and fluctuation in mood that result in lack of energy and time have been revealed as an essential barrier to engagement with digital support tools to decrease depression in the workplace (Deady et al., 2018). Thus, well-timed and flexible support according to service users' needs has been highlighted as an essential factor in facilitating usage (Bernard et al., 2022; Volker et al., 2017). Although exhaustion was not part of the target group of mWorks, current findings indicate that service users benefited from mWorks and were able to use it at their own pace and preferences. As such, it is critical to address the interest, need, and preferences for mWorks to a broader audience with more severe mental health problems and disabilities, who take an interest in utilizing digital aids to complement their traditional RTW support. However, suggestive engagement features and supervision need to address this in future mWorks delivery, which possibly require more delivery and ongoing support resources during users' longer-term usage of mWorks.

As suggested in previous research, human support is essential for online delivery (Lattie, Stiles-Shields, & Graham, 2022). Replacing face-to-face meetings with telephone dialogue meetings for some users due to pandemic restrictions was deemed by professionals as less beneficiary for delivery. Surprisingly, however, this adaption did not seem to have affected service users' satisfaction with delivery, evidenced by interviewees rating delivery quality as the highest possible. Earlier formative research regarding mWorks (Engdahl et al., 2021; Engdahl et al., 2020) highlights the crucial importance of investigating the optimal delivery format for providing human support for digital solutions. This topic has been debated in the current research corpus regarding its importance for service user engagement (Cuijpers, Noma, Karyotaki, Cipriani, & Furukawa, 2019). The current study firmly suggests that there is no question regarding the benefit of human support during the delivery. However, whether telephone delivery is an acceptable format for providing human support remains uncertain. RTW professionals have previously been suggested to be overconfident in face-to-face meetings, whereas digital or telephone formats can be sufficient (Engdahl et al., 2020). Similarly, individual randomized trials and meta-analyses have shown that CBT delivered by telephone is comparably efficacious and

acceptable to CBT delivered in a face-to-face setting (Carlbring, Andersson, Cuijpers, Riper, & Hedman-Lagerlöf, 2018; Lattie et al., 2022; Mohr et al., 2012).

Our findings are preliminary, given the size of the study. However, it further substantiates the causal assumption outlined in the present study (see The mWorks intervention, p.6) and previous formative research (Engdahl et al., 2021; Engdahl et al., 2020). That mWorks is presumed to empower and strengthen the service users on their journey back to work. In addition, the findings reveal which mechanisms mWorks set in motion to produce changes. Perhaps the most exciting mediators relate to empowerment, which indicated a positive trajectory in terms of increased optimism and control for the future. The causal chain by which mWorks produced change was attributed to providing a creative space for service users to reflect and document thoughts in relation to their own motivation, goals, strengths and resources, and new strategies to be used in their RTW process or at work. Consequently, service users reported retrieving authentic insights on approaching work return or situations at work, which was perceived to mediate increased control over their RTW process. Similarly, a systematic review of digital mental health applications highlights the benefit of improving service user's locus of control by developing self-management skills (Borghouts et al., 2021). In line with this chain of evidence, service users reported that mWorks had taught them to 'stand on their own' and RTW professionals perceived them as more involved and active agents during the RTW process. These results are promising for several reasons. First, earlier research has established that empowerment is crucial in enabling the RTW process and decreasing depressive symptoms (Johanson & Bejerholm, 2017; Johanson et al., 2019; Porter & Bejerholm, 2018). Second, these findings presumably suggest that mWorks can affect mediating factors for RTW and health-related outcomes, consequently decreasing sick-leave duration and improving public health. However, more comprehensive full-scale evaluations are needed in order to make such inferences regarding mWorks impact on outcomes including sick leave.

This process evaluation is guided by the MRC framework, which helped plan, analyze, and report the current study. The adherence to MRC has strengthened the transferability and comparability in relation to other processed evaluations (Moore et al., 2015). The credibility of the findings was strengthened by triangulation and utilizing multiple participant groups, data sets, and researchers. Even though the present study indicates positive results, causal inferences cannot be made due to the crucially small-scale study and sample size. Furthermore, the sample group primarily represents middle-aged women which is in harmony of the target group of persons on sick leave due to CMD and may strengthen the overall transferability of our findings (WHO, 2017; Bertilsson, Bejerholm & Ståhl, 2017). Yet, it is also critical that the younger population is represented in the sample. Rigorous large-scale evaluations are warranted to assess its effect on outcomes and accompanied mechanism producing change. Furthermore, the present study was bounded by 10 weeks to evaluate the initial

delivery process of mWorks. Thus, the revelations regarding mWorks should be considered in light of this limited time frame. As such, it is critical to evaluate mWorks long-term usage to gain a more comprehensive understanding.

Conclusion

When the contextual implementation barriers related to the covid-19 pandemic and recruitment were overcome, mWorks were feasible to implement and deliver. Service users and professionals benefited from mWorks by generating more active service users during the RTW process. Clinical and research implications for future implementation should focus on the initial stages of recruitment and involve the entire team during the education phase. The evaluation demonstrated several positive impacts that mWorks may have on users' RTW process that seemed to have altered their engagement, empowerment, self-efficacy, mental health and quality of life in a positive direction. Multiple data sources, methods, and researchers as well as the use of the MRC framework strengthened trustworthiness. However, further research is needed to understand and discern causal inferences fully.

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Declaration of interest

The authors report no conflicts of interest. The authors alone are responsible for the content and writing of the paper.

Author contributions

The first (PE) and last author (UB) drafted the study and performed the analyses, while PE collected all data. All authors conceived and designed the study, discussed the results, and contributed to the final manuscript.

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Development and evaluation of mWorks

There is limited research on digital return to work solutions, especially for persons with common mental disorders on sick leave in a mental health service context. This thesis adds to the current knowledge and understanding about the relevance, development, and evaluation of m Works, a web-based self-management tool to empower service users during the return to work process.

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