

The role of social technologies in community care – A realist evaluation of a Danish web-based citizen-to-citizen platform adopted in community care to promote belonging and mental health

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The first author LMBA received a grant from Aalborg Municipality (the involved municipality) for part of the work. NJR, HB, and CO declare no conflicts of interest.

Recruitment of participants was undertaken in collaboration with key stakeholders including the municipality and the platform provider, Boblberg.

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Data availability statement

The participants of this study have not consented for their data to be shared publicly. Due to privacy issues and ethical concerns, research data are not shared.

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Abstract

As social technologies increase in popularity, there is a growing interest in incorporating them into mental health interventions. Research shows that the use of social technologies may support belonging and mental health. Findings, however, are contradictory and highlight the need to clarify the processes and mechanisms by which this technology may have positive effects. This study conducted a realist evaluation of a web-based citizen-to-citizen platform adopted within community care in a Danish Municipality. It focused on how, for whom and under what circumstances the web-based platform worked to promote belonging and mental health. The evaluation was structured in subsequent phases of development, testing, and refinement of programme theories. A purposeful sampling frame was developed based on the programme theories, and 27 interviews were conducted. With variations, the platform was found to support its users in meeting their social needs by a: expanding their access to social networks; b. allowing them to overcome barriers related to reaching out to new people in real life and c. providing them with an improved starting point for identification of a relational match. Whether this resulted in improved belongingness and mental health was strongly affected by individual and relational circumstances. Findings suggest that web-

based platforms that aim to enable citizens to locate friends and activity partners can serve as helpful tools in interventions striving to promote mental health in the community, as they may support people to fulfil a need for belongingness. However, the impact of such tools is highly dependent on the individual's abilities to use the initiatives to form relationships of sufficient quality to accommodate these needs. People with previous relational difficulties, and who have struggled to achieve feelings of belonging and citizens with limited digital literacy, may need support to realise the social opportunities provided by these technologies.

Keywords

Mental Health, Interpersonal Relations, Online Social Networking, Internet, Internet-based Intervention, Evaluation Study.

What we already know

- A positive impact of social relationships on mental health is well established.
- People are increasingly using social technologies to form and maintain social relationships. Research show contradictory effects on belonging and well-being.
- The need is to clarify how, for whom and under what circumstances social technologies may foster belongingness and mental health in interventions designed with this purpose.

What this paper adds

- Social technologies can serve as helpful tools in interventions that aim to promote mental health as they may support people in meeting their needs for belongingness.
- People with previous relational difficulties and “failed belongingness” and citizens with limited digital literacy may need support to realise the opportunities provided by these technologies.

1. Introduction

Today, social technologies, defined as online resources which enable users to connect with others for the express purpose of social interaction (Nowland, Necka, & Cacioppo, 2018), are increasingly gaining ground as digital tools for people to connect, form and maintain social relationships (Ryan, Allen, Gray, & McInerney, 2017). In Denmark, 82% of the population from the age of 13 were active social media users in 2020 (Hootsuite & We Are Social, 2020). Given this popularity, growing attention is being given to the potential of incorporating social technologies into interventions that aim to support mental health.

The use of social technologies may foster human relatedness which is a widely recognized predictor of positive mental health. This relationship is often explained by its potential to fulfil belongingness needs (i.e. a basic human need to reach out to others and maintain at least a minimum of positive, lasting and significant social relationships (Baumeister & Leary, 1995)). Existing research recognizes the positive potential of social technologies to support human relatedness and mental health, but findings are contradictory. On the one hand, they may lead to the formation of new friendships and communities, support a sense of belonging, reduce loneliness, and promote wellbeing. However, there is also evidence that they may cause loneliness, reductions in feelings of belonging and lower wellbeing (Allen, Ryan, Gray, McInerney, & Waters, 2014; Clark, Algoe, & Green, 2018; Nowland et al., 2018; Ryan et al., 2017). Research suggests that outcomes of the use of social technologies depend on how they are used and on the person using it (Clark et al., 2018; Nowland et al., 2018; Ryan et al., 2017).

In line with a growing awareness in research and public health of the significance of human relatedness for positive mental health, interventions that improve social connectedness in the general population have been advocated for their potential to promote mental health (Saeri, Cruwys, Barlow, Stronge, & Sibley, 2018). The specific role of social technologies, however, used in interventions as resources to facilitate and support social connectedness to improve mental health, as well as the potential pitfalls of the use of this technology, is not well studied. This, along with the contradictory effects of social technologies on mental health highlighted in the previous section, illustrate the need for further research to clarify the processes and mechanisms by which this technology may promote mental health including for whom this type of initiative may be beneficial.

This study contributes to current knowledge with insights from a realist evaluation of a web-based citizen-to-citizen platform (www.boblberg.dk) adopted by a Danish municipality as part of a general policy to promote belonging and mental health in the general population. The platform was developed and provided to Danish municipalities by a private Danish company. It allowed citizens from license-paying municipalities free access to write, view, and search for posts as well as access to connect with other platform users (private citizens, organisations, clubs etc. locally, regionally or nationally) for the purpose of sharing leisure time activities and interests in real life and online. Forty-one municipalities were using the platform that had 315,000 members nationally in September 2020. In the municipality of interest, approximately two thirds of the users were female, and the average age of users was 35.7 years (R. Stæhr, personal communication, 13 March, 2019, 20 March, 2019, 1 September, 2020). The study used a realist evaluation approach to examine how, for whom and under what circumstances the web-based platform worked to promote belonging and mental health.

2. Methods

The evaluation process was guided by the realist evaluation cycle outlined by Pawson & Tilley (1997) and involved three phases of development, test, and refinement of programme theories (Table 1).

Phase 1: Development of programme theories

Four face-to-face interviews were conducted with municipality and initiative stakeholders focusing on their expectations and experiences with how, for whom and in what circumstances the web-based platform worked to promote belonging and mental health. Written information was also obtained from the platform. Interviews were transcribed and reviewed to derive context, mechanism, and outcome configurations (definitions are provided in Table 2). For further refinement of the programme theories, middle range theories explaining the link between social relationships and mental health were used. This literature was merged with data from the interviews into testable programme theories for phase 2 (Table 2).

Phase 2: Test of programme theories

This phase involved testing the programme theories against empirical data collected with users of the web-based platform and stakeholders. Following Emmel (2013), sampling of participants for this phase was based on the programme theories and aimed at seeking out: “*examples of mechanisms in action, or inaction towards being able to say something explanatory about their causal powers*” (Emmel, 2013). A multifaceted recruitment strategy was used to ensure diversity in the participant group in terms of individual contexts and experiences with the platform (Figure 1, Table 3).

Qualitative face-to-face interviews based on a semi-structured interview guide were used as the primary method for testing the programme theories. The interview technique was inspired by the teacher-learner cycle introduced by Pawson & Tilley (1997). This meant that ideas about how the platform was working were presented to and discussed with the participants during the interview for them to comment and refine. The interviewer (author LMBA) also allowed time for the participants to share their personal and lived experiences with the platform.

According to Danish legislation, only interview studies linked to a study or trial involving liveborn human individuals or biological material can be submitted for authority approval from The National Committee on Health Research Ethics. Overall, qualitative studies including this study are based solely on informed consent obtained in writing from participants prior to data collection (Danish Health Research Ethics Committee, 2018). The study was conducted in accordance with the principles outlined in the Act on Research Ethics Review of Health Research Projects (Danish Health Research Ethics Committee, 2018), The European Code of Conduct for Research Integrity (ALLEA - ALL European Academies, 2017), the Helsinki declaration (The World Medical Association, 2013) and the General Data Protection Regulation Legislation (The European Union, 2016). Participants were offered a Cinema Gift Card for their participation.

Phase 3: Analysis and specification of the programme theories

All interviews were audio-recorded, transcribed, and prepared for analysis in Nvivo 12 Pro for Windows. The coding process allowed analysis of differences in the desired outcomes (fulfilment of needs for belonging and improved mental health) in terms of patterns of contexts and mechanisms. This contributed to further refinements of the programme theories (Findings, Figure 2). For reporting, RAMESES II reporting standards for realist evaluations were used (Wong et al., 2016).

3. Findings

Sixteen female and six male platform-users between 12 and 73 years of age with different levels of experience with the web-based platform were interviewed for phase 2 (Table 3). One interviewed couple (man and wife) had not yet used the platform but were within the target group of the evaluated initiative and contributed to the empirical testing of mechanisms and contexts decisive for this outcome (the platform not being used).

For most participants, use of the platform was motivated by a wish to form social relationships of varying depth and commitment with one or a few others. A few had used the platform to locate others for a specific type of activity or to join a bigger group or community. While not all participants had succeeded in their efforts to make connections via the platform, most felt positive about the initiative and the opportunities it afforded. Most of the participants that had actively used the platform had either just communicated with one or several other users or moved on to meet, and in some cases, form relationships. Typically, contacts between users were initiated at the platform but quickly moved on to face-to-face meetings with the purpose of clarifying the future interest in the relationship.

In the following section we present seven central refined programme theories. CMOc 1-4 explain the positive programme theories of how, to whom and in what circumstances the platform worked to support people to fulfil needs for belongingness and promote mental health. CMOc 5-7 explain three negative programme theories of how, to whom and in what circumstances use of the platform was less likely to lead to the desired outcomes.

3.1. How, for whom and in what circumstances did the platform work

CMOc 1: Finding new friends or a community to be part of in real life can be challenging, especially for people with limited social networks (context). By enabling users to view, search for posts, and connect with other users (mechanism resource), the platform helps to increase the visibility and accessibility of social networks (mechanism reasoning) thereby supporting the user's ability to reach out to others to meet their social needs (outcome).

Data indicated that finding new friends in real life was experienced as challenging for many, particularly for people with limited access to social relationships (e.g. those who were socially isolated, not in employment or attending school, working from home etc.). A female participant who had been working from home for a long period of time explained how she experienced this:

“I was working from home as a daycare worker during that time period (...) you couldn’t really find anyone there [friends]. It wasn’t like being in the job market where I would quite possibly be able to find some good people to talk to and good colleagues too.” (Participant 22).

Locating people with similar social needs and interests in connecting and forming new relationships was an important part of the challenge of finding a friend in real life, as the participant explained:

“(...) I did some Cross Dance once but that’s not like a community where you get to... [know new people]. People they know each other. They go there together in groups” (Participant 22)

Overall, the web-based platform was perceived as a helpful tool to locate others. A young woman explained how she found the platform to be helpful in terms of finding friends:

“Well, I think it’s cool that something like Boblberg has been developed. I think it’s because I don’t know where else you would go to find something like this. It’s difficult to be new, as a newcomer, I mean, to a large city and then immediately find out how it’s all interrelated. Find friends outside school (...)” (Participant 21).

In general, the platform worked by enabling people to reach out and beyond their immediate social network and into a network of others with similar relational motives, thereby supporting their ability to meet their social needs.

CMOc 2: Approaching strangers for friendship or to join a community in real life feels challenging and awkward for many (context). The platform gathers users with similar relational motives and enables them to connect from behind a screen (mechanism resource). This contributes to feelings that searching for friends and approaching others on the platform feels

legitimate and safe (mechanism reasoning) and thus encourages users to reach out to meet their social needs (outcome).

In some cases, contacting new people through the web-based platform was thought to be easier than making contact in real life. Several participants shared thoughts about how approaching strangers for friendship in real life felt awkward and intrusive:

“Well, you know, I just had an interest in meeting others and in general it’s a bit difficult to go into town like that and talk to people” (Participant 4).

The platform supported users to cross barriers related to reaching out to new people by providing an online room of people with similar relational motives and with the opportunity to make contact to others online rather than face-to-face. These resources contributed to feelings that reaching out via the platform felt more legitimate and safer than reaching out in real life and supported users’ ability to contact others.

“I thought well; why not give it a try? There are others looking for friendships, so you probably won’t feel like such a big idiot, in inverted commas, because you aren’t the only one who is kind of trying to find friends in there” (Participant 11).

For users who experienced themselves as shy or who disclosed social anxiety issues, the opportunity to contact others from behind a screen, as opposed to face-to-face, furthermore gave them courage to open up socially, thus supporting their ability to form relationships:

“I’m not the kind of person who rushes out and meets a new girlfriend or a new friend. I’m too shy for that. (...) Boblberg has been helpful when it comes to that.” (Participant 9)

CMOc 3: Finding a relational match is an important prerequisite for development of close relationships. The platform offers users (context) to view and search for other users’ posts describing themselves and their interests (mechanism resource), and thus encourages them to reach out towards specific others of interest (mechanism reasoning). Provided that users are able

to locate a match online, and that face-to-face meetings confirm the online impression of a match (mechanism reasoning) this encourages relational development (outcome).

Data showed that a lot of the interpersonal activity going on between users had to do with relational match making. Several were clear about not only what activity but also what kind of persons they were looking for on the platform, as one user explained:

Then it's the walks (...) I reckon it should perhaps be someone with the same interest as me (...) perhaps someone with kind of the same personality. Personality and interests. Perhaps someone who kind of has the same challenges as me (...). (Participant 10)

Based on the various relational experiences shared by the participants, locating a relational match characterized by a sense of commonness, shared social interests and needs, and expectations of the relationship were identified as important contributors to relationship formation, whereas a sense of a mismatch often resulted in no further relational development, and in some cases even produced negative feelings as a user explained:

"We are going to meet a lot where there is no match, and it is going to hurt. It's going to feel like a personal rejection. It's going to feel like having yourself lying on a table for personal assessment."
(Participant 12)

The ability to see another user's posts describing themselves and their interests, before making contact meant that, compared to real life, the web-based platform offered a starting point for communication that encouraged relational development. This was, however, provided that users were able to locate a relational match on the platform in the first place, and provided that the transformation of online contact into face-to-face meetings confirmed the online impression of a match. A young female participant shared her experience of finding a relational match on the platform:

"But this girl I thought was interesting. It was a girl my own age who lived (...) 10 kilometres from me perhaps, and we had just bought a house in the area, and I didn't know anyone either and it was pretty much the same she wrote."

(...)

“She is (...) well in many ways she is exactly like me. Just as stubborn (...).” (Participant 1).

CMOc 4: Especially for people with needs for belongingness (context) the ability to locate and reach out to other users provided by the platform (mechanism resource) promotes mental health (outcome) if contacts initiated at the platform develops into social relationships that feels positive, accepting, and mutual (mechanism reasoning), thus relationships with capacity to fulfil belongingness needs.

The study participants varied greatly in their expressed need for belonging. Some spoke of their belongingness needs already being fully satisfied. Others expressed loneliness due to being disconnected from work, school, or family and friends. A woman that spent most of her time alone in her apartment due to loss of significant relationships and health problems expressed the loneliness she felt in this situation:

“Really, there is no one calling, no one is keeping an eye on you, no one is knocking on the door and...nothing” (Participant 3).

While the extent of this varied, most participants felt that the relationships facilitated by the platform offered at least some contribution to their lives. The data showed that, in several cases, engaging in these widely different relationships led to positive experiences related to increased social activity, social support, and self-disclosure. However, especially for participants, who had had a need for belonging and who felt that this need had been accommodated by relationships facilitated by the platform (relationships experienced as positive, accepting and mutual) this was experienced as highly significant for improved sense of thriving in everyday life. These relationships were ascribed considerable significance by the participants as they contributed to social activity and improved mood, reduced feelings of loneliness, and, in some cases, promoted sense of self-worth and purpose in life, as two participants explained:

“I also think that the feeling where you suddenly think that; Wau it’s so nice suddenly to feel that you are worth something and that you are meeting someone” (Participant 3)

I actually get a good everyday life because I have something to get out of bed for. Even though it's at ten o'clock at the earliest, I have something...something I have to do" (Participant 21).

3.2. How, for whom and in what circumstances did the platform work less successfully

Data indicated three circumstances where use of the platform was less likely to lead to the desired outcomes and/or with a higher uncertainty of the occurrence of positive and negative outcomes.

CMOc 5: For people experiencing severe lack belongingness (context) the ability to reach out to other users on the platform (mechanism resource) may trigger feelings of disappointment and sadness (outcome) when they experience a lack of positive feedback or otherwise feel socially rejected by other users (mechanism reasoning).

Several of the participants had experienced trying to contact someone on the platform without getting a response back:

"(...) you should also probably be aware that not everyone is going to answer (Participant 11).

Others experienced the person they had communicated with suddenly withdrawing from communication or not being interested in meeting again:

"Well, sometimes I've also met with someone where we were supposed to get together again but where they couldn't find the time" (Participant 3).

These types of experiences generally caused a barrier to the participant's attempts to reach out to others through the platform. While some participants did not take much notice of this and experienced this as a natural part of the process, for others, especially those who felt severe lack of belongingness, this experience triggered feelings of disappointment and sadness:

"I have to say that when it happens, it makes me sad" (Participant 3).

CMOc 6: For people with limited digital literacy (context) the resources provided by the platform (mechanism resource) may not result in increased belonging and mental health (outcome) due to difficulties in using the platform (mechanism reasoning).

Ability to access, understand how the platform worked, and successfully use the platform to reach out to others were significant factors determining the platforms potential to promote belonging and mental health. A female participant explained how being unable to retrieve the description she had posted on the platform the day before had led her to feel disappointed and made her give up on the platform:

“(...) Then I was actually both disappointed and a little bit angry, and I also became a bit like... Argh... Whatever... (...)” (Participant 18)

A platform stakeholder who worked with marketing the initiative to citizens with varying digital skills explained that people’s ability to use the platform varied according to age and digital experience:

“So the older ones they are really hard, but some of them have worked (...) with computers like at a later stage in their work life and perhaps gained some experience from that (...) they are easy enough to grab (...) but those who are 70 now and who have never really used a computer, they are really hard to help, because many of them, like we saw today, don’t even have an e-mail” (Stakeholder G).

These data indicated that citizens with no or with only limited digital literacy could be experiencing barriers in relation to accessing the resources of the platform and achieving the desired outcomes.

CMOc 7: For people with previous relational difficulties and who have struggled to achieve feelings of belonging (context) the resources provided by the platform (mechanism resource) may not result in increased belongingness and mental health (outcome) due to negative memory bias and limited social skills (mechanism reasoning). Rather than supporting mental health, new social rejections may trigger negative memories and emotional distress (outcome).

Some of the participants found it difficult to make friends and to achieve feelings of belonging, putting this in the context of longstanding struggles arising from adverse childhood experiences, including childhood abuse. A female participant described:

“I’ve always looked to be a part of a community but have had a hard time with it” (Participant 14).

In general, these participants tended to attribute parts of their relational difficulties to their own behaviour which they felt others perceived as negative and hostile, and generally socially unattractive:

“You gradually begin to behave inappropriately. And inappropriately means that you start to behave unattractively by being, quite frankly, too honest.” (Participant 12).

To these participants, engaging in new attempts to reach out to others to form relationships was viewed in the light of previous negative relational experiences and previous rejections, which either caused them to feel restraint in new efforts to engage in social relationships, or to experience a high sensitivity towards signs of social rejections. A woman described how the sense of being socially rejected by another user that she had met with once made her feel that, once again, she was being pushed away.

“You don’t send anything back because you don’t want me that close, because that’s really the feeling that she’s giving me”. “(...) I am angry; I can see that, in retrospect” (Participant 12).

Feeling socially rejected in this situation reactivated negative childhood memories and produced feelings of anger and sadness:

“I really thought that some of it had been good. I had felt safe. I had felt happy and it’s been a long time since I’ve felt that kind of happiness. (...) That’s probably what hid because of the danger it is for me to open up to the joy of life.” (Participant 12).

4. Discussion

The study aimed to answer the questions of how, for whom and under what circumstances a web-based citizen-to-citizen platform used in community services in a Danish municipality contributed to improved belongingness and mental health. We found that, with variations, the platform supported its users to meet their social needs by; a. expanding their access to social networks; b. allowing them to overcome barriers related to reaching out to new people in real life and c. providing them with an improved starting point for identification of a relational match. Whether this led to improved belongingness and mental health was strongly affected by individual and relational circumstances (Figure 2). The findings suggest that people with belongingness needs may benefit from the platform's resources in terms of improved belonging and mental health if they are able use the platform, if they are able to identify a relational match, if they receive positive feedback from other users, and if this leads to development of relationships that feels mutual, positive and accepting. People with relational difficulties, and who have struggled to achieve feelings of belonging and citizens with no or limited digital literacy, may experience unintended outcomes and may need support to realise the positive potential of the platform.

This study contributes to our understanding of the potential of exploiting the growing popularity of social technologies to deliver purposefully designed web-based platforms within community care to support belonging and mental health. Our findings support the importance of positive and significant social relationships for mental health. However, in accordance with previous research we find that social contacts and relationships differ in their capacity to fulfil needs for belonging (Baumeister & Leary, 1995; Hagerty, Lynch-Sauer, Patusky, Bouwsema, & Collier, 1992; Lambert et al., 2013). Mere social contact with a changing sequence of people is not enough to fulfil belongingness needs; however, these initial contacts may act as possible first steps for the development of significant and longer term relationships (Baumeister & Leary, 1995). We therefore argue that the value of web-based platforms designed for use in interventions to promote community mental health is the online supplement to real life that they present. This acts to increase accessibility of social networks and thus the opportunity for citizens to reach out to others to fulfil their belongingness needs.

Based on belongingness theory (Baumeister & Leary, 1995), we expected that especially citizens with belongingness needs would experience mental health benefits from meeting these needs due to the formation of new significant relationships: *“Having two as opposed to no close relationships*

may make a world of difference to the person's *health and happiness; having eight as opposed to six may have very little consequence*" (Baumeister & Leary, 1995, p. 520). The data confirmed this theory, but also indicated that citizens who feel that their belongingness needs are already being met may experience benefits from the formation of new positive relationships. Our findings support previous literature showing that fulfilling the need for belonging is but one, albeit deeply significant, mental health promoting aspect of social relationships (also including social support, social influence, role based purpose and meaning etc. (Thoits, 2011)). Used within community services, the findings suggest awareness that providing online opportunities for citizens to connect and form social relationships does not necessarily increase belonging and mental health. The capacity of the web-based platform to support mental health was highly dependent on whether the opportunities it afforded were transformed into positive relational outcomes. In contrast, if a person with needs for belongingness reached out and was rejected, did not receive a response or had otherwise negative relational experiences with the facilitated relationships, then the positive mental health benefits were missed, and negative emotions sometimes arose instead.

The findings further indicate that individuals vary in their ability to transform the opportunities offered by the platform into the formation of social relationships capable of fulfilling their needs for belongingness. Citizens with previous relational difficulties who have struggled to achieve feelings of belonging were found to be particularly disadvantaged in this capacity. It may be important to distinguish between people who experience chronic loneliness (often characterized by poor attachment in early childhood, poor social skills, a strong distrust of others, hostility and negative affectivity and reactivity) and people who experience context-dependent or transitory loneliness in terms of their ability and likelihood to realise the opportunity provided by social technologies to fulfil social needs (Cacioppo & Hawkley, 2005; Nowland et al., 2018). Though lonely people often prefer the internet as a medium for communication, chronically lonely people may be less likely to be able to use technology to fulfil social needs due to differences in internet usage and a tendency to interpret interactions more negatively than others, which can lead to a re-establishment of their lonely position (Cacioppo & Hawkley, 2009; Nowland et al., 2018). Consequently, chronically lonely people may need more support to realise the positive potential of this technology and avoid unintended negative consequences.

The multifaceted recruitment strategy used in the study allowed the empirical data to be purposefully sampled. During the analysis, these data were used to test and refine the interrelatedness of contexts, mechanisms and outcomes posited in the programme theories (Table 2). This enabled us to develop a more nuanced understanding of the different pathways by which the web-based platform worked to promote belonging and mental health, or conversely, led to unintended consequences (Figure 2). Use of face-to-face interviews with users of the platform gave in-depth insights into how the platform's resources were experienced and acted upon. Guided by Pawson & Tilley (1997), consulting the recipients of the web-based platform provided opportunities to drill into the generative mechanisms while diversity in the participant group in terms of individual contexts and experiences with the platform allowed for some comparative examination.

This study is limited to providing a qualitative interrogation of the programme theories based on the participants' in-depth descriptions of their experiences of how the platform had, or had not, helped them to meet their belongingness needs and impacted on their mental health. The results are consistent with previous empirical and theoretical work. Future studies should interrogate the refined programme theories presented in this paper using both qualitative and quantitative methods to shed further light on how web-based initiatives work for different subgroups (e.g. vulnerable target groups, people with mental illness etc.). Since the study took place in only one setting, generalising the results to other settings is challenging. Mechanisms are context sensitive (Astbury & Leeuw, 2010), and we would expect that introducing a similar web-based initiative in a dissimilar contextual setting would generate different outcomes. Nevertheless, we consider the findings to provide valuable inputs to others in comparable contexts who wish to use similar web-based solutions in community services to promote mental health.

In conclusion, the study shows that a web-based platform enabling citizens to locate friends and activity partners can serve as a helpful tool in interventions striving to promote mental health as they may support people in fulfilling their needs for belongingness. However, the impact of such tools is highly dependent on the individual's abilities to use the initiative to form relationships of sufficient quality to accommodate their belongingness needs. Citizens with limited digital literacy and people with relational difficulties who have struggled to achieve feelings of belonging may need assistance to realise the mental health benefits. Therefore, we recommend that future web-based initiatives are used in combination with supportive initiatives (e.g. IT-support and

professional facilitators to facilitate activities and meetings and support citizens in building positive, including, and lasting relationships). Before promoting such initiatives to highly vulnerable target groups, further studies are needed to investigate whether the positive consequences outweigh the negative.

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Table 1: Visualising the evaluation process and data collected for each phase of the study

Phase 1. Development of programme theories	Phase 2. Test of programme theories	Phase 3. Analysis and specification of the programme theories
Data: <ul style="list-style-type: none"> • 4 face-to-face interviews with key stakeholders. • Theoretical literature linking social relationships to mental health identified systematically prior to the evaluation. • Information provided on the webpage of the evaluated web-based platform. 	Data: <ul style="list-style-type: none"> • 24 face-to-face interviews: (1 (club) platform user, 22 (private) platform users, 1 double interview with non-user couple from target group). • 3 face-to-face interviews with key stakeholders. 	Analytical phase.

Table 2: Initial CMOcs developed during Phase 1 including definitions used in this study of CMOc and separately of context (C), mechanism (M), and outcome (O).

Definitions	“(…) a CMOc is a hypothesis that the programme works (O) because of the action of some underlying mechanisms (M) which only comes into operation in particular contexts (C). If the right processes operate in the right conditions, then the programme will prevail.” (Pawson, Ray, 2013:21-22).				
Definitions	Context (C)	+	Mechanism (M)	=	Outcome (O)
Definitions	The conditions and circumstances in which a programme is introduced, and which affect the operation of programme mechanisms (e.g. place, interpersonal and social relationships, biology, technology, economic conditions etc.) (Pawson & Tilley, 2004).		Mechanisms make programmes bring about change. It is not the program that brings about change, but the processes of how people interpret and act upon the resources offered by the program (Pawson & Tilley, 2004). Mechanisms consist of the resources introduced by a programme and the participants’ reasoning (Dalkin, Greenhalgh, Jones, Cunningham, & Lhussier, 2015). M (Resources) + C → M (Reasoning) = O		The intended and unintended outcomes generated by combinations of programme mechanisms and contextual circumstances (Pawson & Tilley, 2004).
CMOc	By increasing the visibility and accessibility of potential social connections and communities (M), the web-based platform encourages municipality citizens (C) to meet their needs for belongingness thus supporting mental health (O).				
CMOc	By providing an opportunity for citizens to make contact and communicate with others online (M), the web-based platform encourages citizens who experience difficulties with face-to-face communication (C) to reach out to others to meet their needs for belongingness thus supporting mental health (O).				
CMOc	Platform users who are already well enmeshed in social relationships (C) may be less likely to use the platform to search for new social relationships (O) compared to users with limited social networks (C1) due to the experience of saturated needs for belongingness respectively versus unsaturated needs (M). In line with that, the formation of new social bonds facilitated by the platform may have less impact on mental health (O) to the group of users who are already well enmeshed in social relationships (C) compared to users with limited social networks (C1) due to differences in belongingness needs (M).				
CMOc	Older citizens (C) may, compared to younger citizens (C1), be less likely to use the platform to meet their needs for belongingness to improve mental health (O) due to lack of experience with digital communication technologies (M).				
CMOc	If citizens with needs for belongingness (C) reach out to other users in the platform without success (e.g. if not responded by others or socially rejected) (M), then belongingness needs are thwarted and negative mental health effects may occur (O).				
CMOc	Citizens with prior experiences of social exclusion (C) may be disadvantaged in terms of benefitting from the platform’s resources to meet their needs of belongingness (O) compared to other citizens (C1) due to challenges in terms of establishing new social bonds (M). Negative mental health effects may occur (O).				
CMOc	If contacts facilitated by the platform between users with needs for belonging (C) develop into longer term relationships with frequent interaction perceived by users as temporally stable and enduring, positive/free of conflict, and accepting (M), then these relationships will promote belonging and mental health (O).				
CMOc	If contacts between users (C) facilitated by the platform develop into negative relationships (characterized by				

feelings of lack of acceptance, conflict, unsupportive behavior etc.) (M), then these contacts and relationships will not meet belongingness needs and may cause negative mental health effects (O).

Table 3: Overview of characteristics of participants interviewed for phase 2

	Gender	Age	Employment/education	Experienced mental health problems or lack of thriving	Looking for at the web-based platform
1	Female	25-30	Working	-	Social network locally, company for a specific activity.
2	Male	15-20	Student	-	Meeting new people outside school
3	Female	55-60	Sick leave	Yes	Friends and acquaintances
4	Male	25-30	Working	-	Expand social network with new acquaintances
5	Male	55-60	Disability pension	Yes, major problem	Girlfriend
6	Female	10-15	Student	Yes	Friendship
7	Male	30-35	Working	-	Friends and acquaintances
8	Female	50-55	Disability pension	Yes	Close friend
9	Male	50-55	Unemployed	-	Friendship
10	Female	35-40	Working	-	Only orientated herself within the platform
11	Female	15-20	Student	Yes	Friendship
12	Female	45-50	Disability pension	Yes, major problem	Friendship - close relationships
13	Female	20-25	Unemployed	Yes	Friendship
14	Female	30-35	Unemployed	Yes	A place to present herself
15	Female	70-75	Pension	Yes	Only orientation herself within the platform
16	Female	25-30	Maternity leave	Yes, previous major problem	Friendship
17	Female	15-20	Student	-	Friendship, learn language
18	Female	60-65	Disability pension	Yes	Company for a specific activity
19	Female	50-55	Working	-	Company for at specific activity
20	Male	30-35	Working	-	Join a group
21	Female	20-25	Without employment	Yes	Volunteer work
22	Female	35-40	Student	Yes	Friendship
23	Couple	70-75	Pension	-	No usage

	(man and wife)				
24	Club	-	-	-	Attracting new members
F	Stakeholder	-	Municipal IT-communicator	-	No usage
G	Stakeholder	-	Initiative stakeholder	-	No usage
H	Stakeholder	-	Municipal health coordinator	-	No usage

Figure legends:

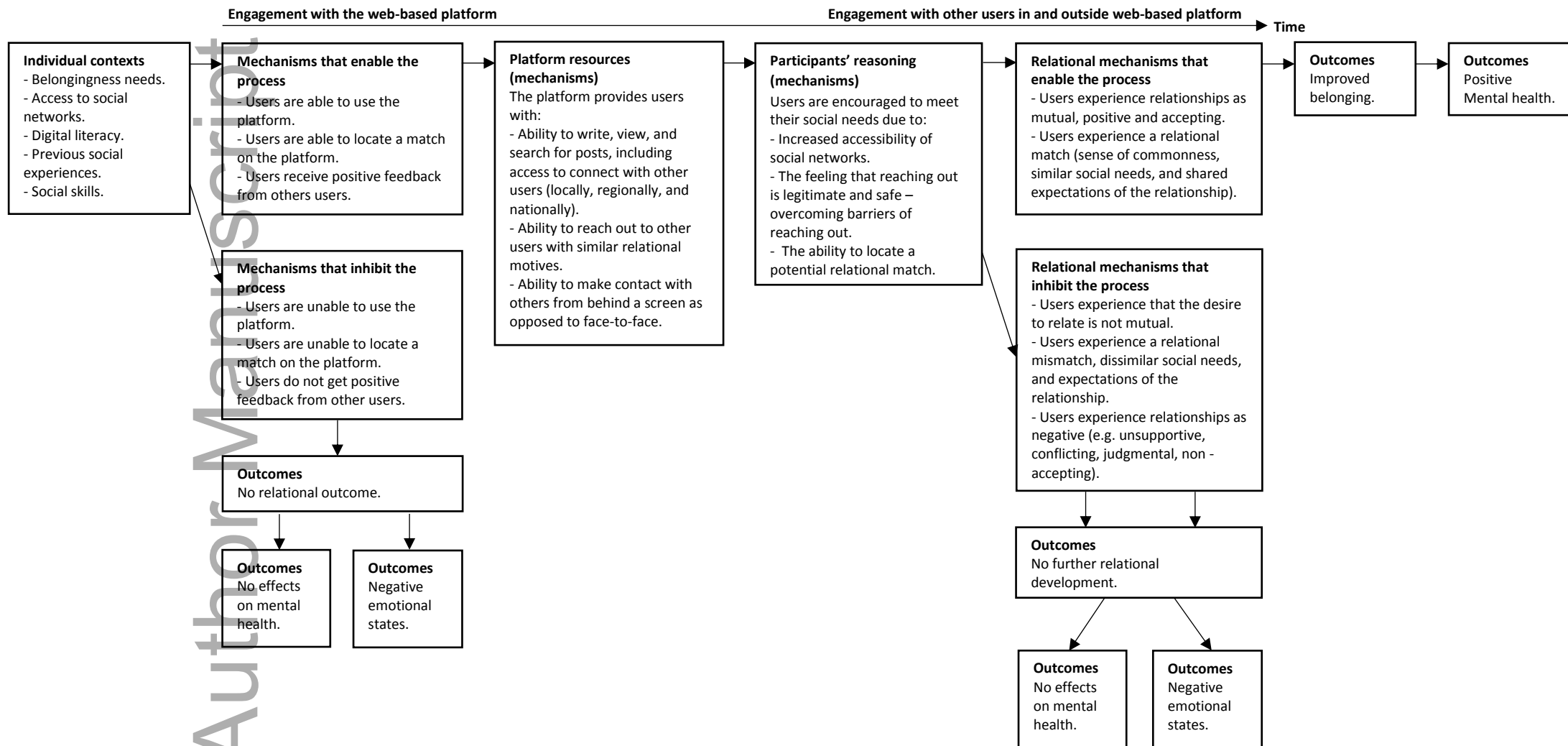
Figure 1: Visualising the multifaceted strategy used to contact participants for phase 2.

Figure 2: Process illustration with contexts, mechanisms and outcomes that visualise the participant's various paths from the moment they enter the web-based platform until the achievement of different relational and mental health outcomes.



† The number of participants recruited via this strategy.

‡ Information on the project was provided on the web-based platform, in monthly emails distributed to users of the platform, and on a Facebook site administered by the municipality.



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