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Design lessons

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eHealth WhatsApp for social support: design lessons

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Abstract: WhatsApp was evaluated as group support tool for a high impact healthy lifestyle intervention, with 11 young professionals. Users valued the WhatsApp group as an attractive social support addition to the existing eTools and personal coaching. Based on preliminary results: 1) the WhatsApp group generated higher participation than most other social media; 2) deploying social media use motives; 3) possibly due to the relatively high 'presence' and 'engagement' attributes of WhatsApp; 4) contributing to healthy behaviours and health advocacy. Peer coaching was confirmed as promising. However, participation declined after the initial weeks. A design lesson was that users wanted more support for community forming. Several improvement suggestions are provided.

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1 Introduction

In this section, we introduce the relevance of social and affective group support in health interventions. In academic thinking, like the health action process approach (HAPA) model (Schwarzer, 2008; Lippke et al., 2009; Wiedemann et al., 2011) and i-change model (De Vries and Mudde, 1998), as well as in the design of eHealth solutions (Simons and Hampe, 2010a), the initial focus often tended to be largely aimed at the functional level. For example, three health behaviour improvement phases that are often mentioned in this line of thinking are: firstly raising health awareness, secondly developing intentions and making plans, plus thirdly implementing health behaviours (including coping, experimenting, improving, sustaining). Thus, health behaviour improvements appear to revolve around setting goals and achieving them.

However, in working with type 2 diabetes mellitus (DM2) patient groups over the past years, we observed multiple user needs and behaviours regarding affective social group support. For example, in the short term of making the first twelve weeks of healthy lifestyle improvements, patients saw each other three times per week for physical training, but they also used that time for sharing experiences, exchanging ideas, showing how well they were doing (or not), celebrating successes and making fun of each other (Simons et al., 2016, 2019). And in the longer run (50 weeks), even though the collective training was over, the group spontaneously organised to continue seeing each other once every month (Simons et al., 2017a, 2019). This triggered us to think how we could provide a more continuous, omnipresent support on the emotional- and group level?

However, regarding technology use, several patient groups tend to be relatively ICT-illiterate and/or even have an ICT-aversion. Still, smartphones are ubiquitous now in the Netherlands, as are messaging and the sharing of photos and videos. Thus, a WhatsApp group was chosen as support tool for an explorative pilot study, being a low-tech, low-threshold and omnipresent technology with social media benefits (Schulz, 2014). In order to test robustness across user groups, this study focuses on preliminary results from a healthy lifestyle group of young professionals.

The WhatsApp group is offered as a voluntary addition to an existing eSupported health coach program, comprising of a personal coach plus multiple eHealth tools described elsewhere (Simons and Hampe, 2010b; Simons et al., 2014, 2016). The pre-existing eSupport has a rather functional focus: aimed at diagnosis (health

behaviours, levels of physical and mental health), health awareness and -literacy, experimenting with new health behaviours, plus fitting them to personal preferences and agendas. Also, the focus is largely on the individual and his/her family. The question in this explorative pilot study is whether the WhatsApp group offers emotional – and group level support.

A special challenge is the degree of participation; in other social media settings over 90% of users only consume, but do not participate in the sense of providing responses or inputs (Nonnecke and Preece, 1999).

1.1   Research question

- Does the WhatsApp group have added value by harnessing social motivators (like connecting with each other, sharing experiences or showing your best) and affective motivators (like pride, having fun, encouragement or compliments)?

2   Theory

In this section, we discuss literature on social media and peer support for groups and health behaviours. Interesting article overviews in this field are provided by Kamel Boulos et al. (2016) on WhatsApp use studies for health, by Regmi et al. (2017) on mobile app and WhatsApp uses focusing on smoking cessation, and by Kulyk et al. (2014) focusing on apps using social, functional and affective cues for healthy lifestyle coaching and serious games. One of the more promising studies (Cheung et al., 2015) showed that WhatsApp group support was more effective than Facebook or a control condition for stimulating smoking cessation. However, another study (Muntaner-Mas et al., 2017) showed that WhatsApp support was less effective than face to face coaching. This latter finding is rather relevant for our study, since face to face coaching (plus various eSupport tools) are the base line condition in our current study, where we seek to find additional support value for participants by adding a WhatsApp group to the overall support portfolio. A second limitation from existing studies for our research question is that generally the relative contributions of the functional versus the affective/social support value remain implicit and unclear (Lehto et al., 2013; Ricciardi et al., 2013). A third limitation from existing studies is that they largely focus on health support from professional moderators or coaches. In this study we have an additional goal, inspired by resilience literature (see below): to foster peer coaching.

Table 1   Service design goals of WhatsApp group, added to eSupported health program

1	Health identity/efficacy	2	Peer advocacy	3	Social support motives
A	Showing my best and celebrating progress.	A	Healthy diet.	A	Asking/giving practical support.
B	Learning how health behaviours work for me.	B	Physical activity.	B	Asking/giving affective support.
		C	Mental energy.	C	Fun and humour.

As explained in the introduction, we focus in this paper on the *social and affective support that the WhatsApp group may add* to the functional health support existing in the eSupported health program. While using a persuasive technology approach (Fogg, 2002, 2009; Ghorai et al., 2014; Hamari et al., 2014) to stimulate healthy behaviours, there

were three types of service design goals present in this pilot study, which we describe below, see also Table 1.

First, the overall purpose of the eSupported health program is promoting long term (>12 months) healthy patterns. Thus the focus in not on short term dieting or exercise activities, but on developing a health identity (including health perceptions and habits) which supports long term health behaviours (see also Simons et al., 2015 for a more detailed explanation of the health competencies that almost 'automatically' contribute to long term health). One of those long term fundaments is developing a positive health identity (including self-norms, health literacy and -beliefs). One type of digital behaviour that can often be seen in social media like in Strava or Runkeeper apps (Simons et al., 2012, 2013, 2014), as well as Facebook, WhatsApp or YouTube (Khan, 2017; Bitter et al., 2014) is 'showing my best' and encouraging/supporting each other in that behaviour. In social media the underlying motive for posting contributions is often called 'self-status seeking' (Park et al., 2009; Khan, 2017), but it is also similar to health-related feeling good about yourself (Fuhrman, 2005), becoming a better person (Paffenbarger and Olsen, 1996) and developing friendship and pride (Reiss, 2004). The next type of health identity behaviour has to do with 'becoming *your own version* of a healthy person'. In the first experimentation weeks of the program, it is important to explore which health behaviours fit your personal preferences, as well as your social- and agenda-contexts (Simons et al., 2017b). This has to do with self-efficacy (Lippke et al., 2009; Schwarzer et al., 2010): mastering and internalising health competencies to such an extent that they become increasingly 'fluent' and that participants increase self-confidence. In this 'learning to understand how health behaviours work for me' phase, see Table 1, it helps to exchange ideas and share examples with others.

Second, the WhatsApp group pilot had the service design goal of fostering peer coaching via advocacy for three domains of health behaviours: healthy diet, physical activity and mental energy, see Table 1. These are also the health domains that are the focus of the eSupported health program. A mechanism making this peer coaching goal especially interesting for us, is something we observed in previous groups (Simons et al., 2016, 2017a) as well as in 'super-survivor' roles in resilience literature (Southwick and Charney, 2012). In this resilience literature, three levels of competence are distinguished, with thus two possibilities to step up. First, people can move from low levels of [health] competence and self-efficacy (on occasion 'falling *victim*' to the effects of ineffective behaviours and coping styles) to the middle level of '*survivor*' where competence and coping levels are quite adequate. But the most interesting step is when previous 'victims' become 'super-survivors' (Southwick and Charney, 2012), teaching others how to grow. In this process they use their own victim pitfalls/experiences as assets to better understand, empathise with and coach others. When certain people in a health group become 'super-survivors' this is a win-win: it further stimulates their own health identity and it provides additional support and inspiration for the other groups members. Conceptually, super-survivors can be seen as a strong form of advocates, role models, or peer coaches (Prochaska and Velicer, 1997; Southwick and Charney, 2012; Thom et al., 2013). On the level of motivators this connects well to the lessons from positive psychology (Seligman, 2012): 'helping others' as a strong intrinsic motivator, leading to a sense of purpose, emotional gratification, plus an interconnectedness which facilitates social exchange and personal growth.

The third design goal of the pilot is to support social interaction motives and use them to stimulate a healthy lifestyle. When looking at the user motives from the uses and gratifications theory (UGT) of social media research (McQuail, 2010; Khan, 2017), the 'Self-Status Seeking' motive was already addressed with motive 1A, showing my best. Next, there are two rather functional UGT motives: 'giving information' and 'seeking information.' In the context of a health intervention, this generally means asking and giving practical information, see motive 3A in Table 1. Next, there is the 'social interaction' motive, in this context of health support, taking the form of asking and giving affective support and feedback, see motive 3B. Finally, there is the 'entertainment' motive, see 3C 'fun and humour' inputs listed in Table 1. In the next section, we explain how we use the design research approach in this pilot study.

3   Methods and materials, including intervention

In this section we first discuss our design research approach and explorative pilot study. Next, we discuss how the WhatsApp group intervention fits in the overall health intervention that is offered. Regarding our design research approach, we follow the design cycle of Vaishnavi and Kuechler (2004): from problem awareness and solution suggestion to development, evaluation and conclusion, see Figure 1.

Figure 1   Design cycle knowledge via design iterations and evaluations
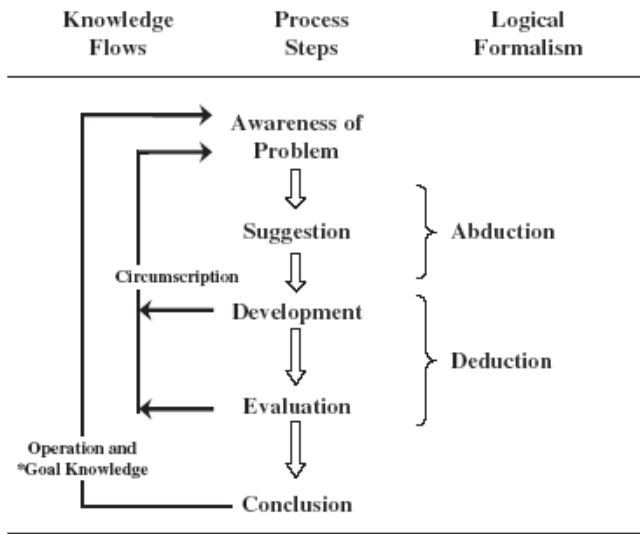
Source: Vaishnavi and Kuechler (2004)

Our research method follows three steps:

a   As 'awareness' and 'suggestion' steps: formulate possible social and affective WhatsApp user contribution motives that suit the design goals of the WhatsApp pilot (this step follows solution suggestions in the abduction step of Vaishnavi and Kuechler; this study does not test the underlying assumptions, but takes them as a stepping stone: Section 2).

b   As 'development' and 'evaluation' steps: adding the WhatsApp group support pilot to existing eSupported health program, plus evaluation: quantitatively based on numbers of user inputs per design goal, plus qualitatively, based on user feedback (deduction step of Vaishnavi and Kuechler: Section 4).

c   As 'conclusion' step several design lessons are drawn, for practice and theory, see Section 5.

At the end of January 2018, a group of 15 employees from academia started with an eSupported healthy lifestyle program. On their start day, 11 of them volunteered to participate in the WhatsApp group support pilot, after reading the pilot study information and signing consent forms. They were a highly international group of scientists (China, Italy, Latin America, Netherlands, South-Africa, Ukraine, Greece, Iran, India) from different disciplines at the Delft University of Technology: postdocs, tenure trackers, assistant professors and the majority were PhD candidates. A first important characteristic of this group is that they are very time-constrained. They experience a high work load (as confirmed with intake surveys) and only want to spend time on (health- or other) activities if they are deemed useful for their performance as professionals. Secondly, the majority of them are young professionals, in their first or second job, and relatively unexperienced in managing work-life balance or ensuring healthy choices. It is not uncommon in this group to observe unhealthy belief/behaviour patterns like: 'I am not productive enough → I will skip my breaks → I lack energy → I need more sugar'. Or sacrificing sleep, or exercise, or socialising, for the sake of working longer hours. Or other unhealthy 'corporate athlete' (Loehr and Schwartz, 2001) patterns. Thirdly, 80% of participants had a mental health score (RAND-SF8) (Ware and Gandek, 1998) below the overall Dutch average (for all age groups combined), even though their average age was below 35 years old. Thus a 20% mental health score below average would have been more appropriate instead of 80%.

During the pilot, running until July 2018, all WhatsApp user inputs are anonymised, counted and clustered based on their contributions to the design goals. Two of the authors conducted the clustering independently and then discussed results in order to reach unanimous scores. Besides the user inputs analysis, subjective user evaluations are collected. We asked them to evaluate WhatsApp group contributions to the design goals (5-point Likert scale, plus explanations, extracted during telephone interviews). This paper compares the preliminary results in February (Simons et al., 2018), based on the first two weeks of the pilot, with the longer term results until July.

The WhatsApp group support pilot is added to an existing eSupported health program, which combines coach sessions with electronic dashboarding and self-management, plus electronic health tips and a digital health quiz game. Key functionalities are (Simons and Hampe, 2010a; Simons et al., 2014, 2015):

• a personal online health dashboard with graphs of progress towards adherence targets on the various health behaviours

• automated feedback on lifestyle aspects where positive scores have been achieved (nutrition, physical activity, stress management or an overall score)

• (Tele)coaching by a health coach, generating online coach reports on progress towards adherence targets in the personal dashboard

- options to ask questions to the coach: via messaging within the dashboard or via email

- online schedule indicating upcoming events: group sessions, individual coach sessions (when and where), physical measurements, surveys

- a micro-learning health quiz accessible via smartphone, mail and/or web

- reading materials in the mail

- weekly tips via email on health, motivation and self-management

- besides individual coaching, group sessions are also used in order to stimulate group support, mutual inspiration and encouragement, plus peer education.

4   Results

In this section we discuss the preliminary results of the first two weeks of the pilot in February, compared to the follow up period until July 2018. Besides the WhatsApp group activity, participant activities in the rest of the eSupported health program were: a full day workshop at the start, intake interview and questionnaire, using the health quiz and other eTools, and an individual health coach session in the first week after the start workshop. These participant activities were conducted alongside their busy jobs.

Figure 2   WhatsApp user and coach inputs in weeks 1 and 2, on the service design goals (see online version for colours)
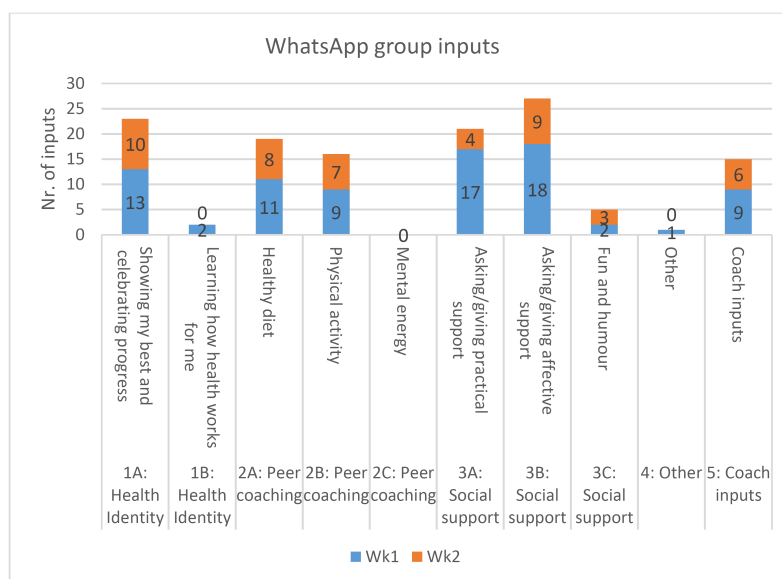
With this group of n = 11 participants, 81 inputs in total were collected in the first two weeks, of which 15 coach inputs (who were part of the WhatsApp group to help the group along) and 66 participant inputs. In the follow up period 47 inputs were collected. Some inputs qualified for more than one goal, hence the sum of scores are higher, see

Figures 2 and 3. The first cluster, 'showing my best and celebrating', of the first design goal (fostering health identity and literacy) received relatively many inputs (n = 23 and n = 12 for the first and the follow up weeks, respectively). Regarding the second design goal (peer coaching and advocacy), the first two clusters ('healthy diet' and 'physical activity') received n = 19 and n = 16 inputs respectively in the first weeks, versus n = 7 and n = 8 in the follow up weeks. This contrasts with the 'mental energy' topic which received none. This is quite a paradox in comparison with their mental energy challenges (see Section 3); a paradox which we address in the discussion section. The third design goal of social support received respectively: n = 21 (start) and n = 4 (follow up) practical support inputs, n = 27 (start) and n = 5 (follow up) affective support inputs, plus n = 5 (start) and n = 0 (follow up) fun inputs. This suggests a tentative 'yes' on the social and affective support goals of the research question.

Figure 3 WhatsApp user and coach inputs, follow up weeks, on the service design goals (see online version for colours)
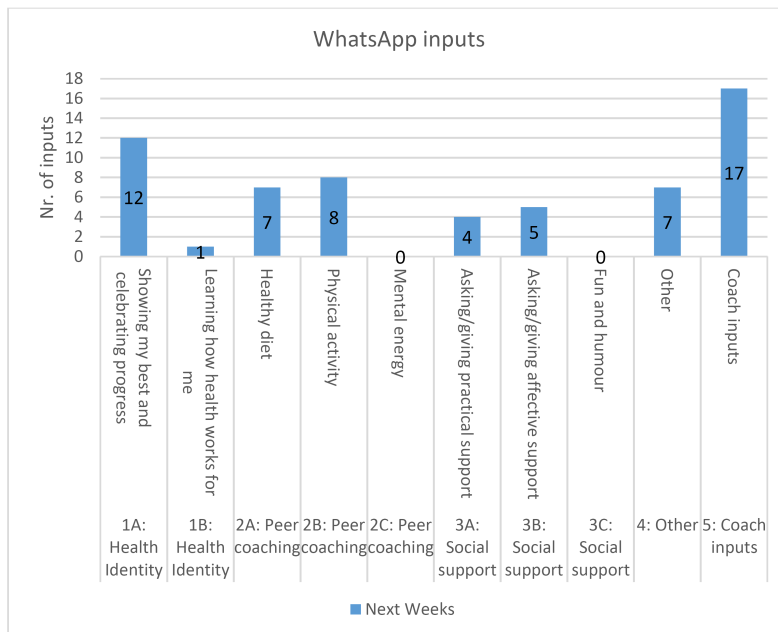
Figures 4 and 5 display the distribution of inputs across participants. To illustrate the types of inputs provided, see Figure 6. As often with social media inputs, the distribution is highly skewed (Nonnecke and Preece, 1999). In the start weeks, one participant generated n=29 inputs and three participants inputted less than two. These three participants were the only Chinese participants in the group, see also the Discussion section. In the follow up period (Figure 5), we see shifts in who are more or less active in the WhatsApp group. Two of the initially most active participants (no. 1 and 3) were much less active in the follow up weeks, since they were least satisfied with the reciprocity of inputs they received back from the others in the App group. However, some of the ones that were initially less active, generated more inputs in the follow up weeks.

Figure 4   WhatsApp input distribution across participants, weeks 1 and 2 (see online version for colours)
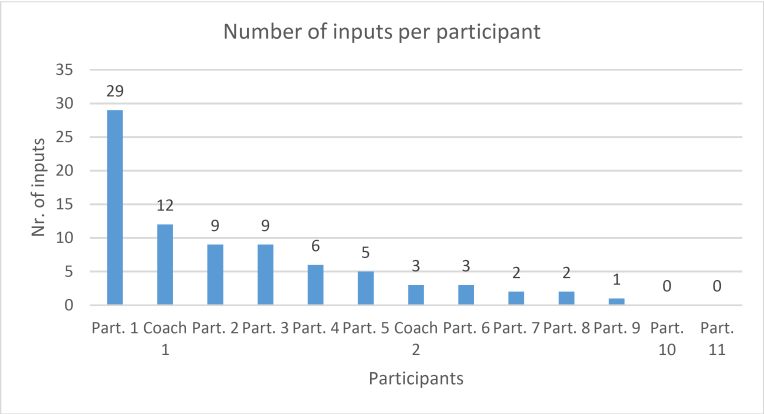

Figure 5   WhatsApp input distribution across participants, follow up (see online version for colours)
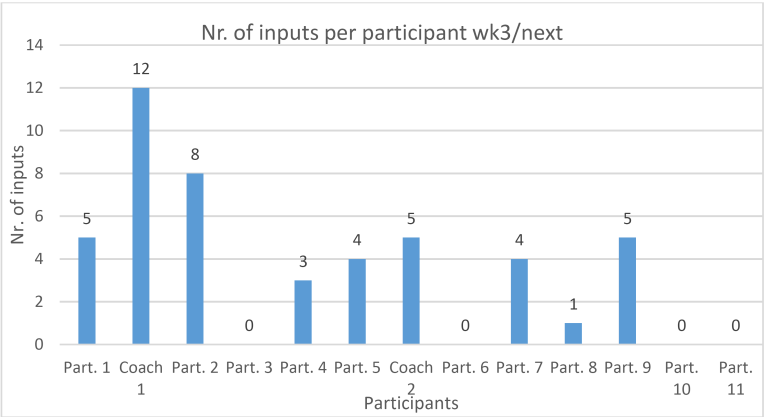

Figure 6   WhatsApp input examples (anonymised) (see online version for colours)

Table 2   User evaluations

User evaluation questions, weeks 1 and 2, (and follow up), n = 7	*Average (3 = neutral)*
1 Helped me develop my health identity?	3.3
• Two disagree, because already developing health identity.	
• Three agree, because of continuous reminders it provides.	
• (Lower satisfaction at follow up due to declining usage.)	(2.6)
2 I am glad with the peer support?	3.7
• Two disagree, the two advocates giving most inputs: 'more giving than getting'.	
• Others agree.	
• (At follow up, four are happy with the peer support, but two strongly disagree.)	(3.0)
3 Helped me with group advice plus encouragements?	**4.4**
• (Strongly) agree, due to constant reminders, awareness, encouragements.	
• (At follow up, mostly the initial degree of interaction was appreciated.)	(3.4)
4 Helped me by sharing our examples?	3.9
• Mostly agree, due to inspiration from the diversity of inputs. The photos help.	
• (At follow up, the sharing of food and sports examples was deemed interesting.)	(3.4)
5 The WhatsApp group adds value?	**4.7**
• Agree: "Really different from the eSupported coaching: it gives more continuous encouragement, plus visual inspiration. More open, less hierarchical."	
• "WhatsApp is ignored less than mails, apps or internet dashboard."	
• "Potential could be used more: with more start day group interactions and some more coach contributions in the WhatsApp."	
• (At follow up, the potential was valued. Still, the group normally does not meet each other and no real (sense of) community was formed. More community building would have been appreciated by six of the seven respondents.)	(3.4)

Notes: 5-pnt Likert: strongly disagree (1)–strongly agree (5). >4 = bold.

The final study results stem from the user evaluations, see Table 2 for the initial user evaluations (*and in italics for the follow up period, when usage was lower*). The first design goal of developing a health identity is least recognised at start and follow up: in their opinion this is already covered (possibly due to the start workshop and eSupported coaching, which has health identity development at its core?) The second goal of developing peer coaching by having participants share their examples, is recognised to some extent. However, question 2 on happiness with the degree of peer support received, illustrates the uneven roles and inputs: the two most-contributing participants are the ones least satisfied with the degree of peer support they received. The third design goal

regarding advice and encouragement from the group (questions 3 and 4), was highly recognised. As well as the overall added value of the WhatsApp group on top of the other eSupport tools, see evaluation question 5. On the one hand WhatsApp as a medium is ignored less than mails, apps or internet dashboard. And on the other hand, the WhatsApp group support gives more continuous encouragement, plus visual inspiration. It is perceived as more open and less hierarchical.

5   Discussion: implications for practice

This section discusses implications for practice. As a first implication for practice, it is nice to conclude that this WhatsApp group pilot initially generated higher degrees of participation than many other social media settings (often more large-scale and 'feeling' more anonymous like on YouTube) with their 90% passive viewers (Nonnecke and Preece, 1999; Sun et al., 2014; Khan, 2017). This is possibly due to the relatively high 'presence' and 'engagement' attributes of WhatsApp, as reported back by our participants. The three Chinese participants did not contribute much, as also addressed regarding Figure 4. We learned that WhatsApp is not available in China, thus it is not a usual (much less an omnipresent) communication channel for them, even when living abroad.

As a second implication for practice, we observed that the amount of user inputs declined significantly after the initial two week, meaning that this pilot was also vulnerable to the eHealth law of attrition (Eysenbach, 2005), which states that the majority (80-90%) of initial eHealth tool usage is likely to be lost after several moments of usage, often within a period of several weeks. Answers of participants to follow up evaluation questions indicated that the majority of participants liked the initial inputs and WhatsApp group process, but that not enough group or community feeling was formed, leading to a decline in WhatsApp group activity levels. Participants provided several suggestions for improvement, which will be included in our next steps (see section 7).

Table 3   Summary of WhatsApp group support for service design goals (author opinions)

Service design goals		Support, affective?	Support, utilitarian?
1	Health identity/efficacy		
	A Showing my best and celebrating progress.	Yes?	
	B Learning to understand how health behaviours work for me.		No
2	Peer coaching/advocacy		
	A Healthy diet.	(Some)	Yes
	B Physical activity.	(Some)	Yes
	C Mental energy.		No
3	Social support motives		
	A Asking/giving practical support.		Yes
	B Asking/giving affective support.	Yes	
	C Fun and humour.	Yes, some	

As a third implication for practice, looking at the type of added value that users experienced, the WhatsApp group appears useful for affective and social support. Combining the quantitative and subjective results from the previous section, we tentatively summarise in Table 3 the WhatsApp group contributions to the three service design goals of the pilot. And given our research question regarding possible affective contributions (in addition to the more utilitarian eSupported coaching), we made this distinction explicit in columns 2 and 3.

For the first design goal of promoting health identity and efficacy we found an interesting paradox: even though 1A, 'showing my best and celebrating', received n = 23 and n = 12 inputs, our pilot participants did not perceive clear contributions to developing their health identity. Given their own explanations (see previous section), we conclude that the perceived added value on top of the eSupported coaching was limited for this goal. Maybe the 'showing my best' inputs do hardly contribute to developing a health identity? Plus, we cannot conclude at this point what the subconscious effects are of the positive behaviour reinforcements from these n = 23 plus n = 12 'celebrations'? Hence the tentative 'Yes?' for 1A in column 2: it is an affective form of group support, but maybe hardly contributing for its service design goal.

For the second service design goal of supporting peer coaching and advocacy, we found that most remarks on healthy diet (2A) and physical activity (2B) had a practical/utility focus. Still some of the inputs were more affective encouragements, hence the '(some)' in column 2. Unfortunately, regarding 2A and 2B, there is uneven reciprocity: the two most-contributing participants are the ones least satisfied with the degree of peer support they received: they gave more than they got. The other group members were more satisfied with the peer coaching they received. Finally, no mental energy (2C) inputs were shared. This is likely due to at least two reasons: firstly, diet and exercise are 'safer' topics. And secondly, mental energy becomes a more prominent topic in the second month, and this topic never came to flourish in the WhatsApp group, since the degree of app usage was already decreasing by then.

With regard to the third design goal of social support and interactions, both the practical and the affect support examples were amply present, as well as a few examples of humorous inputs. This coincides well with the user evaluations of the attractiveness and added value of the WhatsApp group support.

6 Discussion: limitations and implications for theory

This section addresses academic contributions of this study, including limitations and implications for theory. Limitations of this study are the small scale (n = 11), plus the preliminary nature of the results (week 1 and 2, versus half year follow up). Usage and contribution patterns declined after the initial weeks, partly due to limited reciprocity in the group (two participants adopted an advocate role and contributed relatively many inputs in the first weeks, but felt disappointed by lack equal response or inputs from the rest of the group, so they withdrew somewhat). Given the small scale, we are also not able to correct for cultural differences in the group. Also, theory testing is out of the scope of this explorative study. Finally, the added value that participants perceive, is an added value relative to the existing eSupported health coaching, which makes users' added value perceptions harder to objectify.

A first lesson for theory might be that part of the motives we observed for participation were similar to the motives from the uses and gratifications framework of social media research (McQuail, 2010; Khan, 2017), but that the relatively high 'presence' and 'engagement' attributes of WhatsApp, plus the fact that a relatively small scale group setting is used, creates higher degrees of participation and contribution than seen in most social media settings.

Second, given that health behaviours are also driven by intrinsic motivation, two types of motivators for contributing inputs seem to exist that might exceed the Uses and Gratifications framework. On the one hand, 'self-status seeking' does not seem to cover all the relevant motives for 'showing my best'. Regarding health, 'showing my best' also harnesses motivators like a health-related 'feeling good about myself' (Fuhrman, 2005), 'becoming a better person' (Paffenbarger and Olsen, 1996), developing pride and celebrating successes (Reiss, 2004). On the other hand, 'helping others' as a prime motivator appears to be rather implicit in the Uses and Gratifications framework. Still, as Seligman (2012) and others from positive psychology have indicated, helping can be part of our prime motivators. Which is also visible in the 'super-survivor' motives from resilience literature (Southwick and Charney, 2012). In other words, people seem to intrinsically enjoy performing advocacy and peer coaching roles. So out initial results regarding the 'super-survivor' or advocate roles look promising, but more research is needed how to translate these opportunities into active behaviour and role patterns.

A third set of lessons regards the three drivers from persuasive technology (Fogg, 2009): firstly, the WhatsApp group provides regular triggers that participants are unlikely to ignore. Secondly, in terms of simplicity: it is very easy to contribute. Sometimes it is even more difficult not to respond (being socially deviant) than to respond, given the social reciprocity in the group. And thirdly, regarding motivators: most uses and gratifications from social media are present (social interaction, giving information, seeking information, self-status seeking and entertainment), as well as affective encouragements and receiving practical suggestions even when not explicitly asking for or seeking information.

7   Conclusions

This section focuses on the main conclusions, plus on the next steps following this study. A main lesson from this study may be that a WhatsApp group is a low-cost, low-tech, low-threshold way for peer group support, on top of more functional forms of care or coaching. Still, even though the number of coach inputs is modest, it is vital that an expert coach is present in the group, to:

a   ensure the quality of advice and discussions

b   catalyse group interactions

c   ask certain users for help as health advocates in the group, based on their affinity

d   ensure that help is always given to participants when they need it.

The concept from resilience literature about peer coaching by 'super-survivors' was confirmed as promising. However, participation declined rapidly after the initial weeks; users indicated they did not become a real community. Next steps will be to conduct a

follow up pilot study where we train participants in their peer coach roles, foster more cooperation and community forming by assigning tasks to subgroups, plus invite inputs to news/topic feeds from the coaches.

Acknowledgements

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