

The convergence of mobile and social media: Affordances and constraints of mobile networked communication for health workers in low- and middle-income countries

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Abstract

The increasing convergence of mobile and social media is highly transformational because it is shifting the dominant form of digital communication from bilateral towards mobile and networked communication among distributed interactants. This paper explores the affordances and constraints of this dynamic for global health in low and middle income countries (LMICs). In these settings, research and practice have focused on one- or two-way communication designs and on approaches that position health workers as passive actors. To extend current views, three domains of mobile social media usage are theorized: (1) socio-cognitive learning; (2) Socio-cultural professional participation; and (3) Concertive peer and multi-stakeholder control. The theoretical discussion is illustrated with empirical examples from a non-systematic literature review to account for the wide and interdisciplinary problem space.

In the second part of this analysis, suggestions are discussed regarding how to anchor and facilitate mobile social media spaces within existing institutional structures. Finally, this paper argues that leveraging the affordances of mobile social-media-based communication requires the consideration of several constraints and challenges, including the economics of participation, privacy and surveillance, regulation and information quality, equal socio-cultural participation and technical competencies and professionalism.

Keywords: mobile phone; mobile communication; social media; social networks; LMIC; health; m-health

Overview and rationale

Users increasingly access social media, and in particular social network sites, by means of mobile devices such as smartphones or tablets. This media convergence culminates in what this paper describes as 'mobile social media'. It is a highly transformational development because it is shifting the contemporary mode of digital communication from bilateral to networked communication among distributed and mobile interactants. This paper examines the resultant affordances and constraints of mobile networked communication for health workers in low and middle income countries (LMICs). It is argued that in these contexts, and in particular in the field of 'mobile health' (mHealth), research and practice have focused on one-way or two-way communication designs and on technological approaches that place health workers in the role of passive recipients. To expand these perspectives, this paper discusses three domains of mobile networked communication: (1) socio-cognitive learning; (2) Socio-cultural professional participation; and (3) Concertive peer and multi-stakeholder control. Drawing on this analysis, practical suggestions are made regarding how to anchor mobile social media spaces within existing institutional structures. To counter techno-optimistic views, challenges and constraints associated with the adoption of mobile social media are outlined in the final part.

The theoretical analysis is illustrated with empirical studies. To integrate research in this wide and interdisciplinary problem space and to account for different theoretical strands, the literature was reviewed selectively and non-systematically (Cook & West, 2012). That means that the authors make no claims of the comprehensiveness of a systematic literature review. Instead, the main contribution of this article is conceived to be the integration of theoretical tenets from various social science fields with empirical findings as an attempt to conceptualize the emerging phenomenon of mobile networked communication for health workers in LMICs and to add widely neglected perspectives to the field of mHealth.

Background

The convergence of mobile and social media

The growing ubiquity of cell phone usage is associated with the increasing adoption of social media. For example, 40% of cell phone owners in the USA use a social network site on their phone, 28% even on a daily basis (Pew Research, 2015). Reflecting this media convergence, social and educational researchers have started paying analytical attention to this emerging phenomenon—a development that allows for multilateral networked communication (Pachler, Ranieri, Manca, & Cook, 2012). Cook et al. (2013) discuss, for example, how the use of social networking technologies on personally owned mobile phones can facilitate equal access to cultural resources, including health information. Popular examples of social media are social network sites such as Facebook, for personal communication, and LinkedIn, for professional networking. All these tools provide specific apps for mobile phones. Social media, particularly social network sites, allow users to take more active roles by, for example, generating instead of exclusively receiving messages (Kamel Boulos & Wheeler, 2007) to engage in multidirectional communication, to construct profiles and to build and maintain relationships. Social network sites place individuals at the center of their personal and social relationships. These sites are thus considered to reflect social dynamics better than previously popular online communities that focused on specific themes (Boyd & Ellison, 2007).

Mobile social media in LMICs

The potential of mobile social media is deemed to be especially relevant in LMICs because people rely to a lesser extent on formal institutions than on informal networks consisting of friends and family. Social media can mirror these pre-existing dynamics of social relationships. In addition, its use is specifically facilitated by the proliferation of mobile phones (Kolko, Rose, & Johnson, 2007). On average, developing countries are expected to have a cellular penetration of 90% and to host more than half of the world's 2.3 billion mobile-broadband subscriptions (ITU, 2014). This development is underpinned by another recent study from seven sub-Saharan African nations revealing that approximately two-thirds of all adults own a cell phone, and in South Africa and Nigeria cell phones are as common as in the USA (PewResearchCenter, 2015). In these settings mobile broadband is important because the internet is primarily accessed through mobile devices. For example, in Kenya, 99% of internet access is through mobile devices. The decreasing prices of smartphones (GSMA, 2012) and the demand for social network sites, such as Facebook, reportedly drive the adoption of mobile phones and mobile broadband internet (Mims, 2012). This development is further fueled by the fact that social media is no longer restricted to smartphones but is accessible on simple cell phones, for example, by means of 'Facebook SIM' or 'Facebook Zero' (Wasserman, 2011).

Mobile social media for health workers in LMICs

The use of mobile phones is expected to have considerable potential for health workers in LMICs. In these settings, health personnel commonly lack access to information and knowledge (Pakenham-Walsh & Bukachi, 2009) and to professional communities. The latter constraint signifies that health workers, in particular in rural areas, tend to work in professional isolation (WHO, 2010). The mobile phone is often the only digital tool to support their work (Crow et al., 2012).

Recent mHealth reviews have broadly analyzed the potential that mobile phones can provide to support health workers in LMICs. The evidence base for this emerging field is still described as weak, with predominantly descriptive, small-scale study designs, poor documentation (Braun, Catalani, Wimbush, & Israelski, 2013; Deglise, Suggs, & Odermatt, 2012; Mechael et al., 2010) and inconsistent reported outcomes (Chib, van Velthoven, & Car, 2014; Gurman, Rubin, & Roess, 2012). However, positive findings are encouraging and can be synthesized regarding the following functions: (1) education and training, (2) performance and decision support, (3) data collection and tracking and (4) coordination and management. First, nearly one-third of the mHealth projects reviewed by Braun et al. (2013) support education and training. These educational features were mainly accomplished by providing continuing medical education on the health workers' PDAs and phones via text and multimedia messages (Källander et al., 2013). Second, another substantial proportion of the projects reviewed used mobile performance and decision support (Källander et al., 2013), which was found to improve decisions at the point of care and adherence to standards. For example, in Kenya, the repeated provision of text-based guidelines on health workers' mobile phones significantly improved their malaria case management (Zurovac et al., 2011). Third, recent reviews also conclude that health workers are able to provide more complete and timely patient-related data using mobile devices. This improvement, in turn, results in enhanced opportunities for the tracking of diseases, especially when compared with the opportunities arising from paper-based formats (Braun et al., 2013; Källander et al., 2013; Leon, Schneider, & Daviaud, 2012). For example, in Malawi, an intervention in which health workers submitted child nutrition data via SMS was reported to result in higher data transmission rates, increased data quality and better monitoring capabilities (Blaschke et al., 2009). Fourth, in view

of management practices, Braun et al. (2013) found evidence that mobile phones were successfully used to coordinate and supervise rural and geographically distributed health workers. This potential is also substantiated by DeRenzi et al. (2012). They observed that SMS reminders of routine visits sent to Tanzanian health workers and their supervisors reduced the number overdue days.

Examined more closely, the current formats tend to position local health workers in the role of passive actors instead of active and responsible generators of knowledge, which offers them limited opportunities for agency. Health workers memorize pre-given learning content on their mobile phones, and they receive and obey standardized rules in the form of mobile performance support. They also fill in data using pre-structured digital tools, which are then monitored by more central actors in the health system. In addition, management and supervision are set up top-down as *control* approaches. For example, the Rwandan supervisors from the study reported above used the SMS system to assess the performance of community health workers (CHWs) (Ngabo et al., 2012). Similarly, in the Tanzanian study, automated SMS reminders were used to alert supervisors in case of overdue visits of CHWs (DeRenzi et al., 2012). Confirming this observation, Braun et al. (2013) note that mHealth projects are directed from the top to ensure “*adherence to existing guidelines, policies and procedures but with minimal support from home institutions, supervisors, or other CHWs*”. This observation conflicts their perception that “the most successful projects engage CHWs as leaders and experts” (Braun et al., 2013).

In this respect, social media approaches can be promising environments, as they position individual users at the center of their relationships and may make them more active producers who multiply their knowledge and experiences (Kamel Boulos & Wheeler, 2007; McLoughlin & Lee, 2007). The use of mobile phones is also conceptualized with respect to the user-centered, active and self-organized construction of content, conversation spaces and individualized communication contexts (Pachler, Bachmair, & Cook, 2010). These notions are, however, not reflected by the main mHealth literatures in LMICs. In short, according to the reviews most studies apply a one- or two-way communication design that does not take into account the potential of networked, mobile social media-based communication (Chou, Prestin, Lyons, & Wen, 2013; Deglise et al., 2012; Gurman et al., 2012; Källander et al., 2013). Health professionals’ increasing use of social media has been reflected in a considerable number of recent reviews (Chou et al., 2013; Grajales, Sheps, Ho, Novak-Lauscher, & Eysenbach, 2014; Moorhead et al., 2013; Scott, Klassen, & Hartling, 2013; von Muhlen & Ohno-Machado, 2012). However, as observed by Chou et al. (2013), the overwhelming majority of these investigations have been conducted in high-income countries. Only a very small number of the projects are carried out in underserved and marginalized areas.

Mobile social media—three domains

In the next step, to address this gap, three domains are theorized that can shed light on the dynamics of the appropriation and usage of mobile social media and the attendant mobile networked communication: (1) socio-cognitive learning; (2) Socio-cultural professional participation; and (3) Concertive peer and multi-stakeholder control. (See Table 1 for an overview). As can be seen, these domains embrace different perspectives. In short, socio-cognitive approaches are centred on the individual and her/his interactions with the environment; socio-cultural notions involve the dynamics

of participation from a community perspective and the scope of concertive control is even broader by connecting multiple stakeholders across the health care value chain.

Table 1 Overview of domains and underpinning theoretical mechanisms - in contrast to dominant approaches

	Dominant approaches	Theoretical domains	Mobile social media affordances	Examples
Individual	Knowledge transmission: memorizing prescribed learning content on mobile devices	Socio-cognitive learning: Knowledge creation through interplay of cognitive and environmental/social factors in situ; problem solving capacity and self-efficacy	Knowledge co-constructed by health workers who solve 'real' problems in mobile social media-based peer communities; enhanced peer feedback impacts on self-efficacy and problem solving capacity	Nurses in rural South Africa seek advice from peers regarding a more complex patient case in a closed Facebook group by means of their mobiles (Pimmer et al., 2014)
Community	Restricted participation: bilateral SM-based communication	Socio-cultural professional participation: learning and meaning-making through enculturation in professional communities	Engagement in social media spaces allows for novel and more central modes of professional participation of distributed health workers across geographical boundaries	Thousands of medical professionals from different nations engage in Facebook sites via their mobiles and discuss professional issues (Cassaniti, Mwaikambo, & Shore, 2014; Pimmer, Linxen, & Gröbhiel, 2012)
System	Top down control: entering pre-defined data in mobile devices monitored by central authorities	Concertive control of self-organized teams enhances accountability and shapes workers' behavior more strongly than hierarchical power	Engagement of multiple parties from across the health value chain in mobile social media spaces results in concertive, boundary crossing peer and multi-stakeholder control and in renegotiation of power relationships.	1500 Taiwanese emergency department staff voice concerns in Facebook group, triggering a multiparty dialogue with different stakeholders including the health minister and break up previously impermeable hierarchical boundaries (Abdul et al., 2011).

Socio-cognitive learning

The main tenet of socio-cognitive perspectives, which can be derived from Banduras's social learning theory, is that learning results as the interplay of cognitive, personal and affective factors and environmental influences and is best facilitated by the solving of authentic problems in situ. One of the underlying concepts of Bandura's framework (1989) is self-efficacy beliefs. These are people's self-beliefs in their capabilities regarding distinct domains of functioning. Research has found that technology can support and enhance peoples' self-efficacy in problem-solving tasks by promoting social and in particular peer support. For example, learners who received more elaborated peer feedback on assignments through an online platform significantly increased their self-efficacy (Wang & Wu, 2008). In health, most of the studies examine self-efficacy with regard to patients. For instance, patients in a disease self-management program, who used an online platform to engage with peers and program content, experienced increases in self-efficacy followed by improved health outcomes (Lorig, Ritter, Laurent, & Plant, 2006).

Less is known about the relationship between health workers, self-efficacy and mobile social media, especially in LMICs. One study from rural Indonesia found that cell phone use was associated with midwives' enhanced access to peer resources. Access to peers was linked with higher self-efficacy, which was, in turn, positively connected with health knowledge (Lee, Chib, & Kim, 2011). In this study, self-efficacy was based on the midwives' capabilities to access resources and to solve work problems. The latter is also reflected by Kirschner (2006) who argues that socio-cognitive learning bridges cognitive and constructivist perspectives and needs to be situated in problem solving in real-

life contexts. In a number of studies in LMICs, the use of mobile social media in jointly addressing more complex patient problems has been reported. In Indonesia, midwives deemed mobile phones a valuable medium for solving more difficult patient-related problems through the immediate involvement of peer networks and doctors (Chib, 2010; Chib & Chen, 2011). In another example, Malawian CHWs used an SMS network to engage with district coordinators through an SMS network. By allowing CHWs to consult additional resources, these tools also helped them to solve more problems at the local level, thus increasing their self-management and problem-solving capacities (Lemay, Sullivan, Jumbe, & Perry, 2012). Similarly, in rural China, doctors used social networking tools, such as QQ networks, to engage with existing contacts and to build new relationships regarding the diagnosis and treatment of unfamiliar medical conditions. In so doing, they connected with local colleagues, distant alumni and doctors from urban centers. The on-demand retrieval of relevant information through actors in proximate or distant peer networks was also seen to enhance their problem-solving capabilities (Chib, Phuong, Si, & Hway, 2013). Further examples illustrate how medical students and midwives in Nepal and rural South Africa accessed Web 2.0 sources, for examples groups on Facebook, and peer-to-peer networks via their mobile phones to search for ad hoc advice, for instance, in the treatment of more complex patient cases (Bryiewicz et al., 2014; Pimmer et al., 2012).

Socio-cultural professional participation

Socio-cultural perspectives are centered on the notion of participation. Accordingly, the main purpose of meaning making and learning for individuals is to progress from peripheral to more central participation in public and professional life. In other words, participation involves a learner's enculturation in a community. Lave and Wenger (1991) elaborated their groundbreaking theory using, *inter alia*, the example of midwives in resource-poor contexts in the Yucatan. Inexperienced midwives "absorbed" skills by participating in communities of practice (Jordan, 1989). Through this implicit process of participation, they developed from being outsiders responsible for minor tasks to being central actors in a community. Studies show that digital media can enable professional participation that is more central or that is enacted in professional communities that were out of reach before. For example, midwifery investigations highlight the potential of social media to "establish a sense of community" and to foster professional development across geographical boundaries using social networking tools for online conferences (Stewart, Sidebotham, & Davis, 2012). Morley (2013) reported that Facebook and mobile phones effectively supported participation by digitally linking nurses in placement settings with peers and tutors, thereby ameliorating the learners' isolation. Such digital links may be all the more relevant in LMICs, particularly in rural regions where WHO policy guidelines have stressed the strengthening of professional communities and networks as a means to reduce their feelings of professional isolation (WHO, 2010).

In this light, studies have demonstrated how midwifery students in rural South Africa use a range mobile social media tools to dynamically access professional communities of co-workers and fellow students who are fragmented across social, temporal, topical, geographical and digital spaces (Pimmer et al., 2014). Similarly but on a much larger scale, research reveals how Facebook sites have been appropriated by medical practitioners, for example medical laboratory scientists in Nigeria, and that this has enabled participation in massive professional communities on social network sites with tens of thousands of users (Cassaniti et al., 2014; Pimmer et al., 2012). In these spaces, the discussion of

cartoons, jokes or questions enabled users to declare and negotiate their occupational status and professional identities, which in turn helped them, inter alia, in difficult professional situations (Pimmer et al., 2012). Accordingly, the use of the mobile social media platform facilitated their professional participation and connectedness in ways that were not previously possible. Studies in other low-income settings in Indonesia (Chib & Chen, 2011) and Malawi (Lemay et al., 2012) have indicated that the use of mobile phones has not only altered the professional participation of health workers. It has also shifted their positions and increased their centrality within their local communities, contributing to personal growth, recognition and (female) empowerment, as illustrated in the following statement from a female midwife:

[Through our mobiles,] “we’ve become like opinion leaders; we sometimes feel embarrassed because we are still young, yet people respect us” (Chib & Chen, 2011).

As this statement indicates, gender relations *can* be positively influenced by mHealth programs, for example, by improving women's social status and their access to health resources, as a recent review concludes (Jennings & Gagliardi, 2013). However, the review’s authors claim that mHealth initiatives do not lead to gender improvements per se but rather reflect or reinforce existing practices and structures.

Concertive peer and multi-stakeholder control

The notion of “concertive control” was coined by Barker (1993). He observed how the establishment of self-managed teams in a manufacturing company triggered forms of legitimate observation. These peer mechanisms were exercised by all team members instead of only by the supervisor. Concertive control evolved from the joint negotiation of core values to a strong system of normative rules. These jointly established rules enhanced accountability and shaped the workers’ behaviors more strongly than the former hierarchical controls and were thus characterized as “tightening the iron cage” (Barker, 1993). Beyond self-organized teams, the following remarks exemplify how mobile social media can offer spaces for the development of legitimate, concertive peer and multi-stakeholder control across health workers, clients, suppliers and health bodies and can thus lead to more powerful decentralized and participative control mechanisms.

Basically, one direct role that mobile social media can play in improving the accountability of health actors, i.e., their answerability regarding decisions and actions (Brinkerhoff, 2004), is the power it has to engage them in dialogue about accountability issues and professionalism. In this sense, health professional associations and journals use social media to encourage discussion around professionalism and information dissemination (Grajales et al., 2014). The US-based National Physicians Alliance has used both Facebook and Twitter to facilitate dialogue about changing physicians’ cultural values, particularly as regards accepting gifts or donations from pharmaceutical companies (NPA, 2012-2014; Silver-Isenstadt, 2014). These discussions can encourage changes in the professional community’s norms and expectations. In the Global South, this dialogue occurs, for example, in professional associations, such as the Ethiopia Public Health Officers Association, which uses its Facebook page to discuss the challenges facing its members and potential solutions (EPHOA, 2013). In addition, researchers and regulators are starting to monitor social media for signs of unprofessional conduct among individual health professionals and students (Garner & O’Sullivan, 2010).

In addition, mobile social media can provide spaces to exercise concertive control by legitimate observation and dialogue of multiple parties which can eventually transform power relationships in the health system. These dynamics are, on the one hand, shifting “the locus of control to the patient” (Hawn, 2009). In this sense, social media is not only being used by clinics to inform patients and the general public about their services; clients are also using these tools to evaluate the quality of care, for example, on Facebook (Rozenblum & Bates, 2013). An example from the Global South is the Santa Joana Maternity Hospital in Brazil. The hospital maintains a frequently used Facebook page through which they share information with patients about what they should expect from their health providers. In addition, this page also serves as a venue for patients to express concerns about their care (<https://www.facebook.com/santajoana>).

On the other hand, the appropriation of mobile phones and the self-creation of social network spaces have also led to the renegotiations of existing power-relationships up the value chain. For example, rural Chinese doctors started to discover new medications online and demanded them from their pharmacists, which resulted in increased levels of agency and self-confidence (Chib et al., 2013). An even wider-reaching example has been reported from Taiwan. Emergency department staff started to discuss pressing challenges, such as overcrowding, in a Facebook group. Within one week, 1500 people joined the discussion and shared their experiences, enabling a multiparty dialogue with different stakeholders, including the Minister of Health. Unlike previous slow-moving negotiations, dynamics on the social network site allowed actors from the front to initiate and push the debate on health reforms. It also helped them to break up previously impermeable hierarchical boundaries (Abdul et al., 2011).

Practical considerations: tying mobile social media to existing structures

Different approaches to and formats for establishing and anchoring social media can be delineated from the literature. First, if tied to face-to-face training, health and medical education institutions can use mobile social media to connect and engage students more systematically between classroom sessions. In so doing, groups of learners can be supported in situ by teachers, facilitators or peers in handling more complex situations, for example, in solving and reflecting on patient-related problems during placements. Support can also be provided with respect to emotional and social dimensions, thus making it a suitable tool to facilitate virtual connectedness and to alleviate isolation (Morley, 2013).

Second, there are examples that show how social media environments are used to enrich e- and m-learning courses. Zolfo et al. (2010) reported on Peruvian physicians in peri-urban settings who studied virtual clinical cases regarding HIV/AIDS care. In addition, the physicians accessed Facebook on their smartphones to discuss questions about clinical cases with peers and with a network of experts. Third, mobile social media spaces can be developed and maintained by professional health care bodies. Working together with the Medical Laboratory Science Council of Nigeria, Cassaniti et al. (2014) examined a Facebook group that was designed to help medical laboratory scientists to access and navigate certified e-learning courses. The digital group evolved quickly and attracted 8,500 members in 18 months. Beyond the initial scope, this massive network started to form a much broader community of practice and to engage in lifelong learning and in forms of continued professional development. The laboratory scientists shared technical knowledge, employment opportunities and trade union news, thus creating rich opportunities for professional participation.

Fourth, health and health education institutions can leverage alumni connections more systematically. Historic ties that draw on common linguistic and cultural resources can play an important role in bridging social capital in support of medical and health services. For example, Pimmer et al. (2014) report that alumni nurses, who specialized after graduation in different disciplines, supported each other in interdisciplinary problem solving using a private Facebook group. To leverage alumni connections more systematically, cohorts of graduates could be invited to take part in social media spaces.

Fifth, clinics can leverage social media to engage in dialogue with their personnel and with the wider local communities that are distributed across geographical space. One practical example is represented by the Penda Health outpatient clinics in Kenya, which use their Facebook site to communicate and discuss further education or job opportunities for staff and medical services for patients (Facebook.com/PendaHealth). Sixth, health information can be circulated on massive social network spaces, with tens of thousands of users beyond institutional and regional boundaries. These spaces consist of users with relationships that have few or no offline ties. Through social tagging functions, such as liking or sharing, information exchange is not restricted to one specific online group. Instead, information can spread much more easily, reaching diverse and geographically separated networks of health workers. Examples for boundary-crossing communication are Facebook sites such as for, where thousands of users from low-income countries engage with educational and humorous aspects of the medical profession. However, it needs to be acknowledged that social media dynamics can hardly be implemented top-down. Instead, they rise and fall with the engagement and commitment of local actors from the “front”. Thus, much could be learned from the approach of Cassaniti et al. (2014). They encouraged national leaders of a professional body to join a Facebook group and to then invite their friends to join. In so doing, the group gained several thousand members in only a few months. To further decentralize online activities, the moderation of the group was gradually transferred to participants who had shown great facilitation skills.

Constraints and challenges

It would be naïve to assume that the adoption of mobile social media and the resultant emergence of mobile networked communication represent a panacea that resolves shortcomings and limitations in classical mHealth approaches and realizes associated benefits per se. Instead, a number of classic and novel issues need to be addressed to be able to leverage this new socio-technical and cultural phenomenon for the delivery of health services. These issues include, but are not limited to, (1) the economics of participation, (2) privacy and surveillance, (3) regulation and information quality (4), equal socio-cultural participation and (5) technical competencies and professionalism.

First, despite the increasing access of people from the base of the pyramid to mobile technologies, the costs of mobile phone hardware and communication certainly remain an issue. It has been argued that initiatives in which central bodies, such as ministries of health, provided phones and covered all related costs greatly enhanced health workers’ engagement and motivation from the beginning (Ngabo et al., 2012). If costs need to be covered by health workers or patients, their use of mobile communication services can be limited (Chib et al., 2014). Social media is especially problematic because it tends to require a mobile broadband connection that is more expensive compared with SMS technologies. At the same time, social media applications, such as Facebook, are very attractive to people in rural areas (Wyche, Schoenebeck, & Forte, 2013), potentially tempting them to buy airtime at the cost of other expenditures (infoDev, 2012).

Second, privacy concerns and surveillance are certainly issues for any technology that stores and transmits health-related data (DeRenzi et al., 2011). However, compared with open source platforms, the use of profit-oriented social media platforms for health communication is even more critical. Their primary purpose is not the promotion of equal access to health information. Instead, most of the current social media platforms have a commercial imperative that centers on the collection and exploitation of data from users (Beer, 2008). In addition, the concentration of health and other personal data can provide unprecedented surveillance opportunities for businesses and third parties (Semitsu, 2011). This surveillance is particularly critical when discussions involve sensitive content, for example, about patients with diseases such as tuberculosis and HIV/AIDS, who have a high risk of stigmatization (Deglise et al., 2012). Accordingly, it is all the more important to elaborate and communicate guidelines on data, usage and storage rights (Källander et al., 2013).

Third, with respect to the credibility and quality of information, it has been noted that the unregulated nature of social media makes it an ideal place to spread misinformation and rumors. In their review, Chou et al. (2013) expressed their concern about the credibility of health information on social media. In most of the studies, user-generated health content on social media was inconsistent with clinical standards. However, it can be argued that the transparency of social media allows user and administrators to trace and adjust misinformation. In addition, the engagement of qualified health workers on social media spaces is likely to contribute to increased information quality. More generally, it was argued that the profit orientation of social media applications has resulted in the design of software that fosters conviviality and liking (Friesen & Lowe, 2012). This type of design can be noticed, for example, in the absence of “dislike” buttons in social media spaces. It needs to be acknowledged, however, that health communication requires critical debate and controversy.

Fourth, aspects that relate to equal socio-cultural participation, including gender issues, need to be considered. As discussed earlier, gender inequalities, which have been widely neglected in mHealth studies (Chib, 2013), are not resolved through the adoption or implementation of new mobile networked media formats. Thus, this topic needs to be addressed more explicitly in the implementation of mobile social media projects to ensure that media appropriation transforms rather than reinforces gender inequalities. Jennings and Gagliardi (2013) suggested that mitigating gender inequalities requires a more vigilant project preparation and the identification of potential gender implications, such as women’s potential dependence on men for approval and for technical or financial support. Gender issues should also be coupled with more rigorous program evaluation methodologies. In addition to gender, cultural inequalities can also be reinforced through pre-existing social ties, as health workers tend to base online knowledge exchange to a considerable extent on their historic relationships (Chib et al., 2013; Pimmer et al., 2014). Isolated rural actors with limited previous network ties are likely to be discriminated against and will never be able to become central members of emerging digital health networks. Along similar lines, Chib et al. (2013) observed that actors with restricted (medical) capacities would potentially not be seen as adequate counterparts. They can hardly contribute to reciprocal and symmetrical knowledge exchange and may thus obtain only marginalized positions in knowledge networks. These risks may be addressed by especially incentivizing and supporting groups and actors who are likely to be discriminated against when launching and joining social media spaces.

Fifth, health personnel need to be enabled to broaden their technical competencies and, more importantly, to develop digital professionalism. The increasing public use of mobile phones and social media may necessitate less initial training during mHealth implementations. For example, Leon et al.

(2012) reported that due to the familiarity of South African health workers with mobile phones, less than a day with occasional support was needed to train them in the use of diverse mHealth applications. In addition, regarding the use of phones, considerable levels of peer support were observed. For example, South African nurses helped each other when they had questions related to the use of mobile phones and social media. They also consulted the younger “digital natives” in their families and neighborhoods for technical support (Pimmer et al., 2014).

However, beyond technical competencies, the adoption of mobile social media requires the development of digital professionalism. In addition to developing an awareness of the most obvious threats to professionalism, such as sharing sensitive patient information (including images) on social network sites (Berle, 2008; MacDonald, Sohn, & Ellis, 2010), health workers must understand that the blurring of professional and private boundaries on platforms such as Facebook also necessitates the competence to address more nuanced and contested issues, such as the disclosure of sexual and political information. This kind of information is normally not revealed in professional encounters and may negatively affect patient relationships (Cunningham, 2014). It has been argued that health and health education institutions need to develop guidelines and policies that encourage the thoughtful and responsible use of social media. To date, such guidelines and policies have been rarely implemented (Grajales et al., 2014). In addition, guidance and competence development that reflect these new complexities need to be anchored in pre-service education and training curricula. This sensitization should include topics about how to use social media to interact with peers and patients and how to evaluate the trustworthiness of sources as well as information about the underlying rationales and business models of the software. Digital professionalism can be further enhanced through peer-learning initiatives and the nomination of champions and facilitators who are incentivized to support less experienced colleagues. Brown (2010) rightly notes that social media itself can be used as an educational space in which teachers model professionalism to support the development of their students’ professional online attitudes.

Tentative conclusions

This article has analyzed the affordances and constraints of mobile networked communication, which is tied to the use of mobile social media. Special attention has been paid to health workers in LMICs. Considering recent empirical studies, it can be argued that mobile social media use may have the potential to shift the role of health workers, moving them into more active and central positions. Similarly, the appropriation of social media may also allow for increased levels of agency, especially compared with classic mHealth interventions.

First, in addition to consuming pre-designed content, mobile social media-based communication can support health workers in solving problems in situ and, more actively, by accessing peer sources. Centralized dissemination of information can be thus enriched with local and decentralized formats of knowledge generation. Second, in addition to joint problem solving, networked communication can also enable more central forms of socio-cultural participation and professional connectedness. This connectedness is especially relevant for health personnel in LMICs who tend to work in professional isolation. Existing ties can be maintained or strengthened over geographical and temporal spaces. The literature has also shown examples of new and emerging digital relationships that provide novel opportunities for professional connectedness. Third, instead of using mHealth tools exclusively to routinize central controlling and monitoring features in asymmetric power relationships, mobile networked communication can shift the locus and format of power and control. It can potentially

reposition local health actors, helping them to more actively exercise legitimate, concertive control at community and even health-system levels.

The authors hope that the discussion of the three domains in the light of recent empirical findings has extended current perspectives and has offered a viable jumping-off point for further analytical engagement. However, several limitations must be acknowledged. First, the thin and limited empirical evidence and the changing and emerging nature of this new phenomenon allows only preliminary insights and necessitates further qualitative and quantitative investigations. It also must be stated that, in most of the studies, changing power dynamics and socio-cultural participation patterns were only mentioned marginally and did not represent the main analytical focus. Second, a more in-depth theoretical engagement with the three domains is desirable but would go well beyond the scope of this paper. For example, in addition to being considered as field of research in its own right, socio-cultural participation is one of the most central metaphors of learning (Paavola, Lipponen, & Hakkarainen, 2004) and could be discussed far greater detail. Third, there are additional theoretical lenses that are helpful in understanding the socio-technical and cultural implications of this development. An investigation of the theory of social capital (Kwon & Adler, 2014) and its facilitation through social media (Ellison, Steinfield, & Lampe, 2007) is just one example.

Finally, to counter the prevailing techno-optimistic viewpoints, it must be acknowledged that networked, mobile social media-based communication is accompanied by risks and costs that need to be addressed. These are linked, but not limited to, issues such as the economics of participation, privacy and surveillance, regulation and information quality, equal socio-cultural participation and technical competencies and professionalism.

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