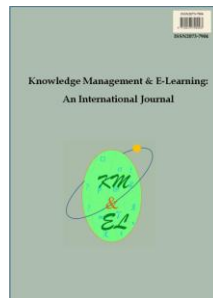

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Designing eLearning courses to meet the digital literacy needs of healthcare workers in lower- and middle-income countries: Experiences from the Knowledge for Health Project

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Designing eLearning courses to meet the digital literacy needs of healthcare workers in lower- and middle-income countries: Experiences from the Knowledge for Health Project

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Abstract: Traditional conceptualizations of knowledge management fail to incorporate the social aspects in which knowledge management work operates. Social knowledge management places people at the center of all knowledge management, including placing the end user at the center when developing eLearning packages, particularly within the context of digital health literacy. As many health professionals working in lower-resource settings face the digital divide, or experience unequal patterns of access and usage capabilities from computer-based information and communication technologies (ICTs), ensuring that eLearning packages are tailored for their specific needs is critical. Grounded in our conceptualization of social knowledge management, we outline two of our experiences with developing eLearning packages for health professionals working primarily in lower- and middle-income countries. The

Global Health eLearning Center provides eLearning courses to health professionals primarily working in the lower- and middle-income country context. The courses have robust and exhaustive mechanisms in place to ensure that issues related to digital health literacy are not barriers to taking the courses and subsequently, applying the course material in practice. In Bangladesh, we developed a digital health package for frontline community fieldworkers that was loaded on netbook computers. To develop this package, community fieldworkers were provided support during the implementation phase to ensure that they were able to use the netbooks correctly with their clients. As new digital technologies proliferate, guaranteeing that global health workers have the prerequisite skills to utilize and apply digital health tools is essential for improving health care.

Keywords: Social knowledge management; Developing countries; Participatory development; Global health; Digital literacy

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Lisa Mwaikambo (née Basalla) has worked for the Johns Hopkins Center for Communication Programs since 2007. She has served as a co-manager of the USAID Global Health eLearning (GHeL) Center. In her role on GHeL, Lisa managed the \$1.5 million President's Emergency Plan for AIDS Relief online distance learning and training program in strategic information. Her experience spans knowledge management, instructional design and online facilitation, program design, and implementation, and management, and research and evaluation. Lisa has extensive experience in family planning and HIV. She is a certified Knowledge Manager and has a Master of Public Health from Case Western Reserve University.

1. Introduction

Knowledge management has been defined in many ways, but perhaps the simplest way to describe it is the process of capturing, distributing, and effectively using knowledge (Davenport, 1994). However, we argue that current conceptualizations of knowledge management fail to recognize and incorporate human and organizational dynamics. We view human and social factors as critical to effective knowledge management work, and therefore suggest a conceptualization of social knowledge management which highlights the “social” pillars of knowledge management: driven by social benefit, occurring within social systems and social interaction, which includes social networks, social learning, social capital, and social media (Fig. 1).

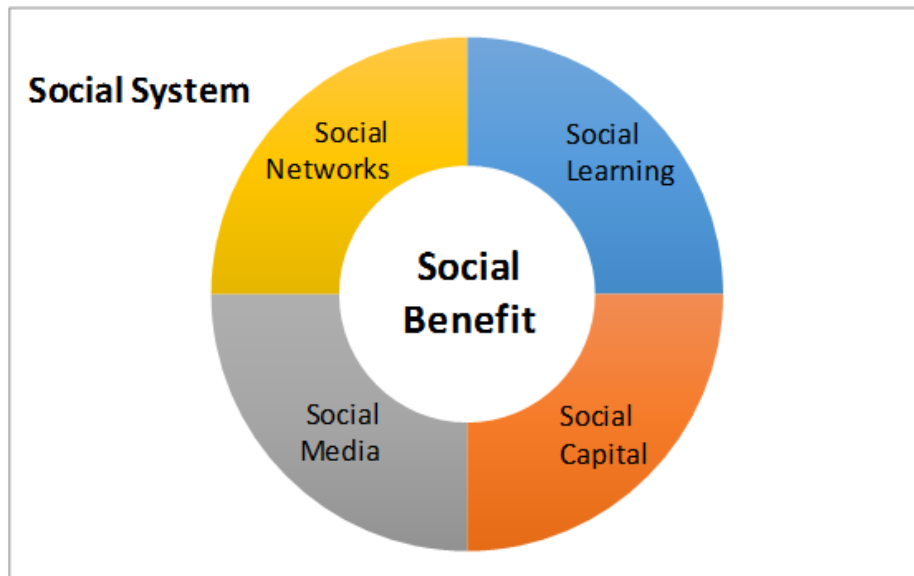


Fig. 1. Pillars of social KM

We suggest that these pillars should underlie and guide the traditional dimensions of knowledge management, such as the processes to generate, capture, synthesize, exchange and use knowledge; technology to support knowledge management interventions; organizational systems to support a culture of knowledge management; and key relationships that facilitate exchange and knowledge use. A critical aspect of this conceptualization is that it is people-centric and structured in networks that promote two-way and many-to-many flows of knowledge (Table 1).

Given our conceptualization of knowledge management, which we call social knowledge management, we approach the knowledge needs of our end users, primarily community health workers, health providers, and program managers (which we collectively refer to as health professionals in this manuscript) working in lower- and middle-income countries, through this people-centric approach, and rely on them to ensure that we develop and implement knowledge management approaches with their digital literacy needs as a key factor. In this paper, we outline the importance and information needs of health professionals within the context of global health, and discuss

how we utilized our social knowledge management approach to ensure that their digital health literacy needs drove the development and implementation of eLearning activities in two case studies housed within the Knowledge for Health (K4Health) Project.

Table 1

Comparison of knowledge management approaches

Traditional knowledge management	Social knowledge management
<ul style="list-style-type: none"> • For competitive advantage • Driven by available technology • Structured in hierarchies • Relegates into “folders” • Top-down knowledge transfer • Closed, controlled & proprietary • Knowledge for power 	<ul style="list-style-type: none"> • For social benefit • Driven by people and relationships • Structured in networks • Tags with keyword to enable dynamic identities • Two-way, many-to-many flow • Free, fluid and open • Shared knowledge for impact

2. Information needs of health care providers within the global health context

Community health workers, health providers, and program managers play a key role in improving health outcomes in lower- and middle-income countries (World Health Organization, 2006). As many lower- and middle-income countries rely on health care workers to reach rural and remote areas, it is particularly troublesome that many face staff shortages of health professionals within rural and remote areas (Lehmann, Dieleman, & Martineau, 2008). Indeed, there is increasing concern about the scarcity of health professionals to address pressing issues, like health equity, health disparities, and infectious diseases (Chen et al., 2004; Pang, Lansang, & Haines, 2002). Health professionals working at the community level play multiple roles, including patient and community education, counseling, monitoring and tracking patients, and linking people to care, among others (Brownstein et al., 2005). Evidence indicates that they are able to improve health care access as well as outcomes and improve the quality of life in underserved communities (Rosenthal et al., 2010).

However, health professionals in lower- and middle-income countries are in dire need of life-saving information (Kale, 1994). Many have little to no access to basic, practical information (Pakenham-Walsh, Priestley, & Smith, 1997; Macrorie, 1997; Sekikawa, Laporte, Satoh, & Ochi, 1997) and some have come to rely on observation, advice from colleagues, and experiential learning when caring for and treating patients (Pakenham-Walsh & Bukachi, 2009). A literature review that examined the health information needs of health professionals in lower-resource countries found that most lacked knowledge about the basics regarding the diagnosis and management of common diseases, resulting in suboptimal health care practice (Pakenham-Walsh & Bukachi, 2009). The provision of health information is essential to delivering quality health care, as it is able to provide direction and a rationale for guiding treatment decisions (Kreps, 2000). Providing access to relevant and timely health information to health professionals is potentially the single most cost-effective and feasible strategy for health care

improvement in lower- and middle-income countries (Pakenham-Walsh, Priestley, & Smith, 1997).

3. Moving toward digital health within the global health context

The use of digital health tools can help address the global health professional worker shortage and the lack of access to continuing professional development opportunities (Aluttis, Bishaw, & Frank, 2014; Nartker et al., 2010). Defined in numerous ways, digital health broadly encompasses the communication of health information through computer technology and the Internet (Brodie et al., 2000) and is increasingly becoming a critical tool in delivering effective global health programs specifically in lower- and middle-income countries, including capacity building assistance and training (Aluttis, Bishaw, & Frank, 2014). The need for rapid access to information to support critical decisions in public health is paramount (Revere et al., 2007).

Digital health is particularly relevant within a learning context and is a key aspect of knowledge management. Many conventional training programs require that health professionals leave their workplaces to participate in trainings, which, in turn, can cause serious disruptions in service delivery and further exacerbate imbalances in health workers' knowledge and skills (Gaye & Nelson, 2009). As a result, global health program designers are exploring novel ways to ensure that health professionals are provided with access to high-quality formal and informal continuing professional development opportunities when most convenient to them. eLearning has become a popular and more readily accessible approach to building the capacity of health professionals with the growth in mobile and Internet access and new information and communication technologies (ICTs) for delivering training content (Bollinger et al., 2013). eLearning can broadly be defined as the use of network technology to deliver training (Welsh, Wanberg, Brown, & Simmering, 2003), and this approach to synthesizing and packaging knowledge in an easily digestible way and transferring this knowledge so that it is ultimately used is the essence of knowledge management (Davenport, De Long, & Beers, 1998). eLearning systems provide a flexible and sustainable way to provide continuous learning yielding improvements in health worker knowledge and skills (George et al., 2014). eLearning has been used in conjunction with other training approaches, known as "blended learning," in which a combination of a variety of learning media (face-to-face, online, print, social media) and learning environments (instructor-led, teamwork, peer-to-peer interaction, self-study and individual work), enables more opportunities for application and support to learners than a one-off training event.

However, using digital health within a global health context comes with its own set of challenges. Others have written about the 'digital divide', which refers to unequal patterns of material access to, usage capabilities of, and benefits from computer-based ICTs (Fuchs & Horak, 2008). While technologies can enable human practices, they can concurrently constrain them. End users must possess the capability to use such digital technologies, as well as the capability to use them in such ways that confer benefits, and a key barrier, which has been identified within the lower-resource settings, is the lack of digital skills and financial resources to support the use of digital technology (Van Dijk & Hacker, 2003). However, eLearning is often viewed as a means to address the digital divide between rural and urban settings by providing health professionals in rural settings with opportunities to use digital health tools and access the same training content as their peers in urban settings (Ruxwana, Herselman, & Conradie, 2010).

Additionally, the rapid development of digital technologies requires the end user to possess a growing assortment of skills in order to utilize such technologies. These skills are often referred to as “digital literacy” (Bulger, Mayer, & Metzger, 2014; Gilster & Gilster, 1997; Inoue, Naito, & Koshizuka, 1997; Pool, 1997). There has been an increased focus on literacy within digital approaches across various social contexts, in response to globalization and the growing range of available technologies (Mills, 2010). Despite its widespread popularity, there are many conceptualizations of digital and eHealth literacy. Some suggest that digital or eHealth literacy refers to the ability to seek, find, comprehend, and evaluate health information from digital resources and then apply this information to solve a health problem (Norman & Skinner, 2006a; 2006b), while others have a slightly different view, suggesting that digital literacy refers to possessing capabilities beyond a simple competence in retrieving information from a digital technology medium (Bawden & Robinson, 2002), and digital literate individuals should be characterized as those that are able to acquire and use information appropriate for any situation (Rader, 1991).

In addition to varying conceptualizations, there is a divide between what end users can be expected to do and the demands for and availability of different digital resources. A number of studies in educational media, health literacy, and numeracy have sought to minimize this gap by addressing user knowledge and competence and improving available resources. Addressing resource access as well as user skill levels has assisted in the development of digital applications that are more likely to impact those with the most pressing health issues (Eng et al., 1998).

4. Role of health literacy in uptake of materials designed for health care providers

From a broader perspective, the concept of health literacy (from which digital literacy is situated within) was developed primarily within a higher-income country and clinical context, as a way to help physicians strengthen their communication with their patients, characterizing health literacy as a patient problem that physicians were expected to overcome (Pleasant & Kuruvilla, 2008). However, the conceptualization of health literacy differs between a clinical context and public health context, as physicians focus on obtaining information about and from a patient while public health practitioners focus on delivering information such as knowledge on relevant health behaviors to specific audiences. The public health approach to health literacy views the acquisition of knowledge as an integral component of health literacy rather than as a separate outcome (Nutbeam, 2000; St Leger, 2001; Zarcadoolas, Pleasant, & Greer, 2006).

The role of health literacy as an important factor influencing health outcomes has been increasingly gaining attention, but while general health literacy is an important determinant of health, it is not sufficient to address the major health challenges facing lower- and middle-income countries (Kickbusch, 2001). Furthermore, most efforts related to health literacy have focused on patients, and studies examining the needs of health professionals are limited. A recent study suggests that there is a need to improve the health literacy of health professionals at all levels within a health system, as this would improve health care delivery to patients (Mackert, Ball, & Lopez, 2011). Relating back to digital literacy, the health literacy literature suggests that there is also a need to examine digital literacy through a public health context, with a focus on digital literacy of health professionals at all levels within a particular health system.

5. People as drivers of their information needs, including mode of delivery and format

While developing programs, it is common knowledge that including the end user in program planning and application design could improve programming itself as well as study evaluation design (Nichols, 2002). For example, understanding the motivations of a particular target audience by involving them in the planning process can assist in the development of a more targeted intervention for behavior change (Krasny & Doyle, 2002). From a research perspective, numerous communities have asked for programs to take into account their perceptions, needs, and circumstances, and one way to assure this participation is the employment of a participatory approach by engaging communities in the formulation of research questions and interpretation of data (Green & Mercer, 2001). Specific to the digital literacy context, several scholars recommend matching digital health technologies to the skills of their intended users, due to the notion that such a fit can also help improve users' working knowledge of digital technologies to a level that is supportive of achieving health-related goals (Norman & Skinner, 2006a; Norman & Skinner, 2006b).

Another important debate regarding the use of digital technologies in lower- and middle-income countries relates to content. As content for digital health technologies is typically developed and produced by fluent English speakers with advanced degrees, some wonder if the individuals accessing the content living in these lower- and middle-income countries will be passive consumers of this information, and how can the end users serve as potential creators and contributors of the content (Alzouma, 2005).

Through our conceptualization of social knowledge management, we assert that the end user of the intervention should drive the process for developing, implementing, and adapting any knowledge management tool. We provide two case studies from the K4Health Project, which seeks to improve health services in lower- and middle-income countries by ensuring that knowledge gets into the hands of health professionals who need it most. The case studies illustrate how we relied upon and worked hand-in-hand with the end users of eLearning packages to ensure that these packages incorporated and addressed factors related to digital health literacy.

6. Global Health eLearning Center

The Global Health eLearning Center (GHeL) was established in 2005 in response to growing demand from United States Agency for International Development (USAID) staff working in lower- and middle-income countries for global health technical updates. Courses are proposed by subject matter experts from various implementing partner organizations or by USAID staff who are technical experts. A team at USAID and K4Health review the course proposal to see if it meets the needs of the GHeL audience and would be an appropriate fit given the current offerings. Often times, courses are proposed based on existing in-person training curricula or the newest programmatic guidance issued by global technical organizations. These in-person trainings are conducted in lower- and middle-income countries either by request of local health institutions and organizations or based on needs identified by the implementing partner organization. Since course authors are unable to conduct trainings everywhere, GHeL courses provide a platform for meeting continuing professional development needs globally, in particular for health generalists, who manage a broad range of health programs.

When GHeL was first launched it was field tested in diverse settings around the world, including South Africa, India, and the United States. Results from the field testing confirmed the usability of the platform and validated the depth of knowledge and materials covered in the courses. Although GHeL's primary audience is USAID staff, other health professionals were taking advantage of these free, self-paced, expertly vetted courses even though they were not promoted widely. Doctors, nurses, technical advisors, and students saw the courses as an opportunity to build their professional development, and program managers saw them as a resource for training staff at their organizations. There are currently more than 70 online courses on the GHeL platform, covering a range of health topics, including family planning, HIV/AIDS, and maternal, neonatal, and child health.

This large secondary audience of GHeL comprises about 85% of the 125,000+ registered users to the site. Given that this audience is more geographically dispersed in lower- and middle-income countries, not just concentrated in urban centers, the GHeL staff initiated new measures to meet the information and digital health literacy needs of this global cadre of health professionals. In 2010-2011, the K4Health Project conducted the first comprehensive evaluation of GHeL to determine its reach, use, and usefulness, to improve collection and analysis of data, and to enhance the GHeL learning experience. The evaluation included a literature review, expert interviews, and analysis of data from October 2005 to April 2010; an online survey with course completers and non-completers; and in-depth interviews. Evaluation findings largely confirmed that the learners are satisfied, often completing numerous courses after completing the first course (Mwaikambo, Avila, Mazursky, & Nallathambi, 2012). Many learners reported that the courses serve as valuable sources of knowledge as well as critical source of updated technical information. In addition, the evaluation indicated a demand to translate course content into specific local languages.

The user feedback informed the GHeL redesign that was undertaken in 2013. As learners indicated that access remained an issue, GHeL offered learners' the ability to download and save PDF versions of the courses as well as a print option for later study. The GHeL team is currently pilot testing the translation of the platform and a limited number of courses into Arabic, French, Portuguese, and Spanish and continues to work with subject matter experts in developing content that is free of jargon, written according to best practices in writing and reading for the Web, and is written in a manner that non-native English speakers can easily understand.

Regarding digital literacy, detailed instructions and guidance on how to use courses, download course content, and obtain course certificates are available on the GHeL website under frequently asked questions (FAQs). In addition, GHeL staff created a video tutorial on "Getting Started" that provides screenshots and instructions on how to register and enroll in a course and familiarizes a learner to the basic navigation of a course. Finally, learners can contact GHeL staff through the website contact page as well as via email for individualized support.

GHeL courses are often used by health organizations in two main ways – internally and externally. Internally, local health organizations use the courses to train staff, since many organizations do not have the finances to fund ongoing training of staff. A GHeL learner from Ghana who completed the IUD course shared that "Neonatal deaths had been a big problem in my district and I needed the course to help train my midwives and nurses in the 'mother-baby-unit' of the district hospital". The courses help health professionals around the world stay current on the latest developments in the global health field. Externally, organizations use the GHeL courses as part of a blended

learning strategy to reinforce and complement their other training activities with their target audience – often external to their specific organization. For example, a USAID-funded initiative in Kigali, Rwanda requested that participants complete a GHeL course prior to the face-to-face training workshop to ensure that all of the participants had at minimum the same basic level of knowledge at the start of the workshop and to inform the agenda of the workshop, since the facilitators were given the participants' final exams and could see which questions were most often answered incorrectly. In this way, the facilitators could truly tailor the face-to-face training workshop to meet the needs of the participants. As organizational and staff capacity in technical health areas increases, so does the quality of health services, which leads to improved counseling and treatment of clients (Pakenham-Walsh, Priestley, & Smith, 1997). Learners also build their digital literacy skills, since the courses require successfully navigating web pages and using interactive features, such as a new community feature that allows learners to communicate with each other which was developed in response to learner feedback. The digital skills acquired from the courses prepare learners to engage with the growing field of online learning opportunities and connect with other health professionals through online communities of practice.

The current platform is suited for mobile phones and Google Analytics reveal that more than 15% of our site activity is from mobile devices. Given the exponential growth in mobile technology, GHeL staff are exploring a number of content delivery methods to reach health professionals at the community level who often work in rural settings and have very limited access to the Internet as well as continuing professional development opportunities. Currently, GHeL is evaluating three adaptation and delivery mechanisms and a major component of these evaluations is to ensure that course content is delivered in a format that matches the digital health literacy needs of the end user. These adaptation models include: text and graphic deployed via a learning module on a mobile application, quiz content deployed via audio through an interactive voice response system, and translated text and graphic with the option of audio in the format of a game-like mobile application. Through this process, GHeL is not only documenting the learning outcomes of these efforts but also the process so that this can be shared with training organizations in lower- and middle-income countries that may find these delivery methods more appropriate for their target audiences.

7. Bangladesh Knowledge Management Initiative

The Bangladesh Knowledge Management Initiative (BKMI) was implemented by the K4Health Project to facilitate a knowledge sharing culture within a lower-resource setting among key stakeholders, including health care providers, health program managers, and behavior change agents such as public sector frontline health workers - Family Welfare Assistants (FWA) and Health Assistants (HA).

In order to improve the knowledge- and skill-based competencies of frontline workers throughout Bangladesh in the areas of health, population, and nutrition; BKMI piloted a foundational digital health platform of evidence-based best practices, standards, and guidelines for basic communication and health interventions along with a comprehensive set of behavior change communication (BCC) tools and resources. This digital health platform included an eToolkit and eLearning courses.

This digital health platform was developed due to a number of challenges frontline workers face when they counsel clients. Formative research indicated that these workers had too many materials and job aids to carry; lacked basic knowledge, tools, and

training to effectively counsel and treat their clients; and possessed materials and job aids that included inconsistent or contradictory messaging. Given these gaps, BKMI compiled a “gold standard” of BCC resources to be part of an eToolkit along with integrating the Government of Bangladesh’s (GOB) standards for counseling clients into an eLearning curriculum. The resources were compiled in consultation with stakeholders such as GOB, international health agencies, and local non-governmental organizations. These two components of the digital health platform were subsequently deployed as part of an eHealth pilot in two districts.

The digital health platform was developed for users with a high school education—a standard at which GOB appoints frontline workers. A formative assessment of frontline workers’ digital literacy was not done but all resources on the platform were compiled and created in accordance with GOB’s standard for educational attainment, and to ensure that usability of the platform catered to the existing digital literacy of frontline workers, BKMI undertook a structured pretest interview with eight frontline health workers before the eHealth pilot was rolled out. The interviews assessed general computer literacy, the ability to register for and navigate the eToolkit and eLearning courses, and the overall usability of both components. The pretest found that the frontline workers were able to use the digital health platform but attested to discrepancies in the local language instructions in the platform navigation. Based on the pretest results, the platform developers made adjustments to the reading of the local language on the platform.

In the course of three and a half months, BKMI piloted its digital health platform with approximately 300 frontline health workers. These frontline workers received the platform on netbook computers to supplement their knowledge and enhance their counseling activities with clients. During the implementation phase, frontline workers used the digital health platform during their normal counseling activities with clients in villages. BKMI hired Monitoring and Troubleshooting Officers (MTOs) to visit frontline workers every two weeks and troubleshoot any technology-related issues. The MTOs also manually issued and collected eLearning course assessments to and from frontline workers, in order to assess their progress through the courses. Finally, the MTOs collected periodic “proficiency information” to assess the gradual increase in ability to use and operate the netbook. Along with the biweekly MTO visits, the BKMI team conducted three monthly monitoring visits to collect qualitative information through focus group discussions and key informant interviews, which included assessments of frontline workers’ attitudes and behaviors in their use of the digital health platform. Results indicated that frontline workers enjoyed using the platform and found the technology easy to use; frontline workers used the eLearning courses for counseling their clients in addition to improving their subject area knowledge and skills; and the use of the platform in their counseling increased their status within the community, resulting in increased demand for more health advice from mothers.

A pre-assessment was conducted before the pilot began, and the same assessment was conducted after the pilot was over. Both assessments collected information on frontline workers’ knowledge and counseling skills. The post-assessment results indicated substantial increases in frontline workers’ knowledge across intervention subject areas – such as family planning and nutrition. For example, frontline workers’ knowledge regarding the available options for family planning increased approximately 30% from the pre-assessment to the post-assessment. Regarding nutrition, frontline workers’ knowledge regarding the benefits of exclusive breastfeeding increased approximately 10% from the pre-assessment to the post-assessment.

The success of BKMI's digital health platform through field-testing demonstrates that broadening access to health information through digital health applications can improve health service delivery at the household level. Moreover, the planning and development of the platform took into consideration the gaps in digital literacy that the frontline worker may face in use of the platform, which was achieved through consultation with local stakeholders and pretesting with frontline workers. Despite these gains, factors such as government buy-in, cost-effectiveness of digital health applications, and in-country capacity to operate these innovations will be important to determine the scalability of the eToolkit and eLearning courses for use by all public sector frontline workers.

8. Discussion

These two case studies illustrate two different experiences the K4Health Project had with regard to developing and delivering eLearning in two contexts. The GHeL platform demonstrated that continuing professional development can be delivered virtually to a global audience of health professionals and that the information and general literacy as well as specific digital literacy needs of these audiences can be met through careful content curation to ensure understanding and application of knowledge. Reaching the end beneficiary of health services, the BKMI digital health platform provides a streamlined alternative to meet the needs of the clients of frontline health workers in Bangladesh. In adopting educational technologies to build the competencies and skills of health workers, other initiatives should consider utilizing a participatory process from the beginning – one that involves not only technologists and subject areas experts but also the end users who will use such applications to inform the development of the interface and structure of such technologies.

Regarding the future use of digital health within the global health context, the ability of digital health to transcend sociopolitical boundaries translates to the potential increase in efficiency of health care delivery (Mars & Scott, 2010). Access to digital health technologies continues to grow, and the gap between lower- and middle-income countries and higher-income countries has been shrinking in terms of mobile subscribers, fixed telephone lines, and Internet users, although disparities remain between rural and urban areas (Kyem & LeMaire, 2006). Additionally, although there have been great advancements with regard to access to digital technologies, program developers should not develop interventions as though the end users utilizing digital health technologies are a homogenous group - even among those with access, it is important to recognize that access and digital literacy is varied (Mills, 2010).

There is clearly a need to educate program designers and developers regarding the use of design technology in a way that is conducive and responsive to the intended user. Addressing the needs of the intended users may not diminish the digital divide, but it may ameliorate its consequences by increasing the digital competence of a specific population.

There is also a clear need to conduct research related to the health information needs of underserved or vulnerable populations, and the ways in which health professionals can deliver this information in a way that is simple and feasible. For example, understanding which digital technologies are most acceptable to health professionals and designing eLearning systems to uniquely respond to their needs would result in a system with higher levels of utilization, and subsequently, higher applications of health knowledge to deliver health care. It is crucial that researchers engage health

professionals at the community level as well as their clients as a way to develop interventions that are effective and efficient.

The use of digital technologies within the global health context illustrates a key distinction between that of higher-income and lower- and middle-income countries. Within higher-income countries, while health professionals may turn to digital information sources to complement other sources (Percheski & Hargittai, 2011), health professionals in lower-resource settings may not be able to access other information sources. As a result, the information contained on a digital system may be the only source of information they have on a particular health area. In that sense, it is even more paramount to ensure that health professionals within this context possess the prerequisite digital health literacy skills.

Digital literacies present major challenges to policy, pedagogy, and research related to training and capacity building within the global health context. Facing and meeting these challenges begins with the notion of ensuring that digital literacy does not exacerbate the digital divide, but rather, narrows it and utilizes such approaches to increase the capacity of health care workers to deliver more effective health care.

If governments in lower-resource countries channel their scarce financial and political resources to developing social and human capital, building the basic infrastructure and creating a level playing field for the private sector, such action will go a long way in creating the prerequisites for the ICT sector to flourish. Beginning modestly with such areas as data management and online workstations, lower-income countries can gradually move to more sophisticated programs, like software development and hardware innovation. Thus, notwithstanding the concerns voiced regarding being left behind in this digital age, developing countries should carefully balance between their conflicting needs of adopting modern technology and continuing to further their economic development.

As lower- and middle-income countries strive to develop their human capital with limited resources and begin to utilize digital technologies to combat pressing issues, they must be cognizant of how incorporating digital technologies impacts their workforce. The world will only continue to become more digitized, and these countries must make it a priority to ensure that those working on the frontlines possess the digital literacy skills to maximize such technology advancements. If not, the progress made in narrowing the digital divide will be lost and health outcomes will suffer as a result.

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