Digital inclusion and women's health and well-being in rural communities

Digital inclusion and Women's Health and Well-Being in Rural Communities

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Abstract

This review explores the role of digital inclusion in women's health and well-being in rural communities. This involves reviewing existing research that focuses on the information experiences of women, specifically those who were digitally excluded or limited users of the Internet, who have benefitted from the support of digital inclusion initiatives and technology. There is a global gender digital divide where more women than men often lack access to information and digital skills, particularly in rural areas. Digital inclusion initiatives are attempting to close this divide and to enable women to make informed decisions about their health and well-being and their families. The review also identifies that digital inclusion is a complex situation of enquiry; there is limited, fragmented research where the concepts of information literacy and digital inclusion have been brought together; and significant tensions and contradictions exist within digital inclusion practice. The review also highlights the opportunity for further research and theory development.

Introduction

Digital inclusion is of global importance as government digital-by-default agendas increasingly recognise the need for society to possess strong digital skills and capabilities to fully benefit from living in a digital world. Yet a global gender digital divide exists where women lack access to information and digital skills, particularly in rural areas (IFLA & TASCHA, 2017). Women are 14% less likely to own a mobile phone than men in low and middle income countries (GSMA, 2015); globally, the proportion of women using the Internet is 12% lower than that of men using the Internet (ITU, 2017); and while the gender gap in Internet access has narrowed in

most regions since 2013, it has widened in Africa, where the proportion of women using the Internet is 25% lower than the proportion of men (ITU, 2017, p. 3).

Digital inclusion initiatives around the world, designed to provide access and the development of digital skills, are critical to bridging the digital divide in local communities (Mervyn et al. (2014). However, the multiple factors that contribute to digital exclusion are complex and make the task of implementing workable digital inclusion solutions particularly challenging for policy makers (Bach et al., 2013).

Information literacy helps people make informed choices and decisions about their lives, including the health and well-being of individuals and their families (CILIP, 2018, p. 5). However, as argued by Dunn (2013), "insufficient attention is being paid to the urgency of information literacy as a key component to any strategy to redress the digital divide" (p. 326), potentially leaving those newly connected to the Internet or with low information literacy vulnerable to poor information content and choices. Anderson and Johnston (2016) argue that without the development of information literacy, "the benefits of digital participation will be significantly diminished" (p. 8). Challenges to access and meaningful use of online information underline the necessity of increased levels of information literacy. "While this may affect both men and women, the challenges are often greater for women (particularly in developing countries) because past information isolation leaves them less equipped to deal with these challenges" (IFLA & TASCHA, 2017, p. 80).

What is Digital Inclusion?

Broadly, *digital inclusion* refers to the activities necessary to ensure that all individuals and communities, including the most disadvantaged, have access to and meaningful use of information and communication technologies (ICTs). Digital inclusion activities essentially

include five key elements: 1) affordable, broadband Internet service, 2) Internet-enabled devices, 3) quality technical support, 4) applications and online content designed to enable and encourage self-sufficiency, participation, and collaboration, and 5) access to digital skills training (NDIA, 2017, n.p.). Such activities are driven by governments to address the digital divide (those without access, skills or the motivation to use ICTs), and implement the digital-by-default agenda (the drive to replace services delivered through face-to-face, telephone and paper-based interactions, with web-based services)**,** and are delivered by a plethora of organisations and community partners (ITU, 2017; Rhinesmith, 2016).

Digital inclusion research emerged from research on the *digital divide*, a topic widely accepted as a complex and dynamic issue, that continues to evolve, particularly as ICTs evolve and diffuse (Jaeger et al.*,* 2012; Van Dijk, 2005). Digital inclusion is addressed by researchers across various disciplines, but compared to the established area of research on the digital divide, *digital inclusion* research is relatively new (Jaeger et al.*,* 2012). Indeed, the *Rapid review of evidence for basic digital skills* (McGillivray et al.*,* 2017) concluded that there is a notable dearth of academic research in relation to digital inclusion solutions and initiatives, and particularly in relation to the role and responsibilities digital inclusion intermediaries and actors play. Similar to research on the *digital divide*, *digital inclusion* is a complex area of enquiry and suffers from conceptual inconsistencies and dichotomies that lead to ambiguities in understanding why and what it takes to be included in the information society (Nemer, 2015).

What is Information Literacy?

The Library and Information Association defines *information literacy* as "the ability to think critically and make balanced judgements about any information we find and use. It empowers us as citizens to develop informed views and to engage fully with society" (CILIP,

2018, p. 3). This definition relates to information in all its forms, including digital and online, reinforcing the relevance and need to consider information literacy when using and accessing the Internet for online information (Anderson & Johnston, 2016; CILIP, 2018; Dunn, 2013). While some scholars advocate information literacy as a set of skills (Andretta, 2005; Burke, 2010), others advocate information literacy as a way of learning (Kuhlthau, 1993), or as an appreciation of the complex ways of interacting with information (Bruce, 2000, p. 97).

Yet, information literacy research as a concept has traditionally been siloed in the library and information science sector. While there is a significant amount of information literacy research within educational (Corrall, 2008; Secker & Coonan, 2013) and workplace (Lloyd, 2010) settings, and an emerging body of research in information literacy in everyday life contexts (Martzoukou & Abdi, 2017), information literacy research within community settings (relevant to digital inclusion) is barely recognised as a research area (Hepworth & Walton, 2013). However, the CILIP definition emphasises how information literacy is relevant to everyone in a wide variety of contexts, specifically the contexts of everyday life, health, citizenship, education, and the workplace (Secker, 2018), and as such makes information literacy relevant to digital inclusion and an essential part of this review.

Women's Health and Well-Being in Rural Communities

The importance of digital inclusion and information literacy has been emphasised in a few areas including health and well-being (Ferreira et al., 2016; Park, 2015). It is further emphasised that access to online services could lead to improved health and well-being, particularly in rural areas (Freeman et al., 2016; Hart et al., 2004). However, the specific benefits of digital inclusion and information literacy to women's health and well-being in rural communities has not been

explicated. Therefore, the review aims to examine the literature to outline the specific benefits of digital inclusion initiatives on women's health and well-being in rural communities.

Rationale for Review

This systematic literature review considers research that focuses on the information experiences of women, specifically those who were previously digitally excluded or limited users of the Internet, especially in rural communities, who have benefitted from the support of digital inclusion initiatives and technology. The review provides an opportunity to unpack the complexity of this situation of enquiry by problematizing the concept of digital inclusion; exploring if and how digital inclusion has been linked with the concept of information literacy and digital skills training; providing insight on the role of digital inclusion on women's health and well-being in rural communities; and revealing tensions and contradictions within digital inclusion practice.

To guide this systematic literature review, the two following questions are addressed: 1) What role do digital inclusion initiatives play with regard to women's health and well-being in rural communities? And 2) How have the concepts of *digital inclusion* with *information literacy* been linked with regard to digital inclusion skills training? The chapter concludes with an agenda for future research within the realms of digital inclusion and information literacy. The chapter includes the following sections: an outline of the methodology of the systematic literature review; description of the reviewed literature; the findings from the selected papers (with respect to theory and methodologies, terminologies, approaches to digital inclusion initiatives, digital inclusion training, digital inclusion, information literacy, health, and well-being); a brief discussion; and a conclusion.

Methods

The review was conducted on journal articles—excluding conference proceedings, PhD theses and book chapters—reporting primary research published worldwide in English language sourced from the *Web of Science* and *Scopus.* Search terms included the phrases *information literacy,* and *digital inclusion,* combined with the terms *rural*, *gender, health* and *well-being* appearing in the topic. The search yielded 194 results, which following the exclusion of conference proceedings, duplicates, articles that were irrelevant, or in a non-English language, was refined to a final set of 66 journal articles. Articles were identified and selected on the basis of their relevance to digital inclusion and women's health and well-being in rural communities and links to the concept of information literacy within that context.

Due to the multidisciplinary nature of the topic, articles were identified across different research domains such as information science, educational research, computer science, and the broader field of social science research. Drawing on the researcher's previous experience in digital inclusion and librarianship, a small collection of relevant grey literature (16 items) was also selected to provide richness, context, and currency to the review. These items were predominantly in the form of reports published by third sector, corporate, and public policy organisations, such as *Development and Access to Information* (IFLA & TASCHA, 2017), *Lloyds Bank consumer digital index* (Lloyds, 2017), and '*Smartphone by default' internet users* (Ofcom, 2016). Grey literature is cited hereafter with an * to differentiate it from journal articles.

The final set of materials (n=82) of 66 journal articles and 16 grey literature items was coded using thematic analysis. This firstly involved a general categorisation of the articles into a number of foci important on the basis of digital inclusion and information literacy, such as Internet access, digital skills, social inclusion, and learning. The second level of analysis involved the meticulous reading of the texts in order to identify and refine themes and

subthemes. Through this process the following themes and subthemes emerged: Theory and Methodologies, Terminology (including subthemes on Digital Inclusion, Information Literacy, and Rurality), Approaches to Digital Inclusion (including sub themes on Differentiation of Digital Inclusion Initiatives, Examples of Digital Inclusion Initiatives Intended for Women, The Use of Mobile Technology in Digital Inclusion**,** Digital Inclusion Frameworks, Measurements and Evaluations), Digital Inclusion Training, and Digital Inclusion, Information Literacy, Health, and Well-Being.

Although all the papers were coded, for the purpose of conciseness not every paper is referred to in the text of the analysis; however, a supplementary reference lists provides the complete set of analyzed journal articles and grey literature.

Description of the Reviewed Literature

The reviewing identified a number of key themes and relationships that paint a complex landscape of enquiry, scope for critique, and opportunities for further research.

Journal articles focused across a range of *demographics*, with a limited number related to just women. Indeed, only a fraction of the academic studies sourced, such as Freeman et al.*,* (2016), Jiménez-Cortés et al. (2015), Martínez-Cantos (2017), Potnis, (2015), Rashid, (2016), and Rebollo and Vico (2014) specifically link digital inclusion and women's health and well-being in rural communities.

The majority of the journal articles tended to be more focussed on the *digital divide* (Adhkari et al.*,* 2017) and *digital inclusion* initiatives across a range of sub-groups in developing countries (Correa & Pavaz, 2016) and developed countries (Freeman & Park, 2015; Shade, 2014; Turkalj et al.*,* 2013); the development of information literacy (Papen, 2013; Yu et al.*,* 2017) and health information literacy (Enwald et al.*,* 2016; Niemelä et al.*,* 2012), or digital literacy skills

(Hughes et al*.,* 2017); gender differences in attitudes and use of ICTs and the Internet (Singh, 2017); and the relationships between digital inclusion, digital inequalities and social inclusion (Park, 2017). Journal articles related to *information literacy* tended to come from the discipline of Information Science, although researchers in other fields used varying terminology such as multiliteracy, transliteracy, or digital literacy to describe aspects of information literacy (Aires, 2014). In comparison, journal articles related to digital inclusion came from a wider selection of disciplines such as ICT for Development (ICT4D), Human Computer Interaction, Geography, Education, Health, Rural studies, and Information Science.

There was only a limited crossover between the concepts of digital inclusion and information literacy. Journal articles related to information literacy tended to focus on effective use of the Internet (Berger & Croll, 2012) or Internet/technology adoption (Chiu & Liu, 2017; Yu et al*.,* 2017). Whereas journal articles regarding digital inclusion referred to a plethora of vocabulary related to digital skills and literacies, and technology and infrastructure, the angle of the articles was often influenced by the research discipline of the journal. For example, journal articles from Computer Science and ICT4D tended to have more of a bias towards digital infrastructure, technology and access (Ferreira et al*.,* 2016; Whitney et al*.,* 2011) whereas Geography focused more on rurality (Roberts et al*.,* 2015) and Information Science on digital skills and motivation (Thompson & Paul, 2016).

Journal articles referred to a plethora of *organisations* where people would go to access computers and the Internet such as public libraries (Fourie & Meyer, 2016; Real et al*.,* 2014); community centres, cybercafes and local agencies (Berger & Croll, 2012); telecentres (Ferreira, 2016; Kapondera & Hart, 2016); and education centres and schools (Salinas & Sánchez, 2009;

Wei et al*.,* 2013). Bertot et al*.* (2014) state that public libraries were often the only providers of free broadband Internet service and computer terminals for communities.

Overall, the limited number of journal articles specifically on the review topic highlights that there is little academic research in relation to digital inclusion on women's health and well-being in rural communities. While the majority of the journal articles focussed more broadly around the subject of the review, academic research on this topic appears fragmented, meaning research is spread across a range of disciplines, and the focus of the articles, theoretical stance and methods used vary, thus potentially hampering the development of a coherent body of work (Meijer & Bekkers, 2015). The inclusion of some grey literature was essential in addition to the academic literature in order to provide further understanding, richness, and currency. Therefore, the review includes interdisciplinary research in the area and the grey literature, while highlighting gaps and setting an agenda for future research.

Theory and Methods

As Table 1 summarizes, the studies used a variety of qualitative, quantitative, and mixed methods. Whilst the review highlights some use of theory, only a very small number of journal articles used any underpinning theory (8 out of the 66 journal articles). For example, apart from Diffusion of Innovation Theory (Rogers, 2003) which appears in two articles, all the other theories have only been used in one paper.

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Activity Theory is discussed by Aires (2014) to explore the opinions of parents and teachers on the Magellan (Magalhães) digital inclusion Initiative in Portugal, to investigate common understandings and contradictions in the dissemination of the digital technologies and digital inclusion in families and schools in rural communities; Diffusion of Innovation (DOI)

theory is used in two articles. Correa et al. (2017) use elements of DOI combined with van Dijk's (2005) Relational/Network Approach to understanding digital inclusion, where consideration of people's context, position in a community, resources, and social networks are necessary to understand their adoption of ICTs. Kapondera and Hart (2016) invoke DOI as a theoretical framework to examine the factors influencing the use of telecentres in rural areas by means of a case study of Lupaso Community Telecentre, in a remote region of Malawi. Potnis (2015) employs the Global Model of Human Information Behaviour as a conceptual model using three constituent constructs—1) context of information needs, 2) information-seeking behavior, and 3) information processing and use—to examine the information use of poor female mobile phone users in rural India. Hughes et al. (2017) use Informed Learning Theory to underpin the development of a new framework to support digital literacy learning through social living labs examined through, a voluntary community organisation in North Queensland, Australia. Madon et al. (2009) apply Institutional Theory to analyse three digital inclusion projects to identify processes of institutionalization crucial to the long-term value, sustainability, and scalability of digital inclusion projects. Yu et al. (2017) use Media Richness Theory to discover the psychological factors that influence ICT adoption behavior of residents in a rural village in Taiwan. Finally, Structuration Theory is used by Correa and Pavaz (2016) to explore Internet adoption in isolated rural communities in remote villages in Chile, considering people's capabilities to choose what they value (i.e., psychological resources, attitudes toward technologies) and social structures (social institutions, cultural norms, and social context).

Terminology

Due to the interdisciplinary nature of the review topic, the theme of the need for shared vocabulary and standardisation of terminology emerged from the journal articles, particularly in relation to the concepts of digital inclusion and information literacy.

Digital Inclusion

Very few journal articles defined or attempted to describe or explain the concept of *digital inclusion.* Indeed, not all journal articles specifically included the phrase "digital inclusion", but were clearly focussed on research in relation to digital inclusion activities using alternative phrases such as *adoption of the Internet* and *ICT access.* Jaeger et al. (2012) define digital inclusion as "the policy developed to close the digital divide" and to "promote digital literacy through outreach to unserved and underserved populations" (p. 3). Thompson et al. (2016) state that digital inclusion is a key component of modern social justice as "the ability of the individual to participate fully in society is increasingly tied to the ability to access and to use digital technologies in a meaningful way for social, political, and economic participation" (p. 93). Hashim et al. (2012) propose that digital inclusion encompasses three areas: access, technology literacy, and content services. According to Rashid (2016), digital inclusion focuses not just on levels of access to ICTs, but also on factors such as motivation, knowledge, and skills that enable individuals to have the ability to meaningfully engage with technology and online information.

Information Literacy

Journal articles related *to information literacy* sometimes included a definition or clarification of the concept such as the Association of College and Research Libraries' Information Literacy Competency Standards for Higher Education (Dorner & Gorman, 2011), the American Library Association and the Australian and New Zealand Information Literacy

Framework (Williamson & Asla, 2009), or the 2005 Alexandria Proclamation on Information Literacy (Jacobs & Berg, 2011, p. 384).

Further clarification of the concept of information literacy was provided by Martzoukou and Abdi (2016) within the context of everyday life, stating that information literacy "is regarded as an important condition for civic participation and engagement, informed citizenship, health and well-being" (p. 634). Drawing on theories from Information Science and New Literacy Studies, Papen (2013) presents a view of information literacy not primarily as a skill but as a social information practice. Papen argues that researchers studying information literacy need to look beyond people's abilities to search for and understand information; rather, they need to focus their attention on the contexts within which such information is used. As Yu et al. (2017) highlight, information literacy is about making sense of information found online that is relevant to an individual's circumstances and specific context, and argue that "information literacy is an important factor in new ICT adoption and increased ICT usage" (p. 206).

Information literacy is also clarified in relation to how it helps make informed choices relating to the health and well-being of individuals and families, such as in articles referring to the concepts of Health Information Literacy (HIL) (Martzoukou & Abdi, 2016) and Everyday Life Health Information Literacy (EHIL) (Niemelä et al., 2012). The presence of HIL "is essential for making health decisions and is considered an important prerequisite for promoting and maintaining an individual's health" (Martzoukou & Abdi, 2016, p. 649) and for "engaging in an informed dialogue with healthcare professionals" (CILIP, 2018, p. 5).

Rurality

The issue of *rurality* was discussed within the journal articles but with limited clarification of the actual meaning of the term. Despite the high levels of connectivity in

developed countries and growing Internet access in developing countries, digital inclusion in rural areas remains a strong concern for policy makers (Correa & Pavez, 2016; Yueh et al., 2013). Indeed, despite many policy-making efforts that have promoted Internet connection in rural areas, the evidence suggests that digital inclusion is a multifaceted and complex phenomenon that is not "solved" after access is provided (Correa et al., 2017).

Boulos et al. (2014) discuss how the higher costs associated with the installation of digital infrastructure for mobile and broadband in rural areas compared to urban areas is overcome through the concept of "distributed cities", where small neighbouring towns and villages (e.g., the Scottish Highlands and Islands) unite together and pool their resources to form a larger "distributed city" and improved economies of scale.

Pavez et al. (2017) highlight the importance of understanding rurality, and exploring how people from rural and geographically isolated contexts may experience digital connection differently from an urban perspective. This supports findings by Correa et al. (2016) which showed that remote rural communities face specific characteristics, such as lack of economic resources, geographic isolation, an aging population, and out-migration of young people, that need to be considered when thinking about digital inclusion initiatives for their particular context.

Approaches to Digital Inclusion Initiatives

The following section provides details of approaches to digital inclusion initiatives, following the subthemes of Differentiation of Digital Inclusion Initiatives; Examples of Digital Inclusion Initiatives Intended for Women; The Use of Mobile Technology in Digital Inclusion; and Digital Inclusion Frameworks, Measurements, and Evaluations.

Differentiation of Digital Inclusion Initiatives: Levels and Approaches

When describing approaches to digital inclusion initiatives, journal articles tend to use a *macro-* or *micro-level* perspective. Journal articles using a macro-level perspective take a top-down approach to describing digital inclusion and focus primarily on digital inclusion policy and agenda setting issues on a national or international scale (Hughes et al., 2018; Shade, 2014; Martínez-Cantos, 2017). This compares with journal articles taking a micro-level perspective, which look at specific local or regional digital inclusion projects and case studies (Madon et al., 2009). Some journal articles initially provide a macro perspective and then provide an example of an initiative at micro-level (Berger & Croll, 2012; Broadbent & Papadopoulos, 2013).

Digital inclusion initiatives are also described in relation to their activities. For example, Armenta et al. (2012) differentiates digital inclusion initiatives between those that take an *access driven/infrastructure approach* and those that take a *user-centric approach*. Indeed, the debate that the provision of technology, infrastructure, and access alone is not enough to get people online is acknowledged in several journal articles (Correa et al., 2017; Freeman & Park, 2015; Haenssgen, 2018; Livingstone & Helsper, 2007).

Haenssgen (2018) adds that the techno-centric focus in ICT4D has been criticised for its emphasis on the social embeddedness of technology, user behaviour, and different forms of use, yet highlights that the discipline is gradually transitioning towards broader research on technological and social development, that permits locally grounded conclusions. Armenta et al. (2012) provide an example of how a techno-centric approach in Mexico was not effective and lacked community participation. Correa and Pavaz (2016) note similar findings when evaluating the experiences of individuals in rural communities in Chile that had benefitted from a public/private initiative called *Todo Chile Comunicado* (All Chile Connected), which provided subsidies for 3G wireless connections. They found there was a lack of motivation and a level of

scepticism among the community participants in adopting the new mobile technologies, again confirming physical access alone is not sufficient.

Correa et al. (2017) highlight government top-down approaches to digital inclusion initiatives by discussing programmes in Latin America targeting rural areas, in Argentina, Bolivia, Brazil, Chile , and Colombia. Their research confirmed that most of these policy-making initiatives focused on the provision of infrastructure; yet while access to both devices and infrastructure connection cannot be dismissed as a logical first step, it does not necessarily entail Internet adoption, particularly in isolated, rural contexts. The researchers recommend that policy-makers should take into account the social, cultural, and economic context of where these initiatives are implemented.

In comparison, Madon et al. (2009) provide a micro-level analysis of three digital inclusion projects: the Akshaya e-literacy project in the state of Kerala in India, a community-based ICT project in South Africa, and a telecenter project in Sau Paulo in Brazil. The researchers describe how the projects changed significantly over time and demonstrate a complex mix of success and failure, and how, while the projects are unique in themselves, they also share common features:

- enrolling government support

- generating linkage to viable revenue streams

- getting symbolic acceptance by the community

- stimulating valuable social activity in relevant social groups

The Kerala project, for example, *got symbolic acceptance by the community* by linking the e-literacy project to Kerala's development philosophy, through grassroots campaigning; and *stimulated valuable social activity in relevant social groups* by widespread participation of

groups, such as Muslim women who are often part of the socially excluded. Madon et al. (2009) argue these successful common features are of relevance to digital inclusion projects, particularly in the developing world.

Examples of Digital Inclusion Initiatives Intended for Women

The main drivers behind most digital inclusion initiatives aimed at women are related to ensuring access, improving digital literacy, and working towards gender equality and participation of women in the digital world (ITU, 2017a*). ITU's Gender Digital Inclusion Map (2017b*) provides a list of digital inclusion initiatives from 97 countries around the world aimed at women.

In the grey literature, the report *Development and access to information* (IFLA & TASCHA, 2017*) has a specific focus on women and the need for meaningful access to information and information capabilities, and provides examples of digital inclusion initiatives, mainly in public libraries. In Uganda, the National Library's digital skills training program is offered in local languages and is designed for female farmers. In Burkina Faso, the Girls' Mobile Health Clubs located in village libraries provide access to health information while providing information literacy and technology skills. In Chile, women, young adults, and low-income families receive preferential access to all BiblioRedes, Chile's national network of some 400 library-based *infocentros*, which offer free digital literacy classes. Additionally, governments have started to consolidate public-private collaboration with different organizations, driving initiatives that empower women through technology. Some examples are Intel's "She Will Connect" program in Kenya, Nigeria, and South Africa; Mexico's "Código X;" and India's "Internet Saathi" (IFLA & TASCHA, 2017*). In most cases these digital inclusion initiatives, through the use of technology, empowered women by ensuring they have equal access to

information and education, enabling them to gain knowledge and confidence and make informed decisions on issues such as family planning and healthcare. Chile's network of Infocentros, designed to be women-friendly spaces, is an example of an initiative that has empowered women through the combination of providing a trusted, safe place with digital skills training that has enabled them to develop knowledge and skills which they can use in their everyday life. Importantly, this initiative has stepped away from the "macho culture found in Internet cafés", enabling women to talk and help each other and get help from directors of the centers (often female), in a way not possible with men (IFLA & TASCHA, p. 81, 2017*).

However, for any of this digital inclusion work to happen, social barriers such as cultural demands, illiteracy, and lack of access to education need to be overcome (IFLA & TASCHA, 2017*). The World Wide Web Foundation (2015*) supports this point, stating that "the Internet can support women in making informed choices about their bodies and health, but without adequate access to safe, legal and affordable sexual and reproductive health services and action against practices such as early marriage, these choices cannot be implemented" (p. 47).

As alluded to earlier, only a very small proportion of the journal articles sourced in the review—such as Freeman et al. (2016), Jiménez-Cortés et al. (2015), Martínez-Cantos (2017), Potnis (2015), Rashid (2016), and Rebollo and Vico (2014)—specifically related to digital inclusion initiatives aimed at women, with reference to health and well-being in rural communities. This therefore highlights the limited amount of research on this topic and the potential for further research

The gender digital divide was clearly referenced in the literature and was particularly evidenced in case studies from the developing world and in rural areas (Ferreira et al., 2016; Rashid, 2016; Rebollo & Vico, 2014). These outlined the information experiences of women,

particularly in relation to their access and adoption of using technology and the Internet and the barriers that they faced. A recent report by Intel (2013*) entitled *Women and the Web* reported that one in five women in India believes the Internet is "not appropriate" for them or useful, and that their families would disapprove. Yet positive aspects about being more connected included how mothers noted that it supports their children with homework and education (Correa et al., 2016).

Rashid (2016) states that research on gender and ICTs has for the most part been centred on the concept of the gender digital divide, particularly in relation to access to provision and the fact that proportionally more men than women use the Internet. However, other articles, such as Martínez-Cantos (2017), looked more towards gender differences in attitudes, self-efficacy, and the experiences of men and women in using computers and the Internet. Shade (2014) provides a critical overview of the changing digital inclusion agenda in Canada, describing how that country played an international role in promoting gender equity in access to the Internet. Yet in recent years, despite the continued persistent issue of digital exclusion, the government agenda of online gender equity has significantly diminished and there has been a gradual disinvestment in funding for programs for Internet access.

As highlighted by Rashid (2016), to reduce the gender digital divide there is a need for digital inclusion policy interventions to not only focus on the supply-side of providing ICT equipment and connectivity infrastructure, but to also include "a more nuanced understanding of the behaviour and use of ICTs by women in meaningful ways to enable them to fulfil specific individual motivations and needs" (p. 327).

The Use of Mobile Technology in Digital Inclusion

The use of mobile technology was identified as a key element in digital inclusion activities in the review. In the grey literature, TASCHA and IFLA (2017*) confirm that "for the billions of people coming online for the first time, mobile phone and increasingly smartphones are their point of entry to the Internet" (p. 31). GSMA's report *Bridging the gender gap: Mobile access and usage in low-and middle-income countries* (2015*), and the report *Development and access to information* (TASCHA & IFLA, 2017*), both provide insights into the use of mobile technology by women and its impact on digital inclusion. Although not specifically focused on women, the UK Ofcom report *'Smartphone by default' internet users* (2016*) provides further insight into the use and behaviour of individuals whose only access to the Internet is via a smartphone, and the implications this has in relation to the user experience and digital inclusion. For example, completing online forms (for government services) and creating and editing document (such as for a CV) via a mobile phone were cited as being particularly challenging. In the Good Things Foundation's Library Digital Inclusion Fund Action Research project evaluation, the use of mobile technology was a key enabler for the research participants getting online through public library WiFi (Good Things Foundation, 2016c*).

The use of mobile technology was also referenced in the academic literature. Correa et al. (2016) found that despite not being able to get good service, many people from Chilean rural communities purchased mobile phones to use when they travelled outside their village. Haenssgen's (2018) study in rural India argued that households without mobile phones are increasingly disadvantaged in their healthcare access, stating that "phone diffusion leads [healthcare] providers to expect health-related phone use among the population" (p. 371).

Rashid (2016) (based on research in developing countries) found that although women rely less on computers and the Internet, they are more likely to use mobile phones compared to

men. Yet Potnis's (2016) research on rural women in India highlighted that women often spoke about rumours and gossip on how mobile phones can cause health problems, thus deterring them from adopting and using mobile phones. Focus group discussions in research by Pavaz et al. (2017) also revealed negative perceptions of how the Internet and mobile devices were viewed as intrusive and disruptive to their way of life, with participants referring to the "adverse and harmful consequences attributed to the Internet, including addiction and isolation" (p. 17).

Haenssgen (2018) also states that mobile technology has become so pervasive in some domains of Western urban life that it is simply expected of everyone to use it so as to not inconvenience others. Yet as stated by Freeman et al. (2016), not everyone has access, the motivation, or indeed the skills to use online services, and many rural regions struggle with slow or unreliable broadband and mobile phone connectivity.

Digital Inclusion Frameworks, Measurements, and Evaluations

Only a limited number of articles focussed on the actual process of measuring or evaluating the success and outcomes of digital inclusion initiatives, highlighting a lack of both underpinning theory as well as evaluation procedures to guide digital inclusion research.

Smith (2015) provides a conceptual framework for analyzing the success of digital inclusion projects, and Madon et al. (2009) identify three crucial factors that must be considered when planning digital inclusion initiatives: the value, sustainability, and scalability of the project. Armenta et al. (2012) provide a seven-stage framework for rural, underserved and less-privileged populations: 1) Identification and evaluation of regional socioeconomic condition, 2) Assessment of external factors which impact the region's sustainable development, 3) Identification of those ICT more favourable to support sustainable development, 4) Analysis of financial viability of ICT infrastructure and operations deployment, 5) Development and implementation of a

technology adoption and training program, 6) Development and implementation of and ICT application focused on the regional sustainable development needs, and 7) Evaluation of the project.

The work of Boulos et al. (2015) related to digital inclusion provides well-being measures calculated through the OECD Better Life Index for the 34 OECD member countries, and the related OECD Regional Well-Being 'How's life where you are?' tool that covers 362 OECD regions. In addition, digital inclusion research by Jones et al. (2015) include Tennant's Short Warwick-Edinburgh Mental Well-Being Scale (SWEMWBS) to measure well-being.

The grey literature contains examples of "outcomes-based evaluation" of digital inclusion initiatives often in the form of a logic model, as an evaluation and communication tool. According to Rhinesmith and Siefer (2017*), this method is useful for communicating the goals and the "theory of change" underlying the work of digital inclusion initiatives to funders. The grey literature also included two frameworks to measure the level of people's digital skills. The UK Essential Digital Skills Framework (Tech Partnership, 2018*) includes five categories of essential digital skills for life and work: communicating, handling information and content, transacting, problem solving, and being safe and legal online. The European Commission's Digital Competence Framework for Citizens 2.1 (Carretero et al., 2017*), includes five competence areas: information and data literacy, communication and collaboration, digital content creation, safety, and problem solving. Both frameworks have been updated to remain relevant. Using the UK Essential Digital Skills Framework (Tech Partnership, 2018*) measures, the Lloyds Bank Digital Index reported that there is a small but increasing digital skills gap between men and women in the UK (Lloyds Bank, 2017*). Rashid's (2016) research on gender differences in ICT access and use in five developing countries also involves the development of

a digital inclusion index. Based on five broad categories—skills, attitude, frequency of use, location of use, and breadth of use—Rashid developed the index specifically to challenge a commonly held assumption in the discourse on technology and gender that "compared to men women are more likely to be lacking in digital competencies" (p. 326).

Digital Inclusion Training

The review identified digital skills training as an important aspect of digital inclusion and the effective use of ICT (Hughes, 2018; Yueh et al., 2013). For example, Martinez-Cantos (2017) note that the EU, in line with academic research and other political institutions around the world, "considers that digital literacy and associated competences play a key role in the development of the *Information Society*, and is becoming a priority in initiatives for social inclusion and human capital" (p. 420). As stated by Ferreira (2016) "users need to feel capable of using ICT administered through training classes and peer support to overcome lack of experience and to encourage participation" (p. 39).

References were made to training and interventions, referring to varying terminology such as digital literacy or digital skills (Martinez-Cantos, 2017) or other inter-related terms such as digital competence (Hatlevik et al., 2015), digital capabilities (Britz et al., 2012), online skills (Zhou & Purushothaman, 2015), Internet literacy (Livingstone & Helsper, 2007), Internet skills (Van Deursen, 2012), computer literacy (Hart et al., 2004), and information literacy (Yu et al., 2017). However, in general few explanations are provided about each of these terms, leaving the reader unclear of the meaning of such terminology.

Only a small fraction of the studies linked the concepts of *digital inclusion* and *information literacy*. For example, the research of Yu et al. (2017) on understanding factors influencing ICT adoption behaviour found that when a digital divide exists, it is important to

keep on investing in information literacy development activities for rural communities to help them develop their ICT competence. Wyatt et al. (2005) extend this point by clarifying that while there needs to be an ability to find and make sense of information found online, it is also important to have "the ability to make sense of generic information that is relevant to one's own circumstances" (p. 213).

Approaches to digital inclusion digital skills training are also discussed. Pischetola (2011) emphasises the need for investment in education and training in schools to utilise the ICT infrastructure and enhance learning. Berger and Croll (2012), in their work on training in basic Internet skills for special target groups in non-formal educational settings, discuss the trainer/learner relationship and the importance of trust. The researchers highlight a successful intervention in Germany where a female teacher was appointed for a group of female learners to prevent them from feeling intimidated and to help create an open learning atmosphere where any question could be raised without embarrassment. Madon et al.'s (2009) research confirms the importance of this approach, highlighting how a digital inclusion project in Mpumalanga, South Africa failed for a number of reasons, including that the trainers were outsiders whose motives were often suspected.

While the review identified the importance of digital skills training, and provided details of specific approaches, there appeared to be a lack of depth in relation to what and how was actually being taught, and this thus provides another opportunity for further research.

Digital Inclusion, Information Literacy, Health, and Well-Being

The health and well-being benefits of digital inclusion initiatives received few mentions in the literature (Ferreira et al., 2016; Park, 2015; Rashid, 2016) and did not always relate

specifically to women in rural areas, or provide specific examples of how health and well-being benefits are gained through digital inclusion initiatives.

For example, Broadbent and Papadopoulos (2013) found that participants reported some improvement in their sense of well-being attributed to the provision of ICT, citing connecting with relatives, reading news in their own language, and getting access to online services as important conduits to improved health and well-being. Other journal articles referred specifically to health practices. For instance, Freeman et al. (2016) state how poor connectivity inhibits basic health practices, such as contact between patients, physicians, and colleagues, and how rural health services would benefit enormously from effective mobile and Internet services, particularly to communicate with their patients. Hart et al. (2004) highlight how the use of the Internet can increase patients' knowledge about their health conditions, although patients in their study were often too overwhelmed by the information available on the Internet to make an informed decision about their own care.

In the grey literature, as part of their evaluation of the NHS Widening Digital Participation, Good Things Foundation (2016a*) stated there is "a huge crossover between those who are digitally excluded, and those at risk of poor health" (p. 8). Although not specifically aimed at women or rural areas, the project was set up to help improve the digital health skills of people in hard-to-reach communities. Similarly, the English My Way project, also evaluated by Good Things Foundation, designed to help people gain English language skills through a blend of digital tools and face-to-face training sessions, found that participants gained health and well-being benefits (Good Things Foundation, 2016b*). Both projects depended on a network of hyperlocal community organisations and agents who were able to reach out to hard-to-reach communities. Deloitte's (2014*) report highlights how an empirical study undertaken in rural

villages in India to analyse the impact of Internet access on child mortality rates found that villages with Internet access that "provided specific online health information to women during and after pregnancy had 14% lower child mortality rates than villages without the Internet" (p. 19*).

As referred to earlier, information literacy is important for health and well-being (Martzoukou & Abdi, 2017) and people's adoption of the Internet (Yu et al., 2017). Williamson and Asla (2009) state that information literacy is crucial to the well-being of people in the "fourth age" (a stage of increasing dependence and disability, for those aged 85+). Martzoukou and Abdi's (2017) work on information literacy in everyday life makes a specific reference to the significant role information literacy can play in both the physical and psychological well-being of women. This is particularly the case in a critical life situation, for example, during pregnancy and childbirth, where the way in which women evaluate different sources of information can have a significant impact. Adekannbi and Adeniran's (2017) work on the information literacy of women in rural communities in Nigeria discovered that women had limited, basic knowledge of family planning and that the acquisition of information on family planning was accidental, as a majority of research participants did not have access to health centres.

Discussion

The review highlights a number of specific tensions and contradictions in relation to digital inclusion initiatives, definitions, and the relationship with public policy.

Vague and Inconsistent Terminology

For example, very few journal articles defined or attempted to describe or explain the concept of *digital inclusion,* which as evidenced from conducting this review, has led to ambiguities in the understanding and meaning of digital inclusion in academic research. Further

confirmation of this tension was revealed by practitioners, funders, policymakers, and other key digital inclusion stakeholders at the 2016 Net Inclusion Summit, who identified a lack of a shared vocabulary in defining digital inclusion (Rhinesmith & Siefer, 2017*). Jaeger et al. (2012) neatly sum up the consequence of this tension stating, "it is a challenge to solve a problem you cannot define, and the inconsistency of definitions has affected policy-making processes that have attempted to address these issues" (p. 4).

Relations between Information Literacy and Digital Inclusion

Similarly, tensions in relation to *information literacy* and how it relates to digital inclusion are also identified through the review. For example, information literacy, despite its association with critical thinking skills (Bingham et al.*,* 2016) and its clear relevance to digital literacy and digital inclusion (Adhikari, 2016; Turkalj et al.*,* 2015), continues to be overlooked in digital inclusion policy and practice. This is also confirmed by the lack of linkages found between digital inclusion and information literacy in the review (Wyatt et al.*,* 2005; Yu et al.*,* 2017), as highlighted earlier. The reason for this is partly explained in the work by Jaeger et al. (2012), which explores the inter-relationships between digital literacy, digital inclusion, and public policy, and the fragmented nature of research in this area. They highlights that "while the terms *digital divide* and *digital literacy* have entered into common usage, the term *digital inclusion* is still in its infancy" (p. 3). This suggests that the use of *digital inclusion* as a term may grow over the forthcoming years, thus providing future opportunities to reveal linkages with information literacy.

Another explanation for the lack of linkages found between digital inclusion and information literacy within the review, and a further tension as alluded to earlier, is that, as noted above, researchers in other fields use varying terminology to describe information literacy and

digital inclusion concepts. For example, a small selection of authors including Britz et al. (2012) referred to the application of Amartya Sen's Capability Approach in relation to an information-based rights framework, in which an individuals' ability to use information is influenced by their relative capabilities. Whilst this approach displays similarities with the concepts of information literacy and digital inclusion, it is also highlights the need for a shared vocabulary within digital inclusion research to reduce ambiguities and fragmentation of the research landscape.

Differences between Developing and Developed Country Contexts

Contradictions were also revealed within the review. For example, a clear split was identified between digital inclusion initiatives in developing countries and those in developed countries, which were often discussed in contradictory terms. Research in developed countries tended to make a number of assumptions in relation to access, knowledge, and skills. For example, Whitney et al. (2011) ascertained through their research in five European countries that there is increasingly an assumption that people should be able to participate in a wide range of formal activities such as eGovernment, eHealth and eEducation via their computers and mobile phones. Research in developing countries, however, tended to be more about access and infrastructure; how access does not necessarily entail Internet adoption, particularly in isolated contexts; and how digital inclusion needs the support of reliable broadband and electricity (Correa, et al., 2017; Pavez et al., 2017; Potnis, 2015).

Contradictions were also highlighted in relation to digital inclusion in public libraries in developed countries. For example, Jaeger (2012) states that libraries report across-the-board increases in the use of their public-access technologies, Wi-Fi, training classes, and online resources. Indeed Real et al. (2014) state that public libraries—and rural public libraries in particular—are still the primary source of broadband access for many, highlighting the

importance of public libraries for digital inclusion activities. Yet as highlighted by Fourie and Meyer (2016), Jaeger (2012), and Real et al. *(*2014), this increase in use has occurred concurrently with dramatic decreases in library budgets, government support, and well-trained staff.

Complexity of and Theoretical Approaches toward Initiatives

Another major insight identified from the review is the tension regarding the need to better understand the complexity of digital inclusion initiatives (Madon et al., 2009). For example, only a small number of journal articles, as noted earlier, contain an underpinning theory to guide the research and attempt to unpick the complexity of digital inclusion projects. This in turn has led to clear gaps in digital inclusion research, such as the lack of insight on the content of digital skills training, leaving scope for criticism, but also providing opportunities for future research into this area.

Conclusion

This review provides a number of contributions to the existing literature on digital inclusion and information literacy. First, while the review confirms that there is a global gender digital divide where women lack access to information and digital skills, particularly in rural areas, there is limited research with regard to the role of digital inclusion in women's health and well-being in rural communities. Second, the review identifies that digital inclusion initiatives are attempting to close the digital divide by providing infrastructure and access to digital technologies; by building capabilities and skills in how to use such technologies and online information; and that mobile technology is playing an increasing role in digital inclusion initiatives. Third, from the limited research that does exist, the review confirms that digital inclusion has the potential to contribute to the improvement of women's health and well-being in

rural communities and that information literacy can play a key role in digital inclusion. Fourth, the review confirms that digital inclusion is a complex area of enquiry, and that digital inclusion research appears fragmented and requires more depth (particularly in relation to terminology, digital skills training, linkages with information literacy and use of theory). Indeed, the inclusion of some grey literature was essential in the review in order to provide further understanding, richness and currency. Finally, the review reveals that significant tensions and contradictions exist within digital inclusion practice and policy.

The review does come with its limitations. This review was limited to using two databases, and a selection of grey literature, and so is by no means exhaustive. The exclusion of books and conference papers rendered the search more manageable, as did the omission of the phrase "digital divide" from the search terms which, if included, would have produced a far greater number of articles but perhaps with less specific relevance.

The identification of such issues in the literature and limitations of this study helps identify a future research agenda. First, there is a need for further systematic reviews across more databases and grey literature on the research topic with inclusion of a greater number of search terms/phrases. Second, there is opportunity for further research, particularly in relation to 1) the processes and mechanisms of digital inclusion initiatives, 2) digital inclusion digital skills training where the concepts of information literacy and digital inclusion are brought together, and 3) the experiences of women who have benefitted from digital inclusion initiatives. Finally, there is scope to incorporate more underpinning research theory in digital inclusion research to make sense of this complex situation of enquiry and provide a deeper foundation for both shaping research in this area as well as in understanding and evaluating the process and results.

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Table 1

Range of Theories and Methods Identified in Review

Theories	Methods
• Activity Theory (1)	• action research
• Diffusion of Innovation Theory (2)	• case study
• Global Model of Human Information Behaviour (1)	• ethnography
• Informed Learning Theory (1) *	• interviews
• Institutional Theory (1)	• literature reviews
• Media Richness Theory (1)	• observations
• Relational/network approach (1) *	• questionnaire surveys
• Structuration Theory (1)	

Note: (#) = number of papers using that theory (n=8 papers); * = same paper

Full Set of References in Review Database:

Journal Articles (n=66) and Grey Literature (n=16)

* Grey literature

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