

Young adolescents and digital media

Uses, risks and
opportunities in low- and
middle-income countries: a
rapid evidence review

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Acronyms

AIDS	Acquired Immune Deficiency Syndrome
C4D	Communication for Development
CIS	Commonwealth of Independent States
CPP	Child Protection Partnership
GAGE	Gender and Adolescence: Global Evidence
GSMA	Groupe Spéciale Mobile Association
HIC	High Income Country
HIV	Human Immunodeficiency Virus
ICT	Information and Communication Technology
ICT4D	Information and Communication Technologies for Development
IICRD	International Institute for Child Rights and Development
ITU	International Telecommunications Union
LIC	Low Income Country
LMIC	Low and Middle Income Country
MCP	Multigenerational Connection Program
MDG	Millennium Development Goal
MENA	Middle East North Africa
MOOC	Massive Open Online Course
OECS	Organisation for Economic Cooperation and Development
OLPC	One Laptop Per Child
OSL	Open Space Literacy
RER	Rapid Evidence Review
SDG	Sustainable Development Goal
UN	United Nations
UN CRC	UN Convention on the Rights of the Child
UNCTAD	United Nations Conference on Trade and Development
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNICEF	United Nations Children's Fund
USAID	United States Agency for International Development
WEF	World Economic Forum
WHO	World Health Organisation
WSWM	World Starts With Me

Executive Summary

Research questions

This rapid evidence review examines adolescents' access to and use of digital media (especially mobile phones and the internet), together with the associated digital skills and practices, opportunities and risks, and forms of safety mediation, in low- and middle-income countries (LMICs). The review is especially concerned with 10- to 14-year-old girls' digital media uses, although little evidence specifically addressed this group. It is guided by two overarching research questions:

1. What do scholars and practitioners know about how young adolescents are using digital media (computers, mobile phones and other information and communication technologies, ICTs) and the key challenges these children face? What are the opportunities involved in their use of such media and what are most significant gaps in our knowledge?
2. What evidence is there of local, national and international development programmes' effective use of digital media to target 10- to 14-year-olds (rather than older adolescents)? What are the most significant gaps in the existing knowledge about these interventions and their outcomes?

Key concepts and terms

To answer these questions, the review sets out a conceptual framework that defines the key terms and examines established knowledge regarding (i) ICTs and digital media, (ii) gender and adolescence, and (iii) Communication for Development (C4D) and Information and Communication Technologies for Development (ICT4D) programmatic interventions in LMICs. These clarify, from the outset, that:

- Spreading from high- through to middle- and low-income countries, more children, particularly in high- and middle-income families, are going online, more frequently, as they gain access to mobile phones, tablets, laptops or games consoles, along with other digital media and associated connectivity. However, many children lack access, and for many who do have

some access, digital media are expensive, unreliable and limited in their contents or services and/or difficult to use.

- In LMICs in particular, top-down or externally-led strategies to promote development through the deployment of ICTs have often been unsuccessful, leading to increasing interest in and support for C4D initiatives based on dialogic and participatory approaches that are responsive to, respectful of, and embedded in particular communities.
- ICTs and digital media have become widely associated with considerable hopes as a potential means of supporting children's needs and rights for provision, protection and participation. Recently, the potential of ICTs and digital media has been explicitly linked to delivery of the new Sustainable Development Goals (SDGs) that came into effect in 2016. But the spread of ICTs and digital media has also raised many concerns in terms of exacerbating forms of exclusion, amplifying pre-existing risks, or advancing state surveillance and/or commercial exploitation.
- Although evidence regarding children is lacking in many countries – including even data on how many children use the internet, or their age and gender – all available indicators suggest persistent gender gaps in terms of access and use of ICTs and digital media. In homes where digital technology is provided by parents or carers, it is more likely that girls will be given access at an older age than their male peers; that the access which they are given will be more curtailed (through sharing) or surveilled; and that the idea of ICT-related careers will be associated more with boys than with girls. Among older children in low-income households it is more likely that girls' income will be incorporated into family survival while older boys might expect to be able to keep a portion of their earnings to support mobile phone access. Precisely how these factors translate into younger girls' digital skills, practices, opportunities and risks is largely unrecorded – hence this review.

Methodology

The methodology for this rapid evidence review follows the GAGE principles and protocol. The main strategy was a keyword search of major online databases, based on explicit inclusion criteria, followed by a structured selection of 481 unique search results, then a coding of 188 results. In all, 62 empirical studies were read and analysed in detail, supplemented by a set of relevant framing studies. In addition, the authors consulted a range of international experts for further sources, and constructed eight case studies of noteworthy programme interventions designed to harness the potential of ICTs and digital media to improve children's lives in LMICs. Since this was a rapid rather than a systematic review, focused on English language publications in a fast-moving technological field, the findings should be read with due caution.

Key findings and recommendations

Key findings and recommendations include the following:

- In contexts where children do have access to digital media, their access often begins in late childhood, may or may not involve access to the internet, can involve shared or community-based rather than personal ownership of devices, and is often greatly enjoyed and valued by children, despite deep and persistent inequalities in and difficulties of access and use. Children's enthusiasm for digital media, often skilled and creative, albeit sometimes ambivalent, provides a promising basis for interventions that advance their needs and rights.
- Children are not, however, 'digital natives' who need little support in making the best of digital media. Few have received much guidance from school or home, too many lack skills other than basic functional skills, with particular gaps in their critical information literacy skills that merit urgent attention, especially as part of any programme that uses digital media to meet its objectives. Where children are knowledgeable in relation to digital media, which may or may not include an understanding of the online sphere, this often goes unrecognised by teachers, therefore being little valued in or extended by school.
- Important gender inequalities concerning digital media exist in relation to internet access, digital skills and patterns of use, and opportunities and outcomes, with wider gaps in LMICs. However, finding robust and up-to-date statistics collected internationally is difficult, with data on non-adult populations being particularly patchy. Hence, the actual scope and consequences of digital inequalities remains largely deductive, and more research is needed.
- Qualitative and participatory research has documented with care the mundane and everyday practices by which children's access to digital media – and to the internet in particular – is impeded, especially for poor or rural children and for girls. Seemingly equal provision, therefore, often turns out to be unequal in practical contexts. Thus well-intentioned interventions based on assumptions of digital skills and/or internet access can exacerbate rather than ameliorate pre-existing inequalities. Children's access to digital media is partly mediated by teachers and parents, partly by peer norms; in both cases, such mediations should be anticipated and addressed when digital media are incorporated into programme interventions.
- Many reports on ICT-related provision in LMICs have been generated by organisations, institutions and corporations with vested interests in promoting the spread of ICTs or connections to other organisations that have commercial interests. There is, therefore, a pressing need for practitioners who institute interventions with children, and for communities where such interventions are proposed, to interrogate the claims of such studies in their own practical contexts, to observe and be cognisant of the associated issues of technical and electronic obsolescence before making any investments, and to explore local low-tech alternatives.
- A number of interventions have focused on the straightforward provision of digital media hardware or contents, and many – especially education and information programmes – have failed precisely because they have neglected the above points. Where digital media interventions have been more successful, they have devoted time and resources to testing and developing low-cost sustainable hardware, to ensuring equal participation, to supporting necessary digital expertise, and most important, to respecting children's contexts, needs, interests and perspectives

- in planning and implementing the intervention.
- Most ICT-related interventions have focused on education or provision of health information, with some efforts towards amplifying children's voices and participation. There are indications that as children gain familiarity with the internet, some value it as a confidential source of health information; it remains unclear, however, whether they gain sustained benefits from such information or whether they have sufficient discernment to judge what information to trust. Media and information literacy education for all children should therefore accompany provision of digital media. In relation to these digital opportunities, there are few gender-disaggregated findings available.
 - Several qualitative studies document the continued and entrenched significance of older media such as film, radio, television and comics in the lives of children living in LMICs. Several development-related digital interventions and entertainment education initiatives in the literature draw on the formats and iconography of older media forms, or on the personalities, characters and narratives of television, film, comics or radio. But insofar as these tend to make use of television characters that are popular in the Global North, often from propriety shows, it is preferable to evaluate and plan digital media interventions that build on content already familiar to children from their own life contexts, including traditional audio-visual and print media.
 - In terms of the online risk of harm to children, this is closely related to the conditions of their access. For instance, mobile phones can be used to distribute pornographic content partly because they are hard for teachers or parents to monitor, while internet café owners may overlook or even enable sharing pornographic content with the children who visit in search of internet access. Both traditional gender inequalities and the mere fact of access bring more risk, and thus girls and those living in urban areas tend to experience more online sexual or violence-related problems. A small but significant minority meet offline someone they first met online, giving as their reasons the desire to get to know someone better, loneliness, boredom, curiosity, verification and an opportunity to fall in love. Often young people are aware of risks and disadvantages associated with social media and take pro-active and responsive steps. As some research

shows, children and adults do not always agree on which risks result in harm to children.

- Indeed, despite popular anxieties about the risk of harm associated with children's internet use, little research has examined children's own concerns about the internet, or has much traced when and whether exposure to online risk (e.g. of pornography or bullying) results in sustained harm. Global North research is stronger in establishing that children who experience (or are vulnerable to) risks in their everyday (offline) lives are more likely to encounter online risks, potentially amplifying the resulting harms and making interventions or support more difficult. This especially applies to girls for, although boys are often associated with higher risk-taking, girls report more upsetting or harmful experiences online. Researchers, policy-makers and practitioners should therefore address questions of risk with care, looking for possible online extensions of offline risk, ensuring that support and coping resources address online as well as offline dimensions of risk, paying particular attention to children who are vulnerable or marginalised while working to improve the resilience of all children as they engage with digital media.

Keywords

ICT, digital media, internet, mobile communication, Communication for Development (C4D), ICT for Development (ICT4D), programme interventions, children, adolescence, girls, gender, race, social class, access to digital media, digital skills, online opportunities, online risks, inequalities, digital exclusion, low- and middle-income countries, Global South, child rights, evidence and evidence gaps, evidence-based policy, critical perspectives, young adolescents, 10–14, older adolescents, 15–24, knowledge gaps.

Introduction

This rapid evidence review seeks to identify the experiences of young adolescents (10–14 years old) in relation to ICTs and digital media. The focus is on adolescents' access to and use of digital media (especially mobile phones and the internet) in low- and middle-income countries (LMICs). Access and use are linked to evidence on inequality, risks and opportunities in specific contexts. The focus on contexts opens up questions about the roles and potential of key mediators (family, educators, welfare policies, community, industry, rights-based and governance bodies) to shape – and be shaped by – adolescents' digital media experiences. The review especially focuses on younger adolescent girls in order to understand the potential and effectiveness of socio-economic, educational and development-linked interventions that use digital media as part of their strategy. This permits suggestions to improve the design of programme interventions, supporting Gender and Adolescence: Global Evidence's (GAGE) objective to design and implement evidence-based policy.

The review fills a significant knowledge gap in GAGE priority areas of knowledge generation, given that increasingly in low- and middle-income countries people are gaining access to internet connections via mobile phones or forms of community access (e.g. local area network (LAN) or cybercafés), albeit with variable and often unreliable connectivity. Also relevant is that young people are often seen as being at the forefront of internet usage, yet girls and women, and especially young girls, continue to face significant inequalities in access to hardware and to internet connections (ITU and UNESCO, 2013; Raftree and Bachan, 2013; The World Bank, 2016). This is important insofar as many government and non-governmental policies and interventions now seek to harness the potential of ICTs and digital media ostensibly to improve girls' lives in terms of education, health, information, communication or participation – and yet, at other times, those same organisations may underestimate or neglect or misunderstand this potential.

Our review takes a critical perspective, recognising that ICTs are regulated by state bodies either directly

or through corporate franchises, and quite often in a restrictive manner involving censorship, thus they can be used as tools for surveillance (Chattopadhyay, 2011; Gomez, 2004). Further, since ICTs are generally commercial, increasingly owned by major (foreign) conglomerates and proprietary ('black boxed') in how they treat the rights, privacy and interests of their users, they can also be used for commercial exploitation. While we therefore recognise that ICTs tend to entrench authority and power hierarchies as well as magnifying existing and introducing further risks and inequalities, we also acknowledge the legitimate interest of many policy-makers in whether and how ICT-based interventions can be beneficial, given their considerable advantages of cost-efficiency, scalability and 'share-ability', as well as having a direct appeal to girls and boys the world over. Thus we seek to understand how educational, health-related or other interventions designed to benefit adolescent girls can most effectively take advantage of ICTs and digital media for programme delivery while curtailing or acknowledging the limitations and risks.

We draw on insights and critiques from the fields of media and communications, Communication for Development (henceforth C4D) and the complementary field of ICT for Development, (henceforth ICT4D), including alternatives to technological determinism, and unpacking the 'black boxing' of 'media' and 'the internet'. We note, with caution, the potential relevance of the framing assumptions and empirical findings already developed through some 20 years of research on girls and digital media in high-income (Global North) contexts. More importantly, we ask, again with caution, given the still-emerging evidence base, what is now being learned about girls and digital media in low- and middle-income countries?

The review addresses two overarching questions:

1. What do scholars and practitioners know about how young adolescents are using digital media (computers, mobile phones and other ICTs) and the key challenges these children face? What are the opportunities involved in their use of such media, and

what are most significant gaps in our knowledge?

2. What evidence is there of local, national and international development programmes' effective use of digital media to target 10- to 14-year-olds (rather than older adolescents)? What are the most significant gaps in the existing knowledge about these interventions and their outcomes?

Conceptual framework

This rapid evidence review concerns the intersections among three domains of knowledge – ICTs and digital media, gender and adolescence, and Communication for Development (C4D) and ICT for Development (ICT4D) programmatic interventions in low- and middle-income countries (LMICs). We begin by framing these domains and their intersections. Each is contested, even with regard to terminology. For instance, how should scholars, stakeholders and practitioners label the expanding and variable array of new or emerging digital technologies? This is not just a question of semantics but a matter of inclusiveness, especially once we look beyond devices (mobile phones, consoles, tablets, laptops, etc.) or services (social networking, health information sites, child helplines) to encompass technological infrastructures (databases, communication networks, pricing plans and corporate policies). Or, equally thorny in different ways, given the still potent teleological and normative assumptions built into the notions of child development and international development (see Escobar, 2011; Manyozo, 2012, on international development, and Beazley et al., 2009 and Banaji, 2017, on childhood and development), how shall we address the lively contestation over the notion of ‘development’ in relation to either children or countries?

In the three scene-setting sections that follow, we draw on established research to identify the central terms, debates and findings that have shaped these fields in the past decade or more, so as to position the findings of the main evidence review that follows. Each section leads us to interpret the two overarching research questions in distinct ways, drawing out pertinent sub-questions as they apply particularly in LMICs. Particularly, we build on key reviews conducted in the last 10 years with an international and/or Global South scope (many more have concentrated on the Global North). While few of these concentrate on young adolescent girls and several need updating given the rapid pace of socio-technological change, they offer some insights into the existing, quite often scattered, research (Cortesi et al., 2015; Gasser et al., 2010; ITU and UNESCO, 2013; Kleine et al., 2014; Livingstone and Bulger, 2014; Raftree

and Bachan, 2013; UNICEF, 2012; Banaji 2015, 2017; Angle et al., 2014; de Pauw, 2011). These reviews provide the baseline knowledge on which our rapid evidence review seeks to build. Thus they are cited in both the conceptual framework and the findings sections of this report.

ICTs and digital media

Worldwide, more and more children are going online, more frequently, having gained access to ICTs – primarily through mobile phones, tablets, laptops and games consoles, along with other online digital media. ICTs take different forms, including online, networked, mobile and also more established media (since radio, television, film, press etc., all of which are increasingly accessible via online platforms); ‘online’ itself includes diverse internet services including information, gaming, social media, streaming and other services. Hardware or devices (usually mobile phones), locations (whether home, work, school or community-based locations varying from informal sharing to cybercafés or public access points) and types of connectivity (fast or slow, reliable or otherwise, expensive or affordable) all vary hugely.

In an increasing number of LMICs, digital media are becoming more accessible, affordable and personal, even though considerable inequalities persist (Kleine et al., 2014; WEF, 2015; UN ECOSOC, 2015). Equally clear is the tendency towards investing in ICTs as part of the national infrastructure for delivering services, underpinning commerce and connecting the institutions and activities of everyday life. Global North literature suggests that young people are often pioneers in embracing ICTs and digital media, engaging more enthusiastically than adults, and developing skills and innovative practices often unrecognised by parents, teachers and others (Banaji and Buckingham, 2013; Livingstone et al., 2012).

In what follows we use the term ICTs to refer to the provider side, capturing the entire information and communication technology infrastructure, and digital media to refer to the user side – the devices (usually mobile), connections (usually the internet), contents (games, websites, video-sharing, etc.) and services (such

as social networking sites) that children may access and use in their daily lives.

Substantial disparities in the provision of internet access, devices and services persist even within high-income countries (HICs), and are often very starkly evident across different households, communities and regions in LMICs (Banaji, 2017). These disparities are therefore significant in terms of the much-hyped prospects for new forms of online learning and information, for the exposure or protection of children from online risks, and in relation to children's rights to participate in community, civic and political realms. In short, the rapid expansion in digital connectivity now reaching some children, families and communities is sustaining and possibly amplifying important digital and social divides on a global scale (The World Bank, 2016). For example:

- There are huge disparities in use of the internet by region of the world. While internet use is far less widespread in developing than developed countries, usage in developed countries has already reached near-saturation. Since the vast majority of the world's population lives in the Global South, the vast majority of growth in internet use is likely to be located there in the future (see ITU, 2016 figures discussed below; see also The World Bank, 2016).
- Since in the Global South, too, children and young people represent a considerable proportion of the overall population (between one-third and one-half, depending on the country), much future internet use may be by today's children in the world's poorer countries (Livingstone et al., 2015).
- In terms of devices and connectivity, 41% of people in developing countries (19% in the least developed countries, 90% in developed countries) now have mobile-broadband subscriptions (ITU, 2016), far higher figures in all regions than are found for fixed-broadband subscriptions (30% in developed, 8% in developing and 1% in the least developed countries). In short, mobile connectivity is more significant than fixed-line services. This could also make internet access more flexible in terms of times and places of use, and more private or personal in its nature for those users who can access phones and connections.
- On the other hand, connectivity is often much slower and relatively more expensive in the least developed or developing countries than in developed ones, making access to the internet more difficult to get, even

on mobile phones. As a result, the internet remains unaffordable and inaccessible or only sporadically accessible in bite-sized packets, to a majority of the world's population, and particularly to children from low-income families.

- Those able to access the internet face further barriers in relation to the online content accessible to them – the amount of available information and its origins are more often from developed than from developing countries. For example, 85% of the user-generated content indexed by Google comes from the US, Canada, and Europe (The World Bank, 2016) and most of this is in English, Spanish or other European languages. Further gaps exist in relation to digital literacy and skills or the ability to get training or experience with ICTs – hence, even when opportunities exist, not everyone is equally able to take advantage of them. This raises further concerns about the disproportionate exposure of digitally inexperienced adolescents when they do go online, and the higher risk of harm (Livingstone et al., 2012).
- ICTs and digital media disparities occur in parallel with and sometimes even exacerbate other pre-existing inequalities, thus creating multiple disadvantages among and within countries and regions with remote areas or income-poor households being particularly marginalised (Kleine et al., 2014; UNICEF, 2013). Maximising the positive potentials from ICTs requires a good understanding of how technology interacts with social, political and economic factors important for development (Banaji, 2017; The World Bank, 2016). Efforts need to be made to ensure that large swathes of populations in developing countries are not excluded further in terms of voice and presence in an increasingly digitalised world (UN, 2003).
- As ICTs are being integrated into several aspects of daily lives in middle-income and some low-income households, more attention is being focused on digital inequalities and exclusions, among which those related to gender are of a particular concern (UNCTAD, 2014). We explore the key dimensions of gender inequalities and ICTs in the next section.

Within these existing global divides, data on children's access and use of the internet beyond the Global North are largely lacking, so identifying exactly which 'population' or 'usage' statistics include children is difficult. What we do know is that data collected on young people aged 15–

24 suggest that in developing countries they outnumber the older population in terms of internet use by a factor of two or three (ITU, 2015). In the few countries that do collect data on children, the proportion online varies considerably but, averaged across those countries, they go online at a similar rate to adults (within the category of 'child' it may be reasonably assumed that fewer infants go online than adults but that more teenagers do). It is possible, therefore, that the population statistics can be applied to children, although caution is required (Banaji, 2017; Livingstone et al., 2015).

There are several decades of research on children and young people's internet use in the Global North, but there are good reasons to argue that the emerging practices of internet use now being established in LMICs of the Global South should be researched *de novo*. In these contexts – and care should also be taken not to homogenise or unduly generalise across countries and communities in the Global South – internet use tends to be 'mobile first' or 'mobile only', far from the workplace computer transferred to the home that characterised formative internet practices in the Global North (Livingstone and Bulger, 2014). A digital device with or without internet access is often conceived as a shared or community resource rather than as a domestic appliance, although this resource may be commercially provided through cybercafés and the like (Arora, 2010). Access and use may depend on resolving a host of challenges associated with electricity, connectivity, cost, digital skills, social acceptability, spatial privacy and adult permission at the community and individual levels, as well as with commercial viability, investment and government regulation at the level of the state or region (Chigona et al., 2008, 2009; Hilbert, 2010).

It may be that, in LMICs of the Global South, pressing questions concern access and use, recognising that for many children access may be absent, limited, sporadic or otherwise problematic, likely to vary by age, gender, socio-economic status, and other important sources of inequality (Banaji, 2015, 2017; Bosch, 2008). But grasping the opportunities on offer is a crucial task for research too, and so it is vital to examine children and young people's positive online experiences, along with their online practices and motivations related to information, learning, community and civic participation, creativity, social relations, entertainment, personal and commercial use. In so doing one cannot presume that children and

adults will agree on the opportunities afforded by digital media, with many children seeking to gain information (e.g. sexual or health information) or enjoy activities that adults disapprove of. Nor can one presume that online opportunities automatically confer benefits, for many factors mediate this relation (Angle et al., 2014; Soh et al., 2008). These include the roles of peers, parents/carers, teachers and mainstream media, as well as wider societal structures. They also include children's digital skills, literacies and competences, whether gained informally or formally taught.

An intensely debated area of children's online experience is related to their exposure to risk. It is important to ask questions about a range of different types of online risk and their possible connections to risks experienced offline (whether face-to-face or via traditional media). It is also important to recognise the different roles children can play in relation to online risks as receivers, participants and actors (Livingstone et al., 2012). Again, depending on the type of risk, there is no necessity that some degree of risk exposure actually results in harm. In the Global North, there is debate about whether a degree of adversity instead stimulates children's coping responses that ultimately build resilience for most, leaving children who are more vulnerable (online or offline) most likely in danger of harm (Coleman and Hagell, 2007). However, there is also growing evidence that online risk compounds offline risks and vice versa, meaning that use of the internet can amplify and extend the scope and associated harm of pre-existing risks in children's lives. Of course, much remains to be understood about what makes children vulnerable online and how this relates in intensity, scale and typology to offline disadvantage or vulnerability. It is therefore important to ask whether digital technologies are creating inequalities in inclusion or risk among adolescents in developing countries. And, pertinent to GAGE, whether girls are now facing greater risks and harm online compared to male peers. Of particular importance is the finding that access and use tends to bring both opportunities and risks together, so that promoting opportunities without attending to the risks is problematic, as is the reverse (Livingstone et al., 2012). In this sense, digital media constitute tools that do not pre-determine their uses or effects. We explore answers to these questions in what follows.

Gender and adolescence: ICTs, agency and digital divides

For more than a decade, digital gender divides have been the focus of a number of large international policy and strategy initiatives, including the World Summit for the Information Society (WSIS, 2003, 2005), the WSIS+10 Outcome Document (ITU, 2014), and Agenda 2030 adopted by UN member states (UN, 2015), which identified ICTs as key factors for improving gender equality and ensuring development, empowerment and participation. ICTs and digital media are seen by some as having a potentially transformational role in improving the life prospects of girls and women by providing access to education, training and employment, and improving literacy, social connections, health provision and opportunities for entrepreneurship (ITU, 2012; Kleine et al., 2014). Some corporate, non-governmental and UN sources have argued that ICTs can also have positive effects on women's health and wellbeing, and their ability to have a voice and influence decision-making, affecting girls and women's empowerment by improving their confidence, self-esteem and self-efficacy (de Pauw, 2011; Intel, 2012; UNICEF, 2013). Again, the relevance of this view when it comes to young adolescents remains to be seen.

On a broader social level, particular uses of ICTs and digital media for social change can also influence social attitudes, enable civic participation and advocacy, give visibility to marginalised and vulnerable groups, and improve governance and service delivery (Banaji and Buckingham, 2013; ITU, 2012; UNICEF, 2013; WEF, 2015). It has also been argued that ICTs bring benefits in the economic sphere too – boosting development, reducing labour market gender gaps by introducing 'flexible' work arrangements, generating new opportunities for online work, e-commerce and the sharing economy (WEF, 2015). These new prospects are argued to be particularly significant in developing countries where the existing gender gaps are larger and the digital opportunities for girls and women are far from fully exploited (GSMA, 2015).

In spite of this strong and generally unreflective emphasis on the significance of ICTs for gender equality and social development, there are still significant gaps in cross-national comparative research into existing divides on a global scale. It is difficult to find robust and up-to-

date statistics even about adolescent girls' access to digital media (especially mobile phones and the internet) at country level, impeding the conduct of reliable global comparisons (Bachan and Raftree, 2011; ITU, 2015; UNICEF, 2011, 2013; Byrne et al., 2016). A partnership of over 10 national and international organisations including the International Telecommunications Union (ITU), UNESCO and the World Health Organization (WHO) was launched in 2004 with the aim of identifying a number of core ICT indicators that cover key areas related to infrastructure, access and use. However, only some of these indicators are broken down by gender, not all of them are collected internationally, and the data on non-adult populations and those from low- and middle-income countries (LMICs) are particularly patchy (ITU, 2015).

A much more wide-ranging and systematic gathering of gender-disaggregated data is needed to adequately address and explain existing digital divides, for example, in relation to affordability, digital skills, online risks and the underpinning socioeconomic factors (UNCTAD 2014). When studies on gender divides do exist, they often use different measures of gender segregation (ITU and UNESCO, 2013), and they tend to lack robust designs or representative samples, creating further difficulties for national comparison. These methodological challenges need to be addressed and overcome so that internationally comparable ICT-related gender statistics enable more accurate estimations of the scope and intensity of the existing gender divides both between and within countries and regions, and contribute to more efficient policies, plans and strategies. Despite the existing methodological and research limitations, we do know, however, that in many developing countries there are significant gender gaps in access and use of digital media, as well as in the digital skills and opportunities that girls and women have in comparison to men and sometimes to boys (ITU and UNESCO, 2013; UNCTAD, 2014; WEF, 2015). The tables below demonstrate the lower access rates of women as compared to men from LMICs, as well as the wider gender gaps in these regions that are also fairly stable over time.

Gender gaps in internet use are linked to a number of factors, such as ownership and access to digital devices, including access to a mobile phone. According to GSMA Connected Women programme estimates, over 3 billion people worldwide do not own a mobile phone and more

Table 1: Percentage of individuals using the internet, by gender, development status and region

Region	Population		
	Female	Male	Total
Developed	80	82	81
Developing	37	45	40
Least Developed	13	18	15
World	45	51	47
Africa	22	28	25
Arab States	37	46	42
Asia and Pacific	40	48	42
CIS	65	69	67
Europe	76	82	79
The Americas	64	66	65

Source: ITU (2016, p.3)

Notes: Estimates, rounded. Penetration rates in this table refer to the number of women/men who use the internet, as a percentage of the respective total female/male population. CIS refers to the Commonwealth of Independent States

Table 2: Percentage gap in internet user penetration rate between males and females

Region	Population	
	2013	2016
Developed	6	3
Developing	16	17
Least Developed	30	31
World	11	12
Africa	21	23
Arab States	19	20
Asia and Pacific	17	17
CIS	8	5
Europe	9	7
The Americas	-0.4	1.8

Source: ITU (2016, p.3) The gap represents the difference between the internet user penetration rates for males and females relative to the internet user penetration rate for males, expressed as a percentage.

than half of these (approximately 1.7 billion) are women, with nearly two-thirds of them living in South Asia, East Asia and the Pacific regions (GSMA, 2015). Across LMICs, women are 21% less likely to own a mobile phone than men, increasing to 23% for women in Africa, 24% in the Middle East and 37% in South Asia. On a regional level there are significant differences in the gender gaps.

These correspond mainly to overall national levels of economic development, and to women's education and employment (GSMA, 2010). Extrapolating these statistics in relation to girls, but factoring in poverty as another reason for lack of access to digital media, it is possible to surmise that girls living in more under-served regions, who are less educated, or who live in poorer

households, are somewhat less likely to have access to digital media than boys who live in similar conditions. While facing multiple disadvantages, girls from more privileged backgrounds experience less discrimination in comparison to boys from the same backgrounds. This demonstrates that digital gender inequalities act in combination with already existing social divisions, thus marginalising even further adolescents facing hardship.

Used most frequently as an indicator to determine digital gender gaps, internet access is only one aspect of the existing gender inequalities related to digital media, with other areas associated with digital skills and patterns of use, and opportunities and outcomes (Helsper et al., 2015). The existing studies on digital skills and online opportunities of adolescent girls from developing countries are limited in numbers and usually small-scale, but they begin to demonstrate that girls use and experience the internet differently from boys (Bachan and Raftree, 2011; Cortesi et al., 2015; Intel, 2012; Kleine et al., 2014; UN, 2011; UNICEF, 2013). Girls generally have less control over digital media, are less likely to take advantage of online opportunities, and less frequently encouraged to undertake skills training. Girls are also given more domestic chores, leaving them less time for using digital media. Some groups of girls are also more vulnerable to social risks ranging from violence to gender discrimination, which also affect the way they engage with the internet (Cortesi et al., 2015; Kleine et al., 2014; UNICEF, 2013).

While further research is needed in order to identify the full complexity, scope and intensity of existing gender digital divides, the existing studies demonstrate that such divides are complex and multi-dimensional in their roots and consequences and reflect broader socio-cultural and economic divides that limit girls' life opportunities in general (Bachan and Raftree, 2011; ITU and UNESCO, 2013; Sørensen, 2002; UNICEF, 2013). For example, the predominant social expectation in some communities that girls will marry early and leave the parental home to become part of their husband's household leads to some girls receiving fewer years of education than boys, and having less favourable job and income prospects (GSMA, 2015). Girls across the world have generally lower chances of participation in science, technology, engineering and maths (STEM) at higher levels of education, which is partially caused by gender-based biases in curricula and among science and maths

educators in earlier formal and informal education, and in university recruitment policies (WEF, 2015). There are also significant male-biased cultures in the technology sector, in relation to long hours, and family-unfriendly policies (Orser et al., 2012). While there is no single cause, some of this in turn results in fewer women working in the well-paid ICT sector or in ICT-linked occupations (WEF, 2015). In OECD (Organisation for Economic Co-operation and Development) countries, women account for less than 20% of ICT specialists (ITU and UNESCO, 2013). Such barriers limit the opportunity of women to act as role models for the next generations of girls (ITU and UNESCO, 2013). Lower incomes in general also act as a barrier to women's ability to afford online devices and services.

Even though digital gender divides might gradually close over time in some countries, and younger generations of girls face better prospects, gendered ICT gaps are still substantial in absolute terms, significant for large numbers of women the world over, and persistent in less developed economies (ITU and UNESCO, 2013). Some reports suggest that such gaps are particularly prominent for girls from more socially and economically oppressed and marginalised communities (Banaji, 2015; UNICEF, 2013), adding to and possibly magnifying the multiple disadvantages they face in everyday life. Hence, realising adolescent girls' full potential and human rights, improving gender equality and ensuring development, empowerment and participation requires research and policy frameworks that systematically address digital technologies, both in themselves and in relation to their capacity for purveying other forms of media.

The number of ICT-based interventions that exist for adolescent girls in developing countries is not large (UNICEF, 2013), but some offer examples of effective use of these opportunities for improving the life prospects and wellbeing of adolescent girls. How can ICTs and digital media be used to deliver information, opportunities or evaluation within interventions? Use of digital media in cases where there is equal access can, on the one hand, enable convenient, personal, private, scalable and cheap access (both of services to young people and to services by young people). At the same time, such use of digital media may place the young person at risk (online exchanges leave a digital trace that undermines privacy and enables unintended control or even abuse by others). ICTs are also usually proprietary, leaving programme

providers dependent on the terms of service of the ICT provider (cost, data security, user privacy, commercial exploitation of data, etc.). It is therefore important to ask critical questions in the face of growing enthusiasm for the use of ICTs within programmatic interventions in LMICs (Banaji, 2015, 2017; Kleine et al., 2014).

A Communication for Development (C4D) approach

Communication for Development (C4D) is a broad term and cross-cutting programme strategy (Raftree and Bachan, 2013) that underlies efforts by international organisations such as UNICEF to promote child survival, development, protection and participation (UNICEF, n.d-a). In 1997, recognising the importance of communication tools and technologies of all kinds in development processes, the UN General Assembly adopted a formal definition of C4D (UN, 1997, Article 6):

Communication for Development stresses the need to support two-way communication systems that enable dialogue and that allow communities to speak out, express their aspirations and concerns and participate in the decisions that relate to their development.

While the UN emphasised the role of C4D in institutional or structural terms with regard to the need to support communication systems that create an enabling environment, the World Congress on Communication for Development (The Rome Consensus, 2007) defined C4D as a:

... social process based on dialogue using a broad range of tools and methods. It is also about seeking change at different levels including listening, building trust, sharing knowledge and skills, building policies, debating and learning for sustained and meaningful change. It is not public relations or corporate communication.

Despite some differences, they both highlight C4D's normative underpinnings of sustainability, empowerment, participation, social inclusion and human rights that have evolved as a result of engagement with the critiques levelled against erstwhile models of development practice and the methods and strategies of their communication (see Manyozo, 2011, 2012; Melkote and Steeves, 2001; Servaes and Lie, n.d.). Such communication strategies and models are known in the literature on C4D and

development communication as belonging to, or being influenced by, what is known as the 'modernisation paradigm' that has dominated international development practice in the post-Second World War era (Melkote and Steeves, 2001; Servaes, 1999). The modernisation paradigm is largely a Eurocentric and economic interpretation of development, initiated by the then global development agenda to restructure developing world economies through eradication of endemic poverty and the transformation of what modernisation theorists named 'traditional' societies (Manyozo, 2012). The communication strategies that accompanied these interventions were top-down, decontextualised, diffusionist and one-to-many forms of communication, premised on the assumption that dissemination of information alone can lead to wholesale adoption of new technologies, and further, the assumption that technical innovations can radically transform remote rural communities in the developing nations by pulling them towards Western, urbanised modernity, and comparable economic prosperity (Manyozo, 2012; Sparks, 2007).

When these large-scale, expensive development interventions consistently failed to provide the intended results, and indeed, often exacerbated economic and social inequalities in their target areas, the premise and foundation of their design and implementation were questioned by some scholars and practitioners (Melkote and Steeves, 2001). The modernisation paradigm has been critiqued and challenged on the basis that it used an approach that assumed the universal validity of the Western, colonial nations' experience of economic development and precluded Global South-based, local knowledge, expertise, participation and ownership which, in turn, undermined their sustainability (Escobar, 2011; Friere, 1978). While some of these critiques of modernisation practices and rationales for using mass media such as television have had some purchase in the media and development communities, many of the entrenched hierarchies that were characteristic of the modernisation paradigm still coexist with the participatory practices of C4D programme interventions. At one level, the proliferation of ICTs and digital media in developing countries in recent years can expand the participatory potential of C4D programming due to the dispersed nature of ownership of certain ICTs such as mobile phones. At another level, the rhetoric around ICTs has provided a new guise for techno-centric modernisation

thinking in development (Mazzarella, 2010).

For instance, some of these technologies with high rates of adoption and penetration in LMICs have been said to have generated major social impact among adults, and have been instrumental in facilitating development interventions in sectors such as education, financial inclusion and health (Smith et al., 2011). The nature of individual ownership of these tools are said by some to enable the dispersion of power among the targeted beneficiary community. In theory, they provide an opportunity to address entrenched power inequities among marginalised individuals and groups by empowering them with equitable opportunities of voice and participation within the development process (Rappaport, 1981). However, the potential of ICTs in contributing towards social justice by expanding equity and participation is undercut by gender constraints on access and use (see de Pauw, 2011). ICTs are often intended and even assumed to act as an enabler or facilitator of equity and participation, but often they do not. The manner in which adolescents' access to them can be facilitated when their access to education, healthcare, leisure and reproductive and sexual rights remain mired in compartmentalised gender binaries based on entrenched social norms, values and practices is an issue that remains to be engaged with, especially as ICTs are increasingly becoming central to development programme deliveries. Building on their assumptions about the increasing role played by ICTs in the development process, ICT for Development (ICT4D) initiatives have argued for the potential for ICTs in fostering human development. For instance, founded in 2001, a UN ICT Task Force was established as a public-private partnership aiming to facilitate the formulation of integrated strategies for the development of ICTs and putting those technologies at the service of development, thus attempting to bridge the digital divides and opening up 'new digital opportunities for those who are currently on the margin or are being left behind' (UN, 2001). More recent activities under the ICT4D endeavours relate to the report on digital development commissioned by UN ECOSOC (2015) and the digital development toolkit set up by USAID as part of its Global Development Lab, as well as the launching of 'Principles for Digital Development' in 2015 (digitalprinciples.org, 2016) guiding the design of technology-enabled development programmes.

ICT4D interventions have delivered some successes

in the field of financial inclusion, health, governance and public administration, and disaster responsiveness (Aker and Mbiti, 2010; ITU, 2011; Sachs et al., 2015; Smith et al., 2011; UNICEF, 2011), but their engagement with issues pertaining to adolescent capability development and child rights is still wanting. The capability approach to development is a notion of human development pioneered by Sen (1999). It signifies development as the ability of the individual to choose and define their own development agenda. Sen's conceptualisation of the notion of development as beginning from the empowerment of the individual aims to make development a participatory practice (Andersson et al., 2012). However, the application of the capability approach with regard to adolescent development is wanting, as is its articulation within a child rights framework, although they both advocate for the autonomy of the individual. Harper et al. (2012) suggest an integrated capabilities and entitlements framework that guides policy towards achieving greater gender justice within programmes aiming at adolescent development. Such an approach helps to clarify policy focus by identifying the development of capabilities needed for individuals to be able to choose and define their own future as well as articulating such capability development within a rights-based perspective that encompasses a range of fundamental entitlement required to achieve a transformative impact in terms of development, equity and participation.

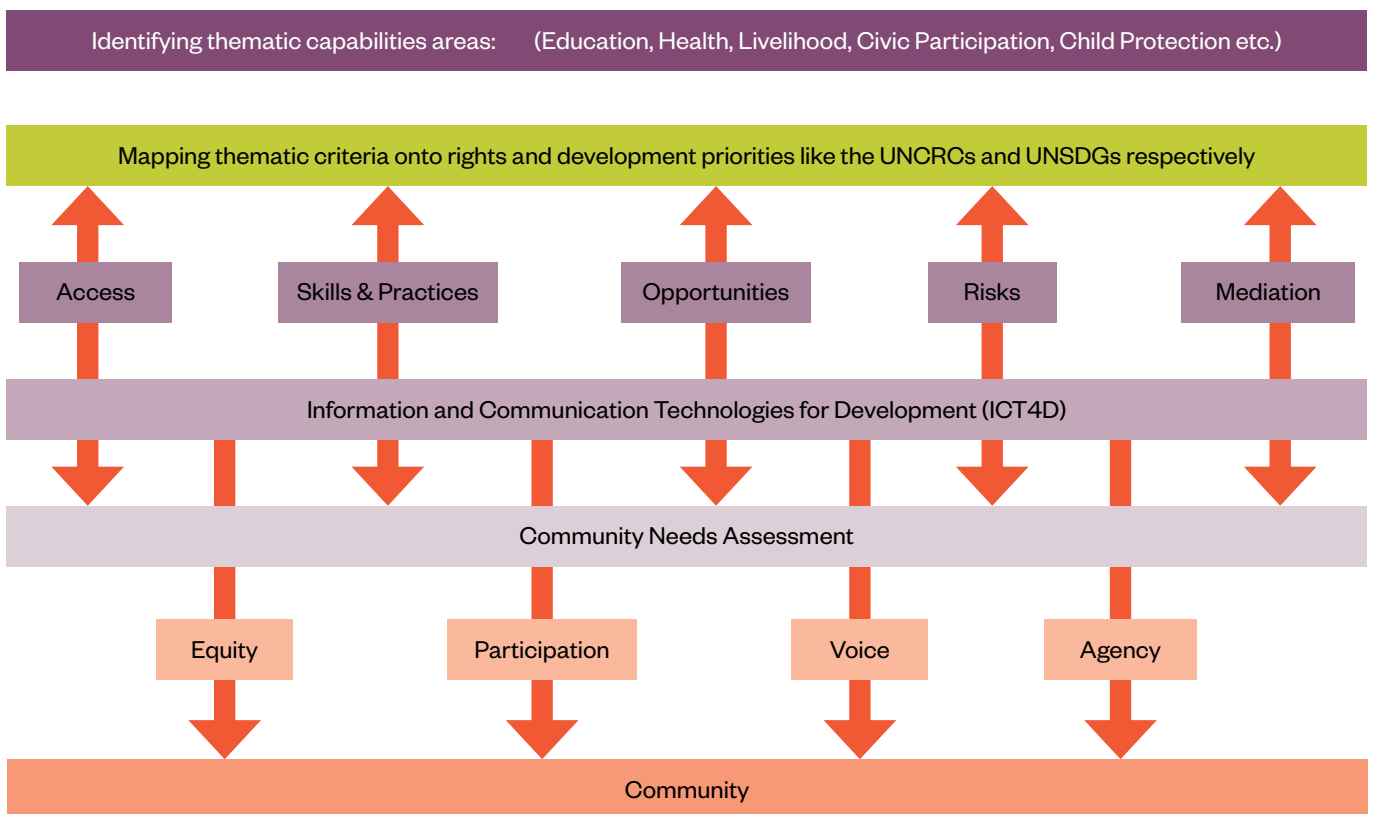
UNICEF emphasises the mix of social mobilisation, advocacy and behaviour and social change in C4D strategies based on the principles that such strategies should be evidence-based, participatory and rights-based. However, it does not emphasise the tools by means of which such programme interventions can be effected, and it does not subject its own interventions to reflective scrutiny. Some of the academic research and evidence reviews pertaining to adolescents in LMICs, on which this evidence review builds, do discuss their digital media uses, skills and practices, and to a certain extent the access constraints that structure their use (see, for example, Banaji, 2015, 2017; Borzekowski et al., 2006; Gasser et al., 2010; Kleine et al., 2014; Livingstone and Bulger, 2014; Mitchell et al., 2011; Porter et al., 2012; Ybarra et al., 2014, among others). However, there is a need to integrate these complementary strands – and to draw out contradictions between them – in order to form an integrated approach that has the potential to

tackle cross-cutting factors of gender, race, religion and caste, socio-economic inequalities and cultural contexts that structure the everyday experiences of marginalised children and adolescents in LMICs.

According to UNICEF, evidence-based, participatory and rights-based processes of social transformation lie at the heart of sustainable long-term behaviour and social change (UNICEF, 2015). This calls for the foregrounding of the UN Convention on the Rights of the Child (UN CRC) as a broad rights-based framework that can be integrated within broader C4D strategies to complement the principles of participation and rights guaranteed under the UN CRC and advocated for by UNICEF. Integrating rights accorded by the UN CRC within C4D programming could be one way of ensuring that future programme interventions are designed within the purview of international children’s rights. Incorporating ICT4D within broader C4D strategies could potentially help to facilitate and mobilise the conceptual framework of participation and empowerment by extending equitable opportunities to its users with a critical perspective on

disenfranchisement, exclusion and power. Existing and continuing academic research and evidence reviews can serve as the critical evidence base by evaluating programmes, identifying gaps, highlighting complex problematic issues such as gender that require a more nuanced approach, and informing the international development community where its attention is most urgently required. As we argue that communication and digital tools are never available in a vacuum, a rights-based approach in the area of C4D would necessitate a consideration of children’s rights as individuals, a group, and as parts of distinct communities who face particular forms of discrimination (see below). It involves an attempt to ensure legally, campaign for and guarantee freedom from particular forms of discrimination as well as access to economic, social and cultural rights enjoyed by adults in the most included, secure communities, whether this may be the transport required for children to travel to places where their concerns may be heard and addressed, or the protection from hate speech against their entire ethnic group.

Figure 1: A rights-based approach to C4D programming



The role of UN Sustainable Development Goals (SDGs) in promoting rights and raising capabilities of adolescents in low- and middle-income countries

The UN Sustainable Development Goals (SDGs) represent a global agenda for sustainable development for the next 15 years, until 2030. They build on the successes and challenges of the Millennium Development Goals (MDGs). Adopted unanimously by world leaders in a historic UN summit in September 2015, they officially came into effect on 1 January 2016 (UN, n.d.). SDGs represent a significantly more ambitious and challenging agenda than the MDGs, with 17 goals and 169 targets between them, formulated to advance holistic development that encompasses education, health, social protection, job opportunities, environmental protections and climate change including economic development. In a first-time initiative, SDGs call on action by all countries, including LMICs, to contribute to global efforts to 'promote prosperity while protecting the planet' (UN, n.d.).

However, a global sustainable development agenda becomes redundant if every child is not afforded a fair chance to develop to her or his full potential. SDGs form an over-arching policy framework within which children's rights can and should be articulated. SDGs build on the issues on which the MDGs were silent: this includes addressing inequality, ending violence against children and combating child poverty (UNICEF, n.d-b). According to UNICEF's interactive mapping of SDGs and the UN CRC all goals are relevant to children since they attempt to secure a collective future (Wernham, 2016). UNICEF underscores a participatory approach, the stated purpose of which is to amplify the voices of children and to recognise their right to participate fully in the achievement of the targets, since the time frame of the SDGs span an entire phase of childhood development, at the end of which the majority of today's children would enter or would already have entered adulthood (Wernham, 2016).

Within this framework of the SDGs, ICTs and digital media form the basis for the vertical service delivery of social protection and inclusion, education, health and capability development. They are explicitly mentioned as targets under 5 of the 17 goals, and have a special role to

play in the deeply transformational changes envisioned by the SDGs, especially in LMICs, as highlighted by the UN's Broadband Commission for Digital Development (2015). Target 9.7 calls to 'significantly increase access to information and communications technology and strive to provide universal and affordable access to the Internet in least developed countries by 2020.'

Due to the assumption that ICTs enable 'leapfrogging' and have a rapid rate of diffusion, especially in the developing world, there is an assumption that ICTs can act as an accelerator for achieving the SDGs (Sachs et al., 2015). Unquestionably, mobile phones have demonstrated some major breakthroughs in financial and health sectors, bridging significant gaps in the access to these services (GSMA, 2016a). There are five major ways in which ICTs can speed up the uptake of SDGs (Sachs et al., 2015):

- First, ICT industries and the devices and infrastructures they circulate are spreading rapidly; the number of mobile subscribers in Africa has already tripled in the last five years to 300 million by the end of 2015, with an additional 250 million expected by 2020; and mobile broadband connections are expected to grow to 60% at the end of 2020 from 28% in 2015 (GSMA, 2016b). All of this is good news for the telecommunications industry and for the makers of mobile phones, but whether it is good news for SDGs and for children remains uncertain. Some operators are developing devices that are available pre-loaded with educational content, and this rapid deployment of digital technologies can offer the benefit of digital inclusion by extending education services and health services in previously unconnected and under-served communities (GSMA, 2016a).
- Second, ICTs and digital media can dramatically reduce the cost of deployment of services and are already disrupting major sectors, a prime example being legacy media, in HICs. Cost-effectiveness on the supply side translates to affordable technologies for the consumers. In developing countries, ICTs have dramatically expanded the capabilities of community health workers to be able to respond to the needs of the wider section of the community than was previously possible (Sachs et al., 2015).
- Third, ICTs facilitate access to and dissemination of information, thereby potentially increasing public awareness, accountability and transparency

Box 1.9. Converging adolescent experiences versus context specificities

While the experience of adolescence varies by both individual and culture, with the line between childhood and adulthood blurred where adolescents do not live with their parents and must work to meet their own basic needs and contribute to the household economy (Bray and Dawes, 2016), there is a widely recognised arc to development that largely transcends particularities. Indeed, although 'marked variabilities in family forms, in the relevance of school systems to cultural norms and economic opportunities, in access to health care and leisure activities, in religious orientations and values... can create deep fissures in the experiences of adolescents from one nation to the next... or among different economic or social groups within a nation' (Brown et al., 2002: 19; see also Hart et al., 2004; Lloyd, 2005; Breinbauer and Maddaleno, 2005), there is growing evidence that the global 'experience' of adolescence is slowly converging as children spend more years in the age-segregated environment of school (Bray and Dawes, 2016; Hammack and Toolis, 2015; Jensen and Arnett, 2012; Casey et al., 2011; Brown et al., 2002; Schlegel and Hewlett, 2011; Schlegel and Barry, 1991). Indeed, even as the notion of adolescence as the transition between childhood and adulthood begins to fray, as 'emergent adults' are unable to assume traditional adult roles because rapid socioeconomic change has narrowed older pathways faster than it has opened new ones – trapping many, especially young men, in decades of 'youth' or 'waithood' – global similarities in the developmental milestones through which young people in the second decade of life progress are striking (Jensen and Arnett, 2012; Arnett, 2011, 2000; Honwana, 2012; Galambos et al., 2007).

(although also sometimes increasing the circulation of rumours, false information and problematic content).

- Fourth, ICTs can dramatically reduce the development time required for technological improvement, particularly through open-source software, which can shorten the time for technological generation, especially for ICT-backed programme interventions with strong local content pertaining to education, health, finance and the environment.
- Finally, ICTs help in capability development by facilitating online learning through MOOCs (Massive Open Online Courses) that can allow some students in some areas of high internet penetration to get free access to aspects of a high-quality university education. None of this is uniformly distributed, and none of it comes without pitfalls.

The above discussion suggests that ICTs can prove to be a powerful tool for the implementing aspects of the SDGs with the potential for accelerating their application and

uptake with regard to adolescent capability development. International policy perspectives pertaining to children and ICTs have tended to deal with single issues such as media literacy, information literacy or child protection. SDGs provide a holistic development agenda within which child development in its entirety can be conceptualised and articulated. However, due to the wide scope of SDGs it is necessary to clarify, organise and sharpen their focus in order to operationalise them with regard to young people's capability development. In considering the complex contribution of ICTs to accelerating the uptake and adoption of SDGs and their potential to empower young people, it is important to approach the SDGs along the thematic criteria of access, opportunities, risks, skills, practices and mediation. Evidence that ICT-enhanced SDGs have contributed to an improvement of children's daily lives must be identified and presented in the context of policy that addresses the continued marginalisation and inequalities constraining the rights of the child.

Methodology: principles, sample, search strategy and results

The review follows the common principles for Gender and Adolescence: Global Evidence (GAGE) reviews (taken from the secondary evidence review framework developed in November; see Byrne et al., 2016):

- develop a protocol that outlines key research questions, search strategy and anticipated data sources, inclusion criteria and analytical approach;
- conduct a comprehensive document search (as far as feasible in the time available) and document the search process;
- draw on material from a range of low- and middle-income countries (LMICs) and as far possible include material from sub-Saharan Africa, South Asia and MENA, with some insights from Latin America or East/South East Asia;
- provide an 'audit trail' justifying inclusion/exclusion of particular studies;
- use all studies judged relevant and high quality in analysis (to reduce bias);
- peer review by at least two reviewers; also, all review proposals go through an internal approval process.

This rapid evidence review was conducted on the available research evidence relating to adolescents' use of digital media in LMICs,¹ based on a twin strategy of database searching and expert consultation. The methodology for the review, including the search strategy, criteria for including/excluding studies and approach to data analysis is explained below. Our aim was to ensure maximum insight and rigour within the time frame available.

Expert consultation

A preliminary expert list was drafted, and the requests for input were sent out to experts on that list (see Annex); subsequent recommendations were generated through snowballing. Expert recommendations,

including the team's own prior knowledge, resulted in 107 recommended research sources.

Inclusion criteria

To guide the expert consultation and database searching, inclusion criteria were determined as follows:

- evidence relating to girls aged 6–18
- evidence relating to middle- or low-income countries
- evidence relating to digital media or internet or mobile phones or ICT
- published in English
- published between 2006 and 2016.

Note that, given the rapid pace of socio-technological change, it was originally planned that the review would concentrate on evidence published from 2010 to 2016, noting key evidence gaps and methodological issues as well as strengths in the literature. However, this time frame proved limiting in its ability to capture important research in some countries or topics, and even meant excluding all existing research in others. Tracking bibliographic sources within the initial review pointed towards important results and research published prior to the planned period under consideration. Following this it was decided at a second meeting to widen the time frame. This was thus broadened to include research published from 2006 to 2016 to account for the rapid pace of socio-technological change without compromising on the evidence base.

Databases searched

The British Library of Political and Economic Science is the UK's national social sciences library, and its collections have been recognised for their outstanding national and international importance. In designing the electronic search process we consulted the subject experts in the library. While priority was given to research published in peer-reviewed journal articles, for reasons of quality control, it was also recognised that much of the research in this field derives from non-governmental

1 For Department for International Development (DfID) listing of LMICs, see http://pedl.cepr.org/sites/default/files/FAQs_LICs%20and%20DFID%20MICs.pdf

organisations (NGOs), government reports and industry sources. Thus, non-peer-reviewed ‘grey literature’ and unpublished reports were also sought and included where quality thresholds are surpassed. The databases searched were:

- IBSS
- ISI Web of Science
- EBSCO/SocINDEX
- Scopus
- PubMed.

Note that the SocINDEX database is an aggregated database that can be used to search multiple databases at once. The databases cross-searched through SocINDEX were as follows:

- Anthropology Plus
- Child Development and Adolescent Studies
- Communication and Mass Media Complete
- EconLit
- ERIC
- PsychINFO
- SocINDEX with Full Text.

Search terms

The scope of the review concerns the intersections among three domains of research – digital media, young adolescents and LMICs. None are uniquely referred to by widely used and agreed terminology. After some experimentation to ensure the optimal combination, the following search terms were used to search the selected electronic databases:

- internet OR online OR digital OR ‘mobile phone’ OR app OR comput* OR ‘cell phone’ OR ICT OR ‘social networking’ OR platform OR broadband OR connect*
- AND

- child* OR young OR youth OR teenage* OR adolescen* OR minor OR kid OR girl OR boy OR student
- AND
- ‘developing countr*’ OR ‘low and middle income countr*’ OR ‘low income countr*’ OR ‘middle income countr*’ OR Africa OR Asia OR MENA OR ‘Middle East and North Africa’ OR ‘Middle East’ OR ‘North Africa’.

The team met at several key points during the design and conduct of the search process to ensure a robust and reliable search strategy. It was anticipated that the search process might generate thousands of sources, with no straightforward way to select only those sources relevant to middle- or low-income countries. Thus some experimentation was needed to identify sources to be analysed. Further, to ensure a manageable body of research for review given time constraints on the project, it was planned that initial selection would be based on abstracts only, with those judged most relevant then being read in full, where available. It was important to test key word searches in different databases to get the best results and identify the most useful databases. It took some time to remove duplicate records from the set of sources to be read and coded in detail.

Search process and analysis of the results

The search terms were tested on the pre-identified databases and the results were limited to English and the period of 2006–16 in each case. Initial search results in each database were streamlined using filters, where available, with regard to age, geography and subject area. This resulted in a total of 5,181 studies. In addition,

Table 3: Number of studies identified by database searched

Database	Number of studies
IBSS	774
ISI Web of Science	826
EBSCO/SocINDEX	263
Scopus	985
PubMed	2,273
Total	5,181
Expert recommendations	107
Total	5,288

the experts consulted (also including suggestions from the research team, based on prior knowledge) added 107 studies, as shown in Table 3.

The screening of these studies proceeded through three stages of filtering the results.

First, the batch of **5,181 studies ('Search results')** were screened on the basis of titles and abstracts to judge their relevance to the inclusion criteria. The total of 5,181 studies represents the cumulative total of hits on each database prior to the exclusion of duplicates. At this stage the 107 expert recommendations were screened either on the basis of their executive summary, where available, or their methodology (including sampling) and study design, keeping in mind the inclusion criteria. Some expert recommendations were also captured in the database searches. The overlap and duplicates between the expert recommendations and database searches were removed at this stage.

This led to a streamlined batch of **481 studies ('Unique search results')**. The majority of the results that were excluded pertained entirely to adults or university students over the age of 18. This can be explained by the different definitions of adolescence in different countries. Despite the filters and the search terms, many results still pertained to countries in the Global North; some of these results were retained where they provided useful insights on the digital media uses of adolescents from marginalised populations in those countries, and could thereby provide an indication of access and uses and practices of digital media of adolescents from underserved communities.

Second, these 481 studies were screened down to **188 studies ('Main results')** by reviewing the sections on methodology and study design of each full text article in order to check their compatibility with the inclusion criteria. Acknowledging the scarcity of that research and evidence relating to the age group under consideration (10–14 years old), and keeping in mind that the purpose of this review is to identify knowledge gaps in evidence between younger and older adolescents, we allowed some leeway in the age criterion, especially regarding studies focusing on age groups that encompassed both older adolescents (15–18) and, in a few cases, young adults (18–21). In very few instances we also allowed studies pertaining to high-income countries (HICs) from the Global North, their inclusion being justified on the grounds that in some useful way they capture transnational

phenomena or approximate conditions pertaining to digital media use in LMICs (such as opportunities and risks linked to digital media uses of adolescents from marginalised populations in those countries).

The main results were then coded – on the basis of reading the full text of each study, where available – according to a set of categories designed to allow for a characterisation of the field as a whole, namely:

- type of study
- type of data (for primary studies)
- design of evaluative studies
- geographical distribution
- income classifications (as applied by DfID).

In addition, each study was coded using a thematic framework to characterise how the research concerned children's internet or mobile technology use in terms of a focus on the themes of:

- access
- skills and practices
- opportunities
- online risks
- mediation (by parents, educators and peers)

These themes were guided by the theoretical and research framework for the study of children's rights, online opportunities and risks developed by EU Kids Online (see Livingstone et al., 2015 and www.eukidsonline.net) and adapted by Global Kids Online (see Byrne et al., 2016; Livingstone, 2016, and www.globalkidsonline.net). The main results were thereby classified as shown in Table 4 below, and discussed under 'Main findings'.

Third and last, the main results (n=188) were further narrowed down by first excluding studies for which the full text could not be located. The studies pertaining to a marginalised population in the Global North were also excluded and used as framing studies so that the key results were only composed of studies pertaining to LMICs. Finally, of the remaining studies, only those that employed the most reliable or robust research design were selected to be evaluated further by means of a standardised template. This resulted in 62 studies ('Key results').

The standardised template, described below, was used to scrutinise and evaluate the rigour of the research design and the nature of the findings, as well as to identify each study's epistemological or discursive account of its findings. The layout of the standardised template was agreed on in a team meeting, and categories were derived that enabled the evaluation of the quality of the study in

terms of its comparative and added value within the evidence base as well as its epistemology and framing.

All evidence reviewed included the use of digital media or internet or mobile phone or ICT in relation to or directly by adolescents in LMICs. However, as several of the regions under review have a mix of high- and middle-income countries, notably, the MENA region, evidence still included some studies from HICs in the key results, since excluding them would undermine the representativeness of the region in the evidence base.

The categories of the template were as follows:

- research theme or questions
- place/geographical location
- method (including sample and age group)
- brief comment on claims/findings
- brief comment on value of the study and place in relation to other studies
- epistemology/framing/discursive critique.

In parallel with the main search process, we also generated a list of ‘framing studies’ – drawing on prior knowledge of the authors, expert recommendations, very recent publications, and/gap or interesting results of the search process that, nonetheless, did not fit the inclusion criteria. These were studies that we judged insightful or influential in some significant way, whether because they introduced a key conceptual approach or offered a critical review of earlier literature, or had influenced development programmes, or were helpful in some other way. The framing studies are mainly used in the conceptual framework (above) and also included on a few occasions in the discussion of the main findings, below, to deepen the analysis, provide a comparative perspective or corroborate evidence from LMICs with findings the Global North. These studies are included in the bibliography under ‘Additional sources cited’ separately from the 62 key results coded in detail as a part of the RER process.

The report also presents case studies and examples of programme interventions targeted at the capability development of children in LMICs that aim to facilitate access to ICTs and digital media technologies, to maximise opportunities, and to understand and mitigate risks. These case studies and examples were selected either because of their prominence in the literature or due to their contribution to development programme interventions implemented by international development organisations (see Annex 2).

Potential limitations and biases of the review and how these were addressed

- In many countries, there has been little or no research on young adolescent girls’ digital media experiences that limits the depth of the review and imposes reliance on whatever research is available, sometimes including studies that are small-scale or lack a robust research design. Reliance on limited available research also creates overrepresentation of certain regions and silencing of others where the evidence is particularly scarce.
- Reliance on research published in English undoubtedly limits and biases the review in ways that are unavoidable given the composition of the research team. It is possible that expert interviews could overcome some of these limitations, which could be addressed in a further study.
- For our analysis, we have drawn significantly on theoretical frameworks originally developed in the Global North (see Livingstone et al., 2015; Byrne et al., 2016), and recently adopted and applied to countries in the Global South (see Livingstone, 2016). While there are good grounds to build on hard-won expertise when researching in countries newer to the potential of internet use for children’s rights, we do so with extra caution, recognising that theory and findings developed in the Global North may not be applicable in – and certainly should not be uncritically extended to – the Global South and developing countries.
- ICT/digital media change fast in terms of their availability, nature and uses. For this reason, we focused on recent research, but even so it is likely that some research will be out of date or its applicability limited. Critical scrutiny of sources, findings and the claims made of them in the review was crucial, and in this we were aided by peer review by experts from LMICs.
- Because the field of ICT use is both new and fast-changing, stakeholders and policy-makers tend to rely on a host of ‘findings’ of dubious validity and reliability (industry press releases, low-cost polls, small-scale studies, etc.). These may not meet acceptable quality criteria, but are included with caution in the absence of better data.

Table 4: Number of main results and key results, by category

	Main results (n=188)	Key results (n=62)
Type of study (number of studies included)		
Conceptual	4	3
Literature review	13	7
Systematic review	1	
Primary research	133	46
Secondary analysis	16	6
Type of data (primary research n=133)		
Qualitative	47	11
Quantitative/survey	60	28
Mixed methods	26	7
Methodology (primary research n=133)		
Quasi-experimental/ex post facto	10	8
Other	63	36
Exploratory	47	14
Case study	13	4
Geographical distribution		
South Asia	11	3
Sub-Saharan Africa	56	19
Latin America	8	5
Middle East and North Africa	20	8
East and South East Asia and Pacific	28	6
Global	14	8
Multi-country/cross-national	21	12
Other	10	
Countries as per Dfid's income classification		
Low-income countries (LICs)	9	4
Lower- and middle-income countries (LMICs)	26	8
Upper- and middle-income countries (UMICs)	80	24
High-income countries (HICs)	16	6
Thematic distribution		
Access	23	9
Skills and practices	69	28
Opportunities	82	30
Risks	45	19
Mediation	28	13

Notes for main results:

1. Document unavailable and abstract insufficient to code: 21.
2. Document unavailable so coded on basis of the abstract: 17.
3. Multi-country/cross-national and global studies not coded as per income classification in order to maintain integrity of the data.
4. The high number of studies coded as 'Other' represent those studies that do not strictly fit into the description of the other categories of study design such as quasi-experimental/ex post facto, exploratory, policy and case studies. They more often than not represent grey literature and institutional reports, literature reviews and conceptual studies, studies that aim to address a gap in the data, and those that employ alternative methodologies such as participatory action research.

Findings

Main results - a commentary on the shape of the field

Research on young adolescents and digital media uses in low- and middle-income countries (LMICs) is relatively sparse, compared to research either in high-income countries (HICs) or on other topics concerning adolescents or adults in LMICs, such as health or education. As a relatively new field, it is understandable that most of the research identified is primary research, and its distribution broadly follows the diffusion of ICTs globally – most research in upper- and middle-income countries (UMICs), then in LMICs, least in low-income countries (LICs). No doubt as internet and mobile access spreads further, research will follow suit. The representation of multi-country studies is helpful, indicating an interest in comparing countries and thereby spreading knowledge and good practice. The relatively large number of studies in sub-Saharan Africa should be read with care, as many of these (10 out of 19 studies focusing on sub-Saharan Africa, excluding cross-national studies) were conducted in South Africa. Similarly, a fair proportion of the Middle Eastern studies were conducted in Israel, in fact, a high-income country, and in Turkey.

We identified a spread of studies across the main themes of interest, from internet access and use to the skills and practices adolescents could thereby obtain, to studies of the opportunities it affords, as well as interest in the attendant risks and, less prominent, the roles played by family, school and other mediators.

Access depends on age, frequency, location and devices of internet use including the nature of connectivity as well as personal versus private use. Access in LMICs is conditioned by affordability with adolescents from a minority of affluent families having personal access to ICTs and the internet, most often in their homes, and those from economically and/or socially marginalised majorities often using shared devices and public spaces such as cybercafés. This inequality is also manifested geographically with city centres enjoying higher internet coverage and ICT penetration than semi-urban or rural

areas. The age of access varies across regions and is dependent on an intersection of factors, from cultural contexts and parenting styles to income and geographical location, and is cross-cut by affluence within the evidence base, with HICs often reporting lower ages of access. Since a majority of the evidence involved primary studies, inferences about access in terms of gender was limited by the variables and frameworks of the studies referred to, especially among quantitative studies from which no clear gender dimension could be determined.

Skills and practices refer to the diverse range of digital skills, literacies and competencies that are increasingly being researched and taught. They attempt to capture the cross-cutting variables such as socio-economic status, marginalisation, gender and age that relate to the complexity of today's internet usage. This thematic criteria also accounts for practices pertaining to search, safety, privacy, interpretation of information, coping strategies, peer group influence and motivations behind usage, thereby attempting to identify how adolescents use the internet and what factors influence such use, allowing for a multi-dimensional analysis. While evidence shows a recognition of digital literacy among LMICs, there is an inadequate focus on critical information literacy, participatory practices and safe online practices. Evidence also shows that skills and practices are inflected by socio-economic and geographical inequalities within and among urban, semi-urban and rural areas within the country, marginalisation on the basis of ethnicity, class and gender, and unequal policies that focus on urban areas in terms of ICTs at the expense of hard-to-reach, remote and rural areas.

Opportunities relate to the potential for tangible benefits (Helsper et al., 2015), such as engaging with learning through digital media both in and out of school, as well as creating content, participation, communication, gaining access to information and creating and maintaining valuable social relationships. In LMICs digital media, especially on mobile phones, has been used by governmental and non-governmental actors in developing interventions such as providing access to sexual health information

in communities with pervasive HIV/AIDS problems. Due to the portable and 'always on' nature of mobile phones, innovative strategies incorporating video games have also been used in some cases for health promotion. It is important to note that opportunities within LMICs are context-dependent. While in some contexts using digital media for sexual health promotion and awareness has a priority in development policy, in other cases the use of digital media to augment education systems becomes the primary motive. Evidence also underscores the scholarly and practitioner communities' hopes that digital media will create informed and active young citizens who can act as vocal advocates of their own rights, which gives children their own voice, and promotes civic participation, as explained further in what follows. It suggests that mobile phones can help in creating and maintaining social capital that can contribute to future income-generation among young people, especially in LICs.

Risks refer to the risk of harm such as meeting strangers online (Livingstone, 2008, 2016; Byrne et al., 2016), online sexual exploitation and abuse (grooming, cybersex, coercive sexual interaction), cyberbullying, exchange of sexual imagery and exposure to negative user-generated content (violence, self-harm, shaming and hate). Evidence on risks from LMICs relates to unsafe online sexual encounters, such as grooming and cyberbullying that can translate to potential offline risks such as meeting the predator in person and extension of cyberbullying into the offline environment. Apart from international institutional reports there was a lack of in-depth in-country studies of online sexual abuse and exploitation including exposure to harmful content online or how digital media can help in overall child protection by creating awareness or mitigating offline risks to children.

Mediation refers to the role played by parents, educators and peers in augmenting opportunities and mitigating harms. Mediation varies widely across LMICs and is dependent on cultural contexts and parenting styles, with some studies factoring in parental digital skills. It refers to the motivations behind parents favouring the use of digital media among their children, as well as their perception of the risks and harms of such digital media use. Dynamics of mediation change with age, with peers becoming more prominent influencers as the adolescent grows older. Compared to the other thematic criteria, the role of mediation is comparatively under-studied within LMICs.

Given the importance both of learning from adolescents' voices and experiences directly, and of making representative claims, it is helpful that there is sufficient representation of both qualitative and quantitative approaches, with some mixed-methods research. Most research is exploratory in nature, including case studies, and rather little is experimental or directly engaged with policy-making.

Key results - detailed discussion of findings by theme

Access and use

As discussed in the conceptual framework, statistics on how many children in LMICs have access to digital media are hard to come by. On behalf of the mobile phone industry, the GSMA issues a series of reports on mobile access and use, surveying a handful of countries each year to build up a picture cross-nationally. Although the surveys vary in representativeness, and are focused on urban areas and better-off children, they cover the countries where little other research could be found (including Algeria, Bahrain, Chile, Egypt, Indonesia Iraq, the Philippines and Saudi Arabia).

It is no wonder that some children are beginning to see internet access and use as their right (Third et al., 2014). Yet basic assertions about access and use inevitably open up questions about opportunities and risks associated with digital media, while research on the contexts of childhood raises questions about the mediating role of parents, teachers, peers and others in shaping the ways in which children gain access to digital media as well as the particular consequences that may follow. In their survey of a group of relatively privileged, privately educated, 9- to 12-year-olds in Chile, Berríos et al. (2015) demonstrate that while digital media are actively enjoyed, they are simultaneously associated with risk (contact with strangers, age-inappropriate content, disclosure of personal information), not least because parents do little management of children's online experiences. Similar results are obtained from other surveys in other countries, albeit usually conducted with teenagers, leading Davidson and Martellozzo (2013, p.1456) to conclude from their comparison of teenagers'

Case study 1: One Laptop Per Child (OLPC)

The One Laptop Per Child (OLPC) initiative was touted as an extremely ambitious education development programme that sought to revolutionise the education system by promoting self-learning among children in LMICs through the provision of low-cost and innovative hardware and software. It was conceived and led by Nicholas Negroponte, former director of MIT Media Lab (Kraemer et al., 2009). According to Negroponte, OLPC was not about curriculum or content, but about leveraging children's potential and innate capabilities. It should already be evident from language such as 'innate capabilities' that the project took a very specific position about what children are, that fitted with a particular strand of modernisation discourse.

At a practical level, the XO laptop developed by OLPC was designed to give shape to this vision. Its hardware design and US\$100 price took into account infrastructural gaps and weather conditions in the Global South as well as affordability in under-served LMIC contexts (Armstrong, 2013; Kraemer et al., 2009). The laptop was designed to consume low power and have a dual-mode reversible display that could be used even under bright sunlight, with a sealed rubber membrane keyboard that could be customised to different languages. The shell of the machine was designed to be resistant to both dirt and moisture, and was fitted with movable rubber Wi-Fi antennas with wireless mesh networking. The software used was the Linux/Sugar operating system due to its enhanced graphical user interface, open-source model and low computing power requirements compared to Windows (Kraemer et al., 2009). In theory, the use of this operating platform was intended to allow students to look into the programming code behind the software, and the successes of the Sugar platform have been attributed to many open-source programmers, including several students who worked on developing a number of programmes independent of centralised control (Armstrong, 2013). In terms of distribution and deployment, the OLPC strategy was to sell the units to developing country governments that would then distribute them to the populations in need. It correctly identified the most efficient distribution channel because in order to reach the poorest children the laptops would have to be subsidised by governments or other funding sources.

High-level officials, including prime ministers and education Ministers from developing countries, were courted, and showed enthusiastic support for the initiative as embracing such technological endeavours reflected well on their own governments' orientations towards technologised modernity. However, the OLPC vision soon crumbled in the face of reality. The cost of production could not be reined in under US\$100. Developing countries could not justify spending money on thousands of laptops in the face of other pressing needs, particularly in the lowest-income communities. Moreover, the estimated and actual deployment rates of laptops varied greatly across countries, with the lowest ratio of actual versus estimated being 0.002 (Kraemer et al., 2009). The concept of a low-cost laptop also spurred intense competition from established market players such as Intel, Microsoft, Acer, Hewlett-Packard and Dell, since OLPC was targeted at emerging market segments (Kraemer et al., 2009), and it was clear that the corporate sector would have much to gain from widespread adoption of ICTs there. The corporate technology sector responded with their own low-cost laptops, and successfully marketed them to education ministries in pilot projects and test runs. This unfettered competition resulted in the creation of the 'netbook' category that ran on Intel's Atom and used the Windows interface. Despite Linux/Sugar's pragmatic logic, national administrative bodies tended to prefer the latter since it provided the interface they expected children to encounter subsequently in the workplace.

While even the lowest-cost laptops remain entirely unattainable consumer goods for hundreds of millions of children in very low-income contexts, and OLPC did not succeed in its stated objectives, unintended consequences of OLPC helped to foster a new market for laptops that were cheaper than they had been hitherto (Behar and Mishra, 2015; Kraemer et al., 2009). However, some of the most troubling critiques of OLPC come from James (2010) who notes that 'the program causes so much to be invested in computers that other educational inputs are entirely neglected and in some cases this is also true of sectors other than education. [Also t] he OLPC requires poor countries to use fewer students per computer than is recommended even in the developed countries' (Abstract). The OLPC experience also highlights the need to factor in demand- and supply-side dynamics for programmes and policies attempting to bridge access gaps through affordability and hardware innovation, and should act as a cautionary tale for uncritically optimistic techno-centric approaches.

digital media use in the UK and Bahrain that ‘young people use digital media in much the same way regardless of the social and cultural contexts, but that culturally gendered perspectives place restrictions upon usage.’ The study found that ideas about appropriate gender behaviour impact on young girls’ use of digital media but also on parental responses to the use, prompting girls to conceal some acts that would be considered socially unacceptable, such as communicating with boys online. While digital media can open up opportunities for freedom of expression previously denied, such acts can lead to further parental control and even violence against girls on discovery (Davidson and Martellozzo, 2013).

While helpful in mapping certain patterns and changes, such research is less helpful in capturing the inequalities that mark children’s access to digital media. Larghi et al. (2015) frame their study of Argentinian teenagers in terms of the digital divide, distinguishing the first-order digital divide (in access to hardware and connectivity as a function of social class and gender), the second-order digital divide (in digital media appropriation within families and the development of digital skills), and the third-order digital divide (in terms of actual practices of use and, thereby, the benefits that might accrue). Moreover, more detailed quantitative research and, especially, in-depth qualitative research, reveals contextual differences that challenge Davidson and Martellozzo’s claim of cross-national commonalities. In their sizeable multi-method study of 9- to 18-year-olds’ mobile phone use in Ghana, Malawi and South Africa, Porter et al. (2012) add some crucial qualifications to the above findings:

- Mobile phone ownership/usage varies according to the income level of each country, with Malawi scoring the lowest, followed by Ghana, then South Africa. There is the same pattern across locations in each country, with the remote rural being the lowest. Substantial differences existed between each site within each country.
- Distinctively, certainly by comparison with children’s experiences in much of the Global North, ‘many young people across Africa obtain work and live off resources provided by social contacts: kin and friendship networks are crucial in this respect.... This requires careful nurturing of social relationships over time and mobile phone contact is extremely valuable’ (Porter et al., 2012, p.149).

- Also shown by Porter et al.’s research, and contradicting the assumptions suggested by the GSMA reports, most young people don’t own personal phones and must ask for or borrow phones, most commonly from a family member; phone ownership is sometimes facilitated as a gift from urban-based family members. But such phone ownership can be transient, since young people’s phones might also be sold to obtain daily essentials when in need. Moreover, borrowing is inflected by status within the family (e.g. foster status), household resources and livelihood patterns, and intergenerational relationships. Age- and gender-related power structures also affect borrowing patterns. For example, restrictions on borrowing were widely reported in Ghana and Malawi that have substantially lower mobile phone ownership than South Africa. In qualitative interviews from Ghana, children, especially young girls, reported fear of punishment if they accessed mobile phones without permission, leading Porter et al. to comment that, ‘acquisition of phones may have less positive undertones, especially in the case of young girls’ (p.151). Further:

- ‘The pattern of lower female use in low-use settlements may be supported by other factors too, such as low network coverage in remoter low population density (low-use) areas, since the combination of girls’ relative time poverty and restrictions on their independent mobility (Porter, 2011) may limit their opportunities to use phones, particularly if network access is only available when a journey is made to a remote site some distance away from home.’ (Porter et al., 2012, p.154)

Yet some cross-national findings are common. Girls, when they reach puberty, are subjected to increased surveillance with constraints placed on their physical mobility, as Porter et al. (2012, p.159) note, ‘These constraints [on girls by parents and communities], often imposed at least in part from positive welfare motives, can be a substantial barrier to accessing education and improved livelihoods, especially (but not only) in rural areas.’ In other words, as has also been found in Europe (Livingstone et al., 2012), efforts to protect children (here, especially girls) can limit their access to resources and therefore their opportunities – now online as well as offline.

In addition to the value of multi-method in-depth study, it is equally important to ask children themselves how they see digital media, and what matters to them

in their lives more broadly, as de Pauw (2011) did in Girls speak out. Based on a 'fast-talk' process with 33 girls aged 12–18 from 13 countries in Asia, West Africa and Latin America across a mix of rural and urban locations, it was quickly clear that the girls' problems are substantial – while they have 'big dreams for their future careers' and 'see education as the foundation for their success in life', they also recognise that teen pregnancy is a major impediment and source of shame and stigma, with child labour, health risks, insufficient transport, poor sanitation and sexual violence also identified as problems.

Meanwhile, education is neither empowering nor child-friendly (outdated, poor resources, corporal punishment), undermining its potential in terms of ICT-related education as well as of education more broadly. As the girls reported, many could access mobile phones and most had their own (or could borrow one, usually from a parent), often using them daily, albeit for curtailed amounts of time; few had a computer, although many could access one at school; and few had internet access at home, although some could access the internet in community centres or commercial cybercafés (although these are not always safe spaces for girls). Many, too, had had a class at school on ICT use, some had accessed other training, but only basic skills were on offer, surrounded by many practical, technical, resource and skill barriers. For those hoping that ICT and digital media will enable opportunities for these girls, the lack of skills is important, although even more pressing are the gendered barriers they face: girls have significant volumes of chores taking up their time (see also Banaji, 2015; Porter et al., 2012); boys are said to intimidate girls in computer labs at school or harass them while in cybercafés; and parents do not see digital media as important for girls as they do not see the importance of ICTs in their girl's education and future careers, or because they are concerned about the potential risks of ICT use, such as girls getting access to forbidden information or being sexually solicited.

The opportunities are significant – if they can be realised in practice. Girls value digital media to research issues they care about, including their rights, community development, physical and mental health information, economic opportunities, news, gaining job skills or finding work. They also share experiences, discuss problems or use it for activities related to awareness-raising, campaigning, civic engagement and student mobilisation. In some cases, digital media can compensate for lack of

available information, for example, in rural settings. Girls' proposed solutions to increasing their access to ICT are also noteworthy – they highlighted the need to address gender-based inequalities, injustice and stereotypes – both in general and in relation to technology. They thought it would be necessary to educate parents, teachers and communities on the importance of girls' access to digital media, as well as to make access to ICTs better. Girls were also interested in ICTs being better integrated in the curriculum, having technology content and curricula in their own languages, and in more opportunities for peer-to-peer learning (de Pauw, 2011).

This Plan/UNICEF consultation with girls (de Pauw, 2011) fed into a more substantial report to UNICEF, thus taking a child rights approach in asking 'how ICTs embedded in broader communication for development strategies can provide the driving power to change and ensure better outcomes for marginalized adolescent girls' (Raftree and Bachan, 2013, p.3). Again, any optimism over the opportunities to be gained either from girls' increasing access at home and in their community, or from programme interventions, must be tempered by a grounded assessment of the barriers. As Raftree and Bachan document:

... the most marginalized adolescent girls often live in areas that do not have Internet coverage or in some cases mobile coverage. They may not be able to afford to go on-line or cover the cost of sending SMS messages. They may not be literate or they may only speak their local language, meaning their ability to participate in on-line discussions is limited since these are usually managed in official languages. Their mobile phone's operating system may not support their local language for texting, or their language may be an oral language that does not lend itself to texting. They may not have their own phone, meaning they have to resort to borrowing one from a family member, or use a call box or other means. (2013, p.10)

With parents sometimes undermining their use of digital media at home, even if access exists in principle, and with boys questioning their access or directly preventing it at home, school and in cybercafés, girls face a daunting set of impediments to ICT use in practice (see also Pfeiffer et al., 2014). Walton and Pallitt (2012) provide a nuanced sense of digital media in everyday life in their small-scale comparison of two case studies with South African youth – one with low-income older urban teens, and one with

younger boys (11–13) from an affluent suburb. For the poorer youth, it emerged that poverty constrains media use in key ways – one boy listened to his neighbour’s music through the wall, and he rationed game play to 15 minutes to save his phone battery (sometimes he must pay to charge it); it seems, too, that he only used some phone functions, again, to save money. Another boy had such an old phone that his peers ridiculed him, so he tried to use it in ways that his friends wouldn’t notice (e.g. on silent/vibrate) to avoid being shamed. Furthermore, the boys in this study selected their games because they were free or very cheap, and were ingenious in locating free/cheap downloads and in avoiding commercial tactics to ‘steal’ their prepaid airtime. The older teen girls, too, had developed strategies to manage their stringent lack of resources – for instance, deleting their games to make phone space for messages from boyfriends (saved to cherish intimate memories). Between the older boys and girls, a local instant messenger app permitted playful and flirtatious interactions, offering a way to show off by competing to collect contacts (or even, ‘steal’ contacts from others so as to win the ‘game’).

Walton and Pallitt observe that: ‘gaming is thus a popular local appropriation of mobile phones. Mobile games are micro-commodities, affordable even within a tight budget. Unlike expensive console games, they do not require specialised hardware or negotiations with other household members’ (2012, p.353). Significantly, this leads them to explore how ‘game literacy’ permits the young people to articulate and reappropriate their lived experiences of gender, class and ethnicity with energy and creativity. The result, however, may be to reproduce existing inequalities – for example, boys using gaming to reassert the value of masculine subcultures and the exclusion of girls from this.

While studies of children’s digital media access vary in how closely they focus on the devices themselves, or on the uses children put them to and the barriers they face in making them serve their interests, over and again the analysis becomes media-centric, risking losing sight of the bigger picture of the contexts and meanings of children’s lives within which digital media may or may not find their place and contribute constructively (or otherwise). Gamliel and Hazan’s (2014) ethnographic study of Israel’s Multigenerational Connection Program (MCP) – in which children teach adults how to use computers and the internet – was conducted in two public primary schools,

one Jewish and one Arab. Beyond the difference that the Jewish school was better funded, the authors argued that children benefited more in the Jewish school partly because their culture favoured child/adult relations based on respect rather than honour, as was prioritised in the Arab school. What mattered, therefore, was:

... the interpretation of the program by the computer teacher at each school.... The significance of these relations, rooted in ethno-national relations between the groups, transcends the global discourse about the uniformity of the generational digital divide. While the Arab group’s ambivalence toward MCP weakened the children’s status, the Jewish children attained empowerment as young teachers. (Gamliel and Hazan, 2014, p.886)

Looking ‘behind the hi-tech fetish’, Banaji’s (2015, p.14) ethnographic account of children in Western India ‘position[s] media products and technologies as familiar and cherished but also competing for attention with a multitude of other possible uses for time from housework and homework to friends, outdoor games and gossip.’

The internet and digital media must also find their place among other, more familiar, media. For instance, in a study of adolescent girls’ access to and use of reproductive health information in Nigeria, Nwalo and Anasi (2012, p.93) found that ‘interpersonal means of communication and mass media were the sources through which the respondents accessed reproductive health information’, while ‘the Internet, libraries and librarians were among the least accessible sources of reproductive health information’ (p.98). At the same time, they observe that parents, teachers and other adults are reluctant to discuss such matters with adolescents, leaving them vulnerable to sexuality-related risks that, potentially, if not in practice, might be alleviated by private access to online information.

Gradually, however, digital media are finding their place within the various contexts of childhood in the Global South, among middle- and lower-middle-class children and youth in India, ‘since 2012, accounts of “cell phones” and Facebook feature alongside discussions of school/college work, films, radio, television and games consoles. Knowledge and skills in apps, games, scams, jokes and memes constitutes one evident facet of media literacy, but is inflected by resilient beliefs and prejudices formed in distinctly national and regional contexts’ (Banaji, 2015, p.16).

Many of the qualitative studies tell a similar story – of creative reappropriations in the face of high-pressure normative expectations from adults regarding children’s ICT use, perhaps understandable given the cost of providing access. Pfeiffer et al.’s (2014) small-scale study of 15- to 19-year-olds in urban Tanzania, for instance, found that:

When mentioning real-life stories and photo novels, youth often referred to the colourful and “catchy” way the two Tanzanian youth magazines published by Femina Hip, Fema and SiMchezo!, try to inform youth in a participatory manner. In addition, it was suggested that celebrities such as movie actors and Hip-Hop musicians should appear in real-life stories, photo novels and interviews, especially celebrity musicians like Bongo Fleva, who are very well known across the country and are often role models for young people. Humour was also regarded by many as an important entry point.... [Yet] almost none of our adolescent respondents made use of sexual and reproductive health information on the sites targeted at youth. Instead, they went into search engines such as Google, where they entered keywords and screened the websites that came up. (p.183)

Countering the myth of the digital native, Banaji reveals ‘global south children’s relative ambivalence towards new media’ (2015, p.16), perhaps unsurprising given the degree to which the meanings and uses of digital media are marked by inequalities in gender, class and ethnicity, as also observed by Walton and Pallitt, and others. Or, as Pathak-Shelat and DeShano (2014, p.984) put it, ‘Indian families in rural areas and small towns experience a clash of expectations between how digital media technologies are promoted and how they are experienced.’ Thus, while children (and their parents) explicitly associate digital media with work, educational opportunity and information, ‘this perception seems to come from the media and other external sources, rather than directly from personal experiences with new media technologies because when they talked about their own practices, playing games on computers and cell phones was the most frequent response’ (pp.989–90). This is not entirely a matter of children’s preferences; for sure, ‘digital technologies are marketed as youth-oriented technologies giving “power” to youth (youth agency), but we observed a web of school and parental controls surrounding their use’ (p.992). Perhaps most worryingly,

... the global corporate players (through new gadgets, schemes, and advertisement), as well as the government, through rhetoric and development schemes, are raising normative expectations to be part of global markets that are impossible to meet in their rural location with infrastructural limitations. (Pathak-Shelat and DeShano, 2014, p.998)

No wonder that a study of 15- to 19-year-old students in urban Brazil concluded that they had grown up ‘under the influence of the Internet and under the logic of cultural consumption associated with it’ (Ferraretto et al., 2011, p.393). Or, as Mackey (2016, p. 168) observed, ‘there is no escape from the fact that telecommunications companies co-opt such trends in communications in the interests of a global capitalist system in the marketing and sale of their devices across South Africa, or that the poor, and in particular poor women, are especially targeted as potential purchasers of products and services they may not be able to afford.’

Skills and practices

Whether, and under what conditions, access and use of electronic media offer opportunities for particular users is therefore something that has to be established by situated research, not assumed. (Snyder and Prinsloo, 2007, p.172)

There are many factors that intervene between ICT access and outcomes for particular children. Within the home, children, especially girls, may not be permitted or able to use digital technologies when they are present. The same applies at school, with ICT use being heavily restricted in most countries, whether wealthy or poor. Then, as Snyder and Prinsloo show through their literature review of research with young people living in marginalised contexts in South American, Europe and Australia, the subtle cultural disjunctures between school, home and community often mean that knowledge and experiences gained in one site do not transfer or are not recognised and valued in another.

Close examination of the limits on young people’s digital practices is often overlooked, argue Brown and Czerniewicz (2010), because of the pervasive discourse – appealing to policy-makers and the public alike – of the ‘digital native’ who, being born in the ‘digital age’, is automatically able to optimise their advantages, leaving older adults far behind in terms of digital competences and literacies. Yet their survey of South African

Case study 2: Open Space Literacy (OSL)

Open Space Literacy (OSL) is an integrated community-based literacy initiative that was kick-started in Kenya by SOS Children's Villages in partnership with Plan International (Nethope Solutions Center, 2015). Its stated aim is to work towards an integration of ICT with primary school curricula in order to incorporate digital media skills and digital literacy within traditional school curricula. Through its use of technology, OSL claims to work towards the provision of quality education to children in marginalised and under-served communities (Plan International, n.d.) as well as raise children's capabilities while promoting gender empowerment for disadvantaged and at-risk children (SOS Children's Villages, n.d.). OSL aims to embed familiarity with digital technologies during early child development by introducing ICT-based education during children's formative years. OSL suggests that its partnerships with teachers and local communities have been instrumental in creating awareness about the benefits of ICT in education, still a comparatively new concept, particularly in rural areas. This has also facilitated adoption by teachers in classrooms and ensured sustainability of the programme intervention (Nethope Solutions Center, 2015).

With regard to reach and scale, OSL claims that it has provided ICT integration to 25 schools in Nairobi, indirectly impacting over 15,957 children, 580 teachers, 140 school board management members and more than 1,000 community members. This case raises several issues. The narratives embedded in an assumption that all contact with ICTs will somehow enhance the lives and employability of children in low-income rural communities remains unquestioned. Additionally, across the globe, simply adding ICTs to a traditional curricula with no re-thinking of these curricula, no questioning of received teacher-centred methods, or any questioning of the content or curriculum goals, has now been shown to have mixed and not necessarily positive results in relation to children's learning and motivation.

university students finds little empirical support for such homogenising and idealistic claims. If even relatively privileged university students lack the digital literacy and confidence to use the internet optimally, it is likely that the difficulties faced by younger and/or less privileged children will be even greater.

For Brown and Czerniewicz, the digital native discourse compounds existing inequalities by uncritically directing learning resources to those who are already at home in digital environments (even though they are often already privileged) on the grounds that they represent future models of learning worthy of investment. In a further critical step, and building on the colonial overtones of the term 'native', they suggest that 'we could adopt a cynical perspective that this westernized digital realm is yet another colonizing attempt to force western norms, beliefs, attitudes, and cultural values on the "natives" in an attempt to get "them" speaking "our" language and thinking the way "we" do' (2010, p.359).

This is not to argue against the importance and value of digital skills and practices but rather, to urge attention to empirical research rather than assumptions about what young people can do in digital environments, including on how such skills are distributed across

unequal populations and further, to ask critical questions about which skills should be fostered and to further which (or whose) goals. Moreover, in many if not most contexts around the world, it is the majority of young people who need further education and support in digital literacy, because whatever their technical skills, they are young and, in most societies, relatively powerless. As Gouws (2014, p.14) observes in a literature review on the evolving place of technologies in the lives of South African 10- to 19-year-olds, although they are often

... perceived to be street-smart, arrogant "know-it-alls" and technological experts, they are also young, lonely, insecure and find themselves in a life period of major developmental challenges and therefore need much support and encouragement from teachers and parents.... Parents and teachers also need to foster an environment where adolescents can build resilience. This environment according to UNICEF (2013, p.54) "should focus on enhancing adolescents' self-efficacy and control, and their ability to make informed, healthy decisions."

A recent report published by Byrne et al. (2016) from the Global Kids Online study, including research in Argentina, Serbia, South Africa and the Philippines, compares a

Case study 3: U-Report

U-Report is UNICEF's mobile-based text messaging communication platform launched in Uganda in 2011 (Kleine et al., 2014). U-Report started out as a local initiative to foster engagement among young Ugandans on issues that affect their everyday lives and futures. Again, although this is not directly targeted at adolescents in the 10–14 age group, children are likely to encounter it through the contact of their older siblings. The intention of U-Report is to allow young people, equipped with even the most basic smartphones, to contribute ideas to governance and decision-making processes that impact on their local communities. For instance, one can volunteer information or become a 'U-Reporter' by texting the word 'join' to a toll-free short code and inputting some basic personal information. Youth who have signed up can then share their opinions on a variety of topics ranging from jobs skills to disaster management (UNICEF, 2015). UNICEF staff send out a question twice a week to collect the views of the young people that would then be aggregated and up-streamed to the media and policy-makers.

Since its inception, U-Report has spread to several other countries in Africa and across the world (Kleine et al., 2014), and has now reached 1 million active users (UNICEF, 2015). It has also succeeded in engaging policy-makers: for example, every Member of Parliament in Uganda has signed up for U-Report, allegedly in order to monitor and respond to the young people's opinions in their constituencies (Kleine et al., 2014), although evidence that they are actually doing so is slim. Issues polled on U-Report include, among others, health, education, water, sanitation and hygiene, youth unemployment, HIV/ AIDS, epidemics and social welfare sectors (U-Report, n.d.). Notably, it helped mobilise awareness and responses during the Ebola outbreak in Liberia, and is the platform of choice to provide one-to-one counselling about HIV/AIDS in Zambia (UNICEF, 2015).

At one level an interesting initiative with the potential to use technologies to include young people in policy processes, it will be immediately evident that this case has serious shortcomings as an interactive technology-enhanced platform for youth voice and for young adolescents. While it is interesting to see how many young people out of those polled report being sexually harassed, short of money or wanting their government to take action to make cities safer, there are few mechanisms for ensuring that young people's views are actually considered and taken seriously, or for feeding back to them when their views do reach policy-makers. Further, the agenda of interventions is generally controlled by adults in a large UN organisation such as UNICEF with its own interests, and despite the asking of weekly questions, the directionality of consultation is very top-down rather than horizontal. Moreover, there is no evidence that either the young people involved or the children are given any kind of training or skills in relation to political literacy, or media and technology use, inevitably meaning that those with an existing level of skills and confidence are more likely to participate. The assumption that all are 'digital natives' proves a barrier to wider inclusion (Banaji, 2011).

range of digital skills, such as information-seeking and online safety². The findings suggest that children in countries where access to the internet is more difficult (expensive, with limited connectivity, or children lack access to devices) are overall less confident in their digital skills, with younger children from poorer countries being the most affected. Children in such contexts have also less support from adults around them who are digitally confident – for example, parents and carers in South Africa are about as skilled as their children aged 12–14

(Byrne et al., 2016). This creates particular challenges for policies aimed at improving children's online safety and increasing their digital skills.

A further challenge to educators and policy-makers that emerges when empirical research on digital skills is conducted is the finding (in Hong Kong by Leung and Lee, 2012; in Europe by Livingstone et al., 2012; and others) that gaining digital skills supports both online opportunities and also online risks. Leung and Lee offer an interesting twist on this finding when they show that 'the technological dimension of information literacy, rather than the analytical and evaluative dimension of information literacy, was exerting much stronger effects on internet risks' (2012, p.128). Thus, in their study of 9- to

2 The report was published after the database search for the rapid evidence review, hence it is not included in the framing studies but is integrated in the discussion of the findings. Further information about the Global Kids Online study can be found at www.globalkidsonline.net/synthesis

19-year-olds, 'In information literacy, they were generally very competent with publishing tools but were not social-structurally literate, especially in understanding how information is socially situated and produced' (p.130). Similarly, Kim and Yang's (2016) survey of Korean teenagers found 'greater proficiency in using the Internet than in critically evaluating online information' (p.446). Yet they also found that it is the latter not the former that predicts interest in social and political issues and, further, in civic engagement. Given the enormous volume of information available on the internet, it is crucial for adolescents to be able to critically evaluate it in order to be able to discern factually corroborated 'real' news as opposed to rumours or 'fake' news circulated on the internet, often aimed at creating a narrative for political propaganda. This skill of criticality helps to develop an active and informed citizenry, capable of instituting accountability in governance.

Although these studies relate to older adolescents in media-rich, high-income countries, this distinction between the skills of internet use and the skills involved in critical evaluation of information could usefully be incorporated into digital literacy programmes and initiatives in the Global South, for children of all ages. Yet over and over again, interventions to increase digital skills in schools tend to favour teaching technological or functional literacy over analytical or evaluative forms of digital literacy (Selwyn, 2006), thereby failing to further online opportunities and, as an unintended consequence, paving the way to online risks.

Building on this ambitious insight, in their literature review and case studies focused on China, India and Vietnam, Lim and Nekmat (2008) conclude that:

The acquisition and transmission of media literacy skills can have significant effects beyond merely equipping people with the skills to consume and

Case study 4: AkiraChix

Working within the logic of the modernisation development paradigm, AkiraChix is a Kenya-based non-profit organisation that partners with large development organisations and the corporate sector with the aim of addressing the under-representation of women and girls in ICT-related fields (see The World Bank, 2016). Founded in 2010, its stated aim is to develop a successful workforce of women leaders in technology who can have a transformative impact on Africa's future. Its programmes are designed to reach women at different stages of their growth and development. These are targeted at primary school, high school and university students, including those working in technology, as well as those who wish to have a career in technology. In order to foster an interest in and familiarity with technology, it runs kids' camps, at a subsidised cost per student, for children aged 7-13, which exposes children to various facets of technology. AkiraChix claims that this helps in sparking creativity and curiosity through integrated technology and art sessions.

AkiraChix's technical training programme in Nairobi targets young women from under-privileged backgrounds. The numbers, however, are very small. It takes 30 'promising' young women from low-income areas and trains them for a year in programming, design and entrepreneurship. The chosen students are mentored by women in the tech industry for the duration of their course and are offered placements in different tech organisations at the end of their programme in order to develop their portfolio of work. One of the more scaleable aspects of the programme is its high school outreach. AkiraChix hold bi-weekly training sessions with different Kenyan girls' high schools, week-long intensive boot camp training sessions on school holidays, and an annual event called 'Girls in ICT' as part of the International Telecommunications Union (ITU) Girls in ICT initiative. Arguably, this at least brings larger numbers of young women and girls into contact with the idea of ICTs as a possible career avenue and into contact with highly skilled women ICT mentors, both of which are in themselves huge opportunities.

Nevertheless, while the purpose is to raise capabilities and to equip girls with employability skills that are supposed to enable them to break the 'cycle of endemic poverty', the small numbers actually reached directly and in a sustained way mean that the programme has extremely limited direct impact on the lives of most 10- to 14-year-old girls. Since 2010, 61 young women, trained by AkiraChix have gone on to get internships, jobs, or to start their own businesses (AkiraChix, n.d.). Thinking about ways of scaling this project would be worthwhile.

produce media content. Vested with these skills, the youths trained in these programmes became considerably more empowered in their ability to express themselves, raise societal awareness about issues that concerned them, and also found themselves growing and developing as individuals ... media literacy programmes that focus on empowerment and democratic participation are arguably more sustainable than those that focus only on skills. Such programmes will be more appealing to participants, and given the focus on nurturing the complete individual, participants are also more likely to be committed to the programme. (pp.273–4)

While the interventions they review, like so many others, struggle for sustainable funding and scalable growth, media literacy interventions show how provision of digital media can amplify opportunities in environments transitioning from low media/digital density while also highlighting how these specific environments can shape socio-technical relationships.

There are examples of interventions that aim to combine the learning of digital skills with education in other areas contributing to young women's wellbeing, such as sexual and reproductive health (see, for example, Fiscian et al., 2009; Rijdsdijk et al., 2011; Rijdsdijk, 2013). The use of digital media in the implementation of such educational programmes is seen by some as

Case study 5: The World Starts with Me (WSWM)

The World Starts with Me (WSWM) is a computer-based interactive sex education programme developed in 2002–03 for secondary school students (aged 12–19) in Uganda, and implemented in over 150 schools since 2003. The programme aims to promote sexual and reproductive health by educating young people and empowering them to make independent informed decisions about sexual practice. The ICT-based approach to sexual education is related to meeting the needs of young people to develop computer skills and creative expression, as well as to learn about sexual health and reproductive rights. The programme also supports the efforts of Ugandan educators to better integrate ICTs into the school curriculum but, due to overall limited access to ICTs at schools in Uganda, has a flexible delivery design that also allows non-computer or mixed implementation.

The programme covers four key areas of learning: self-esteem and personal decision-making, including issues related to identity, norms and values, and sexual development; the role of the social environment (including peers, family, teachers and media), and broader social issues such as gender equity and sexual and reproductive rights; sexual practice including reproduction, sexual health and prevention of sexually transmitted diseases (STDs) and unwanted pregnancy, and sexual violence; and finally, goal-setting and sexual behaviour change.

The evaluation of the WSWM programme involved a quasi-experimental design, including pre- and post-test, intervention and comparison groups, and was conducted using a school-based self-administered questionnaire in English. A total of 48 schools (24 intervention and 24 comparison schools) were selected, and the outcome analysis was carried out with a final dataset comprising 1,864 respondents at pre-test (853 intervention group; 1,011 comparison group) and 1,519 respondents at post-test (723 intervention group; 796 comparison group). Outcomes varied based on the way the WSWM programme was implemented at each school, but overall, students from the intervention group who had considerable exposure to the programme (completed at least the first 10 out of 14 lessons) had significantly better outcomes on a number of indicators. There were significant positive effects on beliefs regarding what could or could not prevent pregnancy, the intention to delay sexual intercourse, on attitudes, self-efficacy and intention towards condom use and on self-efficacy in dealing with sexual violence (pressure and force for unwanted sex).

The evaluation also discovered that the limited number of available working computers, occasional lack of electricity and insufficient teacher training were major implementation problems faced by most of the schools. As a result 'there were practically no schools where the WSWM was implemented by the use of computers in the way it was intended' (Rijdsdijk, 2013, p.123). Hence, ICTs not only lifted but also created barriers to learning.

offering additional benefits and opportunities in terms of making it easier to discuss sensitive issues, such as HIV, pregnancy and sexual violence, offering privacy and autonomy to explore these topics, making learning more attractive and fun (Fiscian et al., 2009; Rijdsdijk, 2013), and promoting active and self-directed learning and multiple educational opportunities (Fiscian et al., 2009). Further benefits relate to the acquisition of digital skills that may have the potential to improve employability and financial autonomy (Fiscian et al., 2009; Rijdsdijk, 2013) when girls are older. Yet, the lack of available technology and often also of digital skills can limit the implementation and sometimes the positive outcomes of such educational programmes (Rijdsdijk, 2013). Hence, ICT-based interventions in contexts of limited access and skills and/or contexts of significant material deprivation in other spheres should also involve the provision of information technology and sufficient training (Rijdsdijk, 2013), as well as sustainable opportunities for development and reducing poverty (Fiscian et al., 2009).

Opportunities

What opportunities to benefit are anticipated from the efforts to increase children's access to and skills in using the internet and mobile technologies in LMICs? Research – and presumably research funders – have concentrated largely on opportunities for education and health information, with less attention to civic engagement, creative expression or some other possible benefits that may be important to children. This is a result more of cultural attitudes to children than to digital media. For example, Mackey (2016, p.168) notes that 'In South Africa, young people of the post-apartheid generation are often positioned by even the most well-meaning public sector sites not as citizens but as citizens-in-waiting.'

Many educational studies have focused on the One Laptop per Child (OLPC) initiative (see Case study 1). For example, Hansen et al. (2012) examined whether provision of a laptop for educational purposes enabled the cognitive development of 10- to 15-year-olds in Ethiopia, comparing them after six months of use to children without such provision. Perhaps surprisingly, 'there were no systematic increases in student performance due to laptop use' (p.993). This overall finding was, on more detailed examination, qualified by finding that use of laptops did benefit the performance of students – on measures of abstract reasoning – in higher grades (year

groups) but not in lower ones, possibly because the older children used the laptops more, and for more activities. Just what such findings reveal, and how valuable abstract reasoning is, remains contested (see, for example, Cristia et al., 2012). Hence, provision of access to ICTs alone is rarely sufficient for improved outcomes. Empowering children must also include digital skills training and provision of suitable online content and opportunities.

The potential of ICTs and digital media to provide adolescents with health information is demonstrated by a number of studies. For example, Global Kids Online (Byrne et al., 2016) found that around a fifth of 12- to 14-year-olds and 43% of 15- to 17-year-olds in South Africa looked for health information online at least every week (rising to over two-thirds in Argentina and some other countries). Much of the available research on online opportunities to gain health information concern adolescents' preferred means of learning, asking whether they want to receive health information through digital media. Less research evaluates whether they actually learn from online sources, let alone whether what they learn is positively beneficial.

A relatively early study – conducted with adolescents (aged 15–18) in Ghana in 2006 – found that the internet came low in the rankings of preferred information sources: 'For out-of-school adolescents, the Internet ranked fifth in importance as a source, whereas for in-school adolescents, it ranked ninth' (Borzekowski et al., 2006, p.456). Nwagwu's (2007) survey of adolescent girls in Nigeria also put the internet into context in relation to other sources of health information, finding that two-thirds of the girls preferred to get reproductive health information from peers; however, half of those surveyed sought it from the internet – liking its privacy, ease of use and the range of information available (although, as Ybarra et al., 2006, observe among Ugandan adolescents, problems of access, cost and parental restrictions are all barriers). By comparison, parents, teachers, medical professionals and other adults in their community were sought out for health information by only around one in five girls. Among young women who had left school, interestingly, the internet was the preferred source of information, because it offered private and unrestricted access to information about sexual activities, sexual diseases and sexual abuse. However, with no checks or balances on what types of information girls and young women are gleaning from the internet, and particularly

Case study 6: Najja7ni

Najja7ni is what is known as an 'm-learning' initiative launched in 2010 by a corporate offshoot Tunisiana, Ooredoo Group (that have their headquarters in Doha, Qatar), ostensibly to provide education services to primary and secondary school children in under-served communities in Tunisia (GSMA, 2014). Since then it has developed an m-English service in 2011 and an employment service in 2013 with the stated aim of helping young people to develop language skills and to improve their chances in the job market as well as to connect young people without internet access to employability resources, financial inclusion and job opportunities via a basic handset. Najja7ni Education offers under-served children in remote rural areas and under-served urban areas mathematics, sciences and languages such as Arabic, French and English. It approaches teaching delivery through popular subject areas like travel, technology and the environment, and involves the use of 2,500 interactive questions.

These are wide-ranging and worthy aims. The content is prepared by teachers and based on official curriculum. The report cites 2.5 million users registered with the service. In theory, the technology used for Najja7ni is inclusive because it is not dependent on the possession of an internet connection, and is supposed to be available across operators, thereby reaching the maximum number of users even in areas without internet coverage. Technically, the Najja7ni platform uses USSD (unstructured supplementary service data) technology that allows the service to be delivered via GSM phones, however old or legacy, and even to ones without credit. Users are supposed to dial a short USSD code for the service and may then choose to receive the menu in Arabic, French or English; having done this, they can then go on to make a selection from the free services. Najja7ni does not require a special program to be installed on the user's device; users connect to the service by dialling the USSD code.

As the first service of its kind in the MENA region it gained 800,000 users within a few months after its launch with the highest penetration rate of the service in rural areas among 15- to 35-year-olds. The numbers presented here are very small, and they cater either to children aged 7 or 8 or older adolescents above the age of 15, and do not exclusively cover adolescents in the 10–14 age range; 68% of these subscribers used the service several times a week, and when surveyed, 80% found the service satisfying and overall excellent, and 96% found it friendly, intuitive and accessible from everywhere and from any kind of handset. While the plan is to scale out Najja7ni services to other emerging countries served by Ooredoo, focusing on services that will empower women and offer inclusion to over-looked and under-served groups, such as young people, many questions remain about the effectiveness and reach of these for children and adolescents, and about the corporate interests involved and ways of ensuring quality control. Additionally, the design of the platform needs to integrate fully with local systems and servers, making replication in other countries potentially difficult, time-consuming and expensive.

no mechanism for ensuring that accurate information in one area of the globe is locally relevant in another, there is no guarantee that the information sought online is either relevant or accurate. Arguably, the more widely it is used, the more troubling the presence of uncurated, inaccurate or naïve health information online will become.

More recent research shows the internet increasingly favoured as an information source – as in Mitchell et al.'s (2011) evaluation of an internet-based HIV prevention programme for adolescents in Uganda:

Fifty-one percent (n=525) of all students said they were somewhat or extremely likely to access a health education program about HIV/AIDS prevention for

adolescents via text. A similar percentage (52%) was receptive to receiving such information through email. The Internet was the most highly endorsed technology-based delivery method, however, with 64% somewhat or extremely likely to receive an HIV program in this way. Still, students were more receptive to HIV/ AIDS prevention information through more traditional means, either from a religious organization (72%) or in school (84%). (p.776)

Yet even as the internet becomes more available and popular, other forms of health information retain their value. For example, in Ybarra et al.'s (2014) study on older teenagers' responses to an HIV prevention programme in

South Africa, they found that the 'likelihood of accessing an HIV prevention program was greatest if the program were offered at school' (p.1564). This was the case even though 'by utilizing the Internet as the program delivery mechanism, one safeguards program fidelity by ensuring all youth have access to the same, accurate sexual health information, while simultaneously allowing youth greater privacy to complete the program when and where they are comfortable' (p.1565). One problem is that these young people had become bored by repeated exposure to such health messages, so possibly learning with peers is more engaging than exploring already-familiar messages alone online. Yet given that the effectiveness of behaviour change programmes is still very doubtful (Manyozo, 2012), and since not all young people follow prevention advice, strategies are still needed.

Ybarra et al. suggest that 'a hybrid approach may be feasible and acceptable. For example, perhaps an Internet program could be offered as an after-school activity on school grounds' (2014, p.1565). Again, we see the potential of digital media in complementing, but arguably not displacing, face-to-face forms of information provision and learning. Thus, like Ybarra et al., and also conscious that adolescents' access to digital media is growing significantly in many low- and middle-income contexts, Mitchell et al. recommend not an either/or approach but, rather, that 'education programs delivered face-to-face, such as in school or religious settings could be enhanced with SMS reminders and additional information about program content' (2011, p.778).

As noted above, whether health information gained online or by other means is beneficial raises further issues. Using a pre-test/post-test design to examine the possible benefits of providing 15- to 16-year-olds in Iran with online health resources for a three-month period, Ghorbani and Heidari (2011) found considerable increases in health knowledge about personal hygiene, nutrition, puberty, contraception, disease and AIDS. As they conclude, 'The mere existence of ICT makes the lives of today's children and youth differ in important ways from the lives of earlier generations. The media culture and its products teach children and youth about different attitudes as well as presenting a vast range of informed skills and information' (p.363).

Although much of the research Khoo reviews (2012) derives from HICs, where adolescents have spare time and resources to engage in multi-player video games,

the idea that multi-player video games afford pro-social, ethical and self-reflexive insights could be incorporated into video games designed for educational purposes as part of ICT4D initiatives in the Global South.

Such potential was explored in Lemphane and Prinsloo's (2014) ethnographic comparison of the digital literacy practices of 8- to 14-year-olds living in a wealthy (white) and a poor (black, 'slum') households outside Cape Town, South Africa. Beginning with a consideration of the everyday in relation to theories of children as sites of learning, cognition and emotion, the researchers question a priori assumptions about the progressive and linear potential of digital skills acquisition, digital literacy and pedagogy. The study revealed that digital tools in and of themselves, along with the ways in which these resources have become part of a rhetoric of progress and modernity, can entrench social and economic inequalities. 'Rather than democratising resources', Lemphane and Prinsloo's research shows that 'digital media as at least partially complicit in a "widening of the gap" to the extent that the differential uses and availability of resources across social classes produce different imaginings of self, social ambitions and investments, and differing ways with social semiotics. Such differences translate into and contribute to the maintenance of social inequalities in school settings that coincide with language and social class divides' (p.738). For example, in the context of language in South Africa, where English is the language of a privileged White elite, going online was implicated in reinforcing hierarchies of power:

While the Bolton children are learning to think of themselves as legitimate participants in local, online, globally connected middle-class English language-based culture, the Mahlale children are acquiring linguistic resources that are localised, indexical of their sub-elite status and not associated with success in schooling. (Lemphane and Prinsloo, 2014, p.750)

Lemphane and Prinsloo (2014) are thus critical of calls for digital out-of-school interventions that use mobile phones but pay little attention to the way in which limited and limited access and unsympathetic surroundings (lack of food, time, parents with little interest in digital media) can frame and alter poor, non-white children's experiences of pleasure and learning online. Many other studies do not pay attention to the ways in which social class inequalities and their maintenance are implicated in the use and rhetoric of digital technologies. As one of the rare studies

designed to examine these differences in qualitative and comparative ways, this is significant work and suggests a template for other future studies in different locales. In other words, if insights from wealthy homes are to be applied in less privileged contexts – which is arguably desirable insofar as considerable resources have been invested in developing such insights – very considerable care and adaptation will be vital.

Risks, safety and mediation

As already observed, with increasing access, skills and opportunities come increased risks. Noting that knowledge gaps about risk and internet usage from most parts of Africa, Middle East and Asia are significant and need urgent attention, an international literature review by UNICEF (2012) concluded that:

Children from low- and middle-income countries are less likely to use the Internet from home, and are more likely to go online from cybercafés, where they are at greater risk of encountering inappropriate images and online and offline solicitation. Lack of parental awareness and knowledge, difficult economic conditions and under-developed regulatory frameworks can further exacerbate potential risks and the likelihood of harm. (p.95)

While most research concentrates on sexual and/or aggressive risks to children of ICT use in LMICs (Gasser et al., 2010), the range of risks examined is considerable. As the above quotation from UNICEF makes clear, online risk of harm to children is closely related to the conditions of their access and, also, of any parental mediation, along with possible mediation by teachers or other adults in the child's locale. As with research on opportunities, therefore, we must take careful note of the contexts in which risk is encountered, and of the workings of any mediating factors that influence whether or not such risk results in actual harm. As we have also learned from the foregoing, there may be considerable disjunctures in perspective over what even counts as a risk, depending on the perspective of children or adults. Additionally, in the research literature on risk (as we have also seen in relation to that on opportunities), a strong theme is the question of whether use of the internet amplifies, mitigates, transforms or merely re-locates familiar (i.e. long-established) forms of risk of harm.

Addressing the risk that has, perhaps, generated the most concern internationally, Cook et al. (2012)

take a participatory approach to finding solutions to the challenge of ICT-related forms of child sexual exploitation. The problem is considerable, although hard to quantify, with mobile phones being used for the pervasive distribution of harmful and pornographic content, and with internet café owners sharing pornographic content with the children who visit in search of internet access, being encouraged to chat with adults and even to dress so as to entice older foreign tourists. Recognising the array of bureaucratic, training, law enforcement, funding and practical challenges in their research, 'children, youth and adults in four Thai communities collaborated in co-creating integrated strategies to address ICT and child protection' (Cook et al., 2012, p.574). For a child protection partnership (CPP) to work, Cook et al. argue, interventions will:

... depend on adequate consultation and cooperation with the young persons involved. CPP encourages children to protect themselves and to contribute to peer prevention and protection through working with bodies such as governments, policymakers, police, owners of Internet cafés, and non-governmental organisations. To do this, CPP partners work with young people to build on their strengths and expertise in ICT child protection. (2012, p.576)

Unlike many in this field, the findings of this study are contextualised within lived experiences of the children, their coping strategies and their digital media practices, and thus they cater to priorities as identified by children. By exploring the possibility of raising children's capabilities to negotiate and navigate digital risk environments, Cook et al. (2012) challenge the widespread tendency to infantilise children as incapable of understanding the risks involved. Indeed, the study shows that not only are some children aware of the risks, but they deal with them on a daily basis. Systematic formal educational initiatives to teach younger children about the complex risks and opportunities in digital environments in low-income communities of the Global South are few and far between, and significantly hampered by norms governing the discussion of sexuality, pornography and other sexual content. Informal educational initiatives, which occupy far less time with children, tend to concentrate on basic literacy and information search skills rather than on differentiation between safe and unsafe content. By far the most common means by which children in the 10- to 14-year-old age group appear to learn to manage their

Case study 8: Child Protection Partnership (CPP)

The Child Protection Partnership (CPP) is a project of the International Institute for Child Rights and Development (IICRD). Its goal is to reduce and eliminate, where possible, online exploitation of children through child protection good practices and technology that promotes an enabling environment across public and private sectors (IICRD, n.d.). It aims to develop innovative systems of social support by attempting to understand the unique and emerging threats posed by ICT-enabled sexual exploitation. CPP advocates for a Circle of Rights (COR) process within programme implementation that extrapolates from the United Nations Convention on the Rights of the Child (UN CRC), but contextualises and grounds them within local realities. The COR process is intended to be a child-centred, participatory and action-oriented research process that begins with children's perspectives and builds on local and community wisdom to develop innovative and contextualised strategies that adhere to local realities and that are sustainable (Cook et al., 2012).

CPP works towards three outcomes: equipping law enforcement, government and other supporting organisations to better address ICT-enabled child exploitation; connecting vulnerable children to protective services and mechanisms such as responsive legal and other protection aimed at preventing and addressing ICT-enabled child exploitation; and adopting a coordinated approach among stakeholders to prevent and address ICT-enabled child exploitation. CPP began as a three-year programme (2008–11), and has been implemented in two countries: Brazil and Thailand. It has worked directly with 429 children through the COR process in the two countries, and literature about CPP claims that it has positively benefited 117,000 children through programmes run by CPP's partner organisations, including government ministries, NGOs, the private sector, law enforcement, communities and children. Through its training, curricula and ICT-based game development, another claim made is that it has indirectly but positively influenced 100,000 law enforcement personnel and over 2 million teachers, parents and other adults (IICRD, n.d.).

We would caution, however, that simply having reached (indirectly) and conveyed information to large numbers of adults about internet-related child protection and risks does not itself constitute 'positive influence'; we suggest that regular in-depth qualitative evaluations of these claims are necessary to understand how information dissemination in this manner is affecting all the parties involved. Further, separate evaluations of the content and (technological) means of the interventions with different groups of adults and children are highly recommended: the assumption that online risks will be evaluated in the same manner in environments of secure income or great deprivation is misplaced (Banaji, 2017).

online use is via peer-to-peer support from friends who have more informed parents/family members.

Samuels et al.'s (2013) study of 13- to 17-year-olds use of social media and mobile phones in South Africa captures how access, opportunities and risks can be closely intertwined, challenging the policy-makers who wish, understandably, to disentangle them so as to maximise the former and minimise the latter. Their combination of a survey and focus group interviews found that:

- Adolescents from urban and rural areas alike use social media and mobile phones for sharing information and social connectedness, including strengthening their offline connections and discussing personal problems that it would be embarrassing or difficult to

discuss face-to-face – to the point that lacking such opportunities can lead to social exclusion.

- A small but significant minority meet offline someone they first met online, giving as their reasons the desire to get to know someone better, loneliness, boredom, curiosity, verification and an opportunity to fall in love.
- Young people are aware of the risks and disadvantages associated with social media and take pro-active and responsive steps.
- Girls, and those who live 'in metropolitan and urban areas are significantly more likely to experience some form of online violence than those living in rural areas' (Samuels et al., 2013, p.32).
- 'Many of the risk factors for face to face or traditional violence were also found to be significantly associated

with online violence, highlighting a huge overlap between these two forms of violence. Specifically, exposure to family and community violence, interactions with delinquent peers, access to alcohol, drugs and weapons, knowledge of criminality, as well as parental and sibling criminality were all strongly related to both the victims and perpetrators of online violence' (Samuels et al., 2013, p.36).

- However, the study also found that young people are aware of online risks and take pro-active and responsive steps. They would first try to solve the problem on their own, failing which they would turn to a trusted individual.

The researchers drew several important conclusions for policy and practical interventions. First, they note (as has also been found elsewhere; see Livingstone et al., 2012) that risks are correlated: 'The relationship between sexting and cyberbullying becomes most apparent when the consequences of failing to comply with requests for photos are explored. Failing to concede to such requests could result in other forms of bullying' (Samuels et al., 2013, p.35). Thus interventions cannot be designed simply for bullying without considering the link to sexual harassment, for example. Then they note the strong links between online and offline risk and vulnerability: 'This suggests that interventions aimed at reducing levels of online violence should target at-risk youths in general and not simply those who frequently make use of social and digital media' (p.36). Third, they note (as was also seen from the research on health information-seeking, above), that adolescents prefer first to solve a problem on their own, failing which they turn to a trusted individual. This makes it difficult for any outside agency to intervene in relation to online risks, although some interventions build on peer mentoring schemes for exactly this reason. The importance of peer support is also highlighted by the Global Kids Online study (Byrne et al., 2016) which found that children in Argentina, Serbia, South Africa and the Philippines most often turn to a friend when something upsetting happens online, while seeking support from a teacher or another professional is comparatively rare.

Considerable efforts are underway internationally to understand, quantify and alleviate the cyberbullying that accompanies use of the internet and mobile phones in many countries (Livingstone et al., 2016). For example, in Turkey, a modest survey of 12- to 19-year-olds found that that 'the most reported form of exposure to cyberbullying

students experience is being insulted and being threatened' (Aricak et al., 2008, p.259). Although parents and teachers are tempted to see verbal threats as less serious than the physical bullying that can occur face-to-face, research shows that cyberbullying is also linked to a range of harms, including depression, exclusion and other adverse mental health outcomes. Another Turkish study (Erdur-Baker, 2010), this time of 14- to 18-year-olds, found that:

Regardless of gender differences, the relationships between being a cybervictim and cyberbully are significant and much stronger than the relationships between cyber and traditional bullying. This result suggests that the same adolescents who are victims are also bullies in cyber-environments. (p.121)

As Aricak et al. (2008) also show, students who spend more time on the internet are more likely to engage in harassing behaviours that rely on the technical expertise they have gained through internet use, while less expert students are more likely to use simple forms of harassment. Nonetheless, it should be noted that not all those who are cyberbullied also bully others. More important, perhaps, one might interpret the actions of perpetrators as indicating difficulties or victimhood on their part too. While the correlations across risks, and across victim and perpetrator positions, complicate the interventions needed, they serve to remind of the complexities that can surround experiences of risk in children's lives, thus simplistic or decontextualised interventions must be avoided.

While the notion of 'internet addiction' is often discussed in the popular media, research across a range of countries suggests this is both relatively rare and best explained not by internet use but by pre-existing factors. For example, a survey of 14- to 16-year-olds in Tehran, Iran, found that of 1,968 students in the sample, 977 were internet users, and of those 37 could be classified as 'internet addicts' according to the measures used – in other words, some 3% of internet users (Ghassemzadeh et al., 2008). As they further found, these adolescents 'are lonelier and have lower self-esteem and poorer social skills than moderate users but not necessarily than possible addicts or nonusers' (p.731). General time-wasting did not feature within the evidence review conducted, and one reason could be the paucity of leisure time among children in LMICs. Very few studies focused on evaluating comparative digital media uses

and practices across socio-economic frontlines within LMICs, and it is estimated that this phenomenon is largely correlated with class. Banaji (2017) highlights the class differential in media uses and practices among children in India.

Mesch (2009) obtains similar findings in relation to exposure to online pornography in his survey of 13- to 18-year-olds (both Jewish and Arab) in Israel. In brief, use of the internet for pornography is broadly correlated with online opportunities (use for communication, music and learning) – and it is noteworthy that while we have classified it here as a risk, some adolescents can see

access to pornographic content as desirable, partly as a way of learning about sex in places where there is no direct access to information on sex, sexuality or relationships education. A similar survey, this time of 10- to 18-year-olds in Israel, broadens the focus to include a range of risky online behaviours, and explores the link to parental mediation (Sasson and Mesch, 2016). They found that boys were more involved in risky behaviour than girls (see also Adebayo et al., 2006), possibly because, as the survey also showed, parents had higher expectations of their daughters' good behaviour than of their sons, while boys proved more sensitive to peer group norms which, it

Case study 9: Afroes

Afroes, short for African heroes, is a mobile-first enterprise working with multiple partners and clients to deliver game-based mobile products that claim to be designed to foster youth engagement, awareness and learning. Afroes' games-based products aim to connect young people to 'information, opportunities, skills, and resources with the aim of positioning African youth for a more productive future' (Afroes, n.d-a). Again, this is an initiative set firmly within the modernisation development paradigm, with fixed ideas about what entrepreneurial and educational success looks like, and a hierarchical structure. Its partners are drawn from business, industry and international development organisations, all with their own set needs and goals. Nevertheless, there is merit in the fact that its products might give young people the opportunity to engage with unfamiliar real-world content, since they address issues ranging from 'competing for employment, gender-based violence, electoral peace, environmental degradation, and child protection' (Afroes, n.d-a).

For instance, Moraba is an award-winning mobile game designed for UN Women and is geared towards educating young audiences in a South African township on gender-based violence (Broadband Commission for Digital Development, 2015). It is touted as a quiz-based adaptation of Morabaraba, a traditional South African game of strategy and wit (Afroes, n.d-b). HAKI Chagui ni Lako or Haki 2 is a mobile game designed with the stated aim of fostering peace and tolerance among the young Kenyan electorate where players are ultimately encouraged to commit to peace and tolerance (Afroes, n.d-c). Champ's Chase is a mobile game designed as part of the Nelson Mandela Children's Fund-led Champion for Children campaign. Although there is no evidence to suggest that it has, in reality, effected these changes, Champ's Chase is supposedly designed to raise awareness about child protection, to educate young people about child safety and to empower children to speak out about the violence and abuse happening in their communities. In this game the user is set with a task of locating and rescuing children across South Africa. In each level the user must avoid contact with five different child abuse perpetrators including physical abusers, child traffickers, criminals, online predators and substance abusers. To assist in the rescue, child protection resources, such as Childline numbers, are available throughout the levels. The game has registered more than 5,000 downloads worldwide (Mobile Champions, 2010), which again, may or may not be by children, and may or may not be by residents on the African continent.

All of these games developed and disseminated by Afroes also contain inherent logics depending on the developers' interests, definitions of empowerment and economic positioning. Fisher's (2016) work on the 'gamification of development' in Africa provides a thought-provoking account of the ways in which these games are frequently encoded with the ethnocentric, neoliberal priorities of their commercial or INGO developers, and may also simply being used to push the agendas of organisations that do not necessarily have the interests of specific groups of local communities, and children, as their first priority.

is implied, pressure them towards riskier behaviours.

The importance of peer group norms, and the blurring between opportunities and risks, has also been pursued in other areas, although there are notable gaps – for instance, we found no studies of religious radicalisation, despite contemporary interest in the role that internet use may play here. Another under-studied area is that of online activities relating to mental health and self-harm. Based on an American study of pro-anorexia websites, Polak (2007, pp.82–3) challenges a host of common-sense assumptions when arguing that:

As a rhetorician, I value the possibilities of an online pro-ana/mia websites. The space that provides opportunities for girls to speak to a variety of audiences in an array of textual forms. As a feminist, I value the unrestricted space that online discourse provides for girls and young women, allowing for alternative viewpoints and voices of female resistance. But the pro-ana movement ... is more powerful than anything I have ever seen before online. The written texts by pro-ana followers are sometimes both shocking and disturbing.

She adds, further, that ‘Pro-ana followers are critical analysts of their disorder and of the culture in which they exist. The assumption that members are too immersed in their disorder to think objectively about the issue does not allow for the growth that does occur in pro-ana communities, the conversations that do happen’ (p.90). This study is valuable because it deals with the complexity of resistant identities for children online as well as the risks at play in allowing articulate teenage girls to determine their own attitudes to weight in light of commercial culture. While it relates to girls’ lives in HICs, where issues of food and risk of starvation take on very different meanings compared with the situation for girls who do not have regular daily access to food in low-income contexts, it may be noted that stress and anxiety around weight are increasingly common among school girls in middle-income households in Asian and African countries, and so this study has its place in examining the risks and opportunities of online discourse about eating disorders.

Conclusions

Conducting this evidence review on digital media uses of young adolescents in LMICs has led to the appreciation of how unevenly distributed the evidence is across LMICs, both within and among regions. With regard to the MENA (Middle East and North Africa) region, most evidence pertains to Turkey, Iran, Israel and Kuwait, the majority of them with regard to risks such as cyberbullying, online sexual content, online risky behaviour and internet addiction. Studies also exist on the role of ICTs in supporting adolescents' health knowledge, comparative studies with HICs on media uses and practices, as well the role of media and communication strategies such as games that can purportedly influence children's propensity for civic engagement. Africa represents the largest volume of research; however, the majority of it pertains to South Africa. Other countries within the African continent on which evidence is available are Nigeria, Ghana, Uganda, Ethiopia and Tanzania, among others. Research from this region primarily encompasses opportunities, risks, skills and practices, as well as access, to a lesser extent. The East/South East Asia region comprises a rich trove of research that speaks to the thematic criteria, although our remit was not to dwell at length on insights from Latin America or East/South East Asia, and much of this research was, in any case, conducted with older adolescents and university students. From Latin America, evidence has tended to be from Brazil, Argentina, Peru and Chile, and has tended to concern digital media and parental mediation, adolescents' changing digital media practices in the face of advancing convergence, as well as the co-dependence of digital and social inequalities. Evidence from South Asia has been scarce and has mostly corresponded to skills and practices inflected by lived experiences along with other socio-economic parameters. Given blind spots in evidence both between and among regions, international development policy informing programmes targeting adolescent capability development will need to be extremely cautious. Mediation is, overall, an understudied phenomenon.

The evidence review has highlighted a particular research and programmatic blind spot with regard to

young adolescents, especially girls, within the age group of 10–14. They are both an understudied age group as well as a neglected target group for programme interventions. Is it worth providing children with access to digital media and ICTs? Kleine et al. (2014) conclude, with due caution, that ICTs can help reduce inequality by improving connectivity in under-resourced and marginalised areas, although hopes for quick wins are rarely realised. Hence the experts they interviewed stressed the importance of working with intermediaries in ensuring the effectiveness of ICT4D interventions, especially in identifying and responding to local demand. ICTs and digital media represent a capital-intensive form of intervention, making private partnerships in many cases unavoidable if interventions are to be sustainable. However, these tend to focus on particular devices or technologies rather than the child's overall digital ecology, and/or to undermine the use of free and open-source software or transparency and ethics in data collection and management.

The report by Raftree and Bachan is the only major report we have identified on the specific rights, needs and barriers to digital media faced by young adolescent girls in developing countries, the exact remit of Gender and Adolescence: Global Evidence (GAGE). Raftree and Bachan observe that,

In our review and analysis of C4D programs that used new ICTs with a focus on marginalized adolescent girls, we found that information and communication technologies (ICTs) can be an important addition to C4D work for three main reasons:

- Connection, engagement and agency
- Access to knowledge
- Improved governance and service delivery. (2013, p.12)

They illustrate this claim by pointing to several successful interventions, some of which we discuss in this report. To make these scalable and sustainable, which is often difficult, they offer a series of careful and tailored recommendations regarding embedding ICT in programme design, how to address girls' privacy and protection, and how to establish an evidence base to guide programme evaluation and

development, capacity-building and policy. Thus we quote their conclusions in detail:

Considering ICTs within existing C4D frameworks rightly places them within a wide-ranging toolbox of C4D tools which include other channels of communication. The advantages that ICTs offer in delivering C4D objectives must be tempered with an in-depth understanding of the existing drawbacks and risks posed by these technologies; for the most marginalized and excluded access to and ownership of ICTs remains a challenge. As suggested in the recommendations, the added value of implementing C4D aims with ICTs must be firmly established, otherwise programs run the risk of utilizing inappropriate means for delivering results or attempting to engage marginalized adolescent girls. (Raftree and Bachan, 2013, p.26)

Furthermore:

Interest in programming with ICTs will increase, not just amongst C4D specialists, but across many agencies and work streams. Keeping ahead of the game and planning towards both the expansion of technology available in various settings and the importance of technology in delivering established goals will be critical. Training and capacity building should be rolled out and relevant technical materials should be developed as soon as possible. The increase in programming should also involve robust analysis to allow measurement of results and to learn from experience. Finally, the focus on the most marginalized, and especially girls, should be kept as a core aim of any programming which uses ICTs, to ensure those who can benefit the most from the advantages of communication technologies are empowered to access and control these tools. (Raftree and Bachan, 2013, p.26)

The question of analysis is crucial; in their report we could find little evidence of programme evaluations demonstrating lasting benefits, and nor have we found much evidence in other research reviewed here. Larghi et al.'s (2015) findings are among the most encouraging – a comparison of 15- to 17-year-olds in an upper-middle-class and a lower-class school, both in receipt of a connecting equality programme, PCI (Programa Conectar Igualdad):

The main findings show that in terms of access, skills and types of use, the implementation of the

PCI has had a positive impact among lower class youth, guaranteeing access to their first computers and promoting the sharing of knowledge and digital skills with family members. Moreover, evidence of more diverse and intense use of ICTs among lower class students reveals the development of digital skills related to educational activities. Finally, in terms of sociability, having a personal netbook enables access to information and cultural goods which are very significant in generating ties and strengthening identities and social integration. (Larghi et al., 2015, p.1)

Possible reasons why Larghi et al.'s intervention was successful include the fact that the PCI was implemented by the Argentinian Education Ministry as part of a national policy that was grounded in local contexts, engaged local communities and teachers, and that provided a degree of sustainability. Thus the study was sensitive to digital and socio-economic inequalities. Seemingly similar studies are often less successful. For instance, in an ICT4D study of a telecentre in a remote and mountainous part of Peru, the teenage school students who lived near the telecentre became regular users, making the telecentres a social space that enabled 'collective learning', local content creation and information searching (Heeks and Kanashiro, 2009). Yet for those who lived further away or lacked control over their everyday lives (more often girls and young women) or who were not proficient in reading Spanish, usage was considerably lower, and the intervention risked reinforcing old inequalities or creating new ones.

As the experts interviewed for Kleine et al.'s (2014) report made clear, access to ICTs and digital media represents a considerable challenge for children, especially in marginalised areas or for marginalised groups. Gender adds a further layer of exclusion and risk, insofar as girls often enjoy less access and opportunities for digital media use than boys, and access can further be accompanied by sexual harassment or gender-based violence. No wonder that de Pauw (2011, p. 10) asks, on behalf of a UNICEF/Plan project, 'whether [ICTs] are the right channel for working with marginalized adolescent girls and their communities, given that the most marginalized may also be the least likely to access ICTs.' Recognising the concern that programme interventions can exacerbate rather than ameliorate such inequalities by providing ICT first in areas where connectivity is already available, Watkins (2014, p.68)

calls for 'progressive universalism', namely:

... a determination to ensure that people who are poor gain at least as much as those who are better off at every step of the way towards universal coverage, rather than having to wait and catch up as that goal is eventually approached. Establishing the principle that the most marginalized children should be first in line for enhanced provision of health, nutrition, education and other services is the starting point for a strengthened commitment to equity.

At stake in much of the above-discussed research is the fundamental question of whether evidence can establish, as is widely hoped, that 'the new media holds considerable prospects for empowering young people to becoming informed and active advocates of their rights while reducing the tokenism that has characterised their engagement in child rights advocacy programming' (Fayoyin, 2011, p.57). Having reviewed a wide literature, Fayoyin draws out a series of challenges, including offering a warning against the temptation towards oversimplification of child rights issues that are deep-seated in norms and practices and require structural and systemic changes, and observing that while they amplify opportunities, new media have also created additional risks such as cybercrime and new harmful activities such as excessive use and addiction. Furthermore, there is inadequate guidance on how to design programme interventions around new media and young people, and insufficient monitoring and evaluation of actual interventions, leaving child rights agencies unable to identify evidence-based directions that could benefit children in the future.

A study by Internews Europe (Angle et al., 2014, p.8) of the media reporting of child rights issues in Kenya, India and Brazil shows how digital media themselves undermine child rights in several crucial ways:

- Lack of children's voices: A patronising attitude towards children and young people severely limits the space that children get in the mainstream media, and all but excludes their voices from the public debate on child rights.
- Lack of coverage: There is an absence of meaningful, realistic and socially relevant media coverage or information flows on child rights issues.
- Lack of professionalism: Reporting on child rights and children's issues is not widely recognised as a specialised field, and this means not many journalists

are motivated or even capable of producing in-depth coverage. This neglect starts right from journalism school and extends to almost all newsrooms.

- Lack of media – civil society organisations cooperation: Almost everywhere, Internews Europe has found a high level of mistrust between the media and child rights advocates. Both sides do not really understand each other's needs and expectations, and find it hard to work together constructively.
- Lack of rules: Ethical guidelines on reporting child rights are little known and poorly implemented.

According to Internews Europe's theory of change, the claim is that the media, children, civil society and young people could and should be empowered to provide valid credible information and educate others in society about child rights in accordance with international standards, and that if news and education were shared in this way, to give voice to children and advocates, society would gain an understanding of the appropriate standards and practices for protecting and empowering its children through laws, policies and community action.

In addition to efforts to empower children directly through digital media and ICTs, this review also supports the conclusion that adults – parents and teachers, on the one hand, and also policy-makers and practitioners initiating interventions, on the other – should strive to achieve a child-centred grasp of the opportunities and risks that matter to children and that are meaningful within their life contexts. The literature suggests a clear divergence between what adult stakeholders expect children to do with digital media and with what they actually do, and between development interventions' assumptions about the potentials and realities of many children's access to, skills with and interest in ICT-linked interventions, which is why the legacy effects of employing digital media within development interventions have tended to perpetuate entrenched hierarchies of gender- and age-related power structures. Interventions have tended to focus on the supply side while ignoring dynamics that structure demand and use, and therefore condition practices. In the technological determinism that continues to underlie many ICT4D programmatic interventions, social norms, values and practices that shape socio-technical relationships are often ignored. None of the evidence reviewed highlighted examples of long-term/longitudinal programmatic interventions, even though it is critical that development interventions

are sustained beyond the rudimentary achievement of programme objectives in order to learn the effects of ICTs on adolescents' capability development, especially their potential to contribute towards social justice by expanding the equity, participation and agency of young people in determining their futures.

Here, it is also important to note that most studies were aimed at understanding the field and generating more knowledge in relation to one or more of the thematic criteria prioritised within this review. While knowledge-building is critical, in a field that continues to be shaped by the rapid pace of technological evolution but where evidence is greatly needed (especially from LMICs), we would specifically call for more research that can identify entry points for the role of ICTs in augmenting opportunities, mitigating risks, negotiating structural barriers to access, developing frameworks for critical skills-based education and facilitating an enabling mediating role by parents and carers at a programmatic level. Mobilised by a 'digital native' discourse, development interventions that have incorporated ICTs have tended to target older adolescents above the age of 15, ignoring younger adolescents between the ages of 10–14. In the absence of long-term engagement of ICTs over an adolescent's life stages, inferences cannot be drawn regarding capability development across the life course. In order to understand the optimum time for programme

interventions there first has to be engagement with the neglected age group of 10- to 14-year-olds. Further, interventions should be guided by what children already know, what they already have access to as part of their normal socio-economic family activities, and how they do or do not wish to engage with digital media. Since many studies show that parents and carers are generally the most accessible and preferred source of information and support for their children, C4D and ICT4D interventions should include these as key mediators of children's needs and rights. It should be noted, however, that we have found a particular evidence gap regarding the knowledge, expertise and actions of parents and other mediators of children's opportunities and risks in relation to ICTs and digital media.

This raises the more general point that much research focuses closely on particular digital media in relation to particular hoped-for benefits, neglecting the complex interdependence of the many factors that influence children's life chances and that need to be addressed holistically. Finally, we suggest that given the continued innovation and adoption of ICTs and digital media across LMICs, it is no longer possible or desirable to conceive of development without ICTs. At the same time, the positive role of ICTs needs to be carefully assessed, rather than assumed, and evaluated alongside a range of non-digital development opportunities.

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Annexes

TABLE OF ANNEXES

Annex 1: Experts consulted	54
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Annex 1: Experts consulted

- Alexandre Barbosa, Brazilian Network Information Center, Brazil
- Amani Gamal el Din, UNICEF Cairo, Egypt
- Anna Falth, Empowerwomen.org, USA
- Anna Feuchtwang, National Children's Bureau, UK
- Antonella Notari Vischer and Servane Mouazan, Womanity Foundation, Switzerland
- Carla Kraft, UN Women, USA
- Caroline Harper, Overseas Development Institute (ODI), UK
- Dorothea Kleine, Royal Holloway, University of London, UK
- Erin Hodgeboom, National Girls Collaborative Project, USA
- Gina Porter, University of Durham, UK
- Jasmina Byrne, UNICEF Office of Research-Innocenti, Italy
- Jonathan Das, BRAC, Bangladesh
- Linje Manyozo, RMIT University, Australia
- Marie-Laure Lemineur, ECPAT International, Thailand
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- Nevine Tewfik, Research, Studies and Policies Bureau, IR Division of MCIT, Egypt
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About GAGE

Gender and Adolescence: Global Evidence (GAGE) is a nine-year longitudinal research programme generating evidence on what works to transform the lives of adolescent girls in the Global South. Visit www.gage.odi.org.uk for more information.

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