# Comparative global knowledge about the use of digital technologies for learning among young children

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## Abstract

We examine evidence regarding young children's digital literacy practices around the world. Although little is known about children under eight years old, especially on a global comparative basis or beyond the West, we identify such research as exists, including from East Asia and the global South. Barriers to access represent the major challenge globally, a problem often obscured when research focuses on wealthy countries. Some challenges are shared cross-nationally, albeit in different forms, including inequality, curriculum development and the home–school connection. Experimentation with ways of appropriating digital technologies for learning is occurring in diverse contexts, and valuable lessons are beginning to emerge.

## Global trends in young children's access to digital technologies

Remarkably little is known of young children's access to digital technologies around the world, let alone the learning and literacy practices that may result. This is remarkable since children – especially the youngest children increasingly born into an already-digital world – are the focus of considerable public and policy interest regarding their supposed "natural" affinity for all things digital. There is considerable speculation about how this may open up new educational and participatory opportunities as well as expose them to new sources of vulnerability and risks of harm (Holloway, Green and Livingstone, 2013; Livingstone et al., 2017). With speculation rife that the pace of global internet and mobile adoption continually outstrips the capacity of parents, educators or governments to provide for children's wellbeing in the digital environment, the paucity of sound research is problematic.

In this chapter we take on the challenge of examining the conditions and consequences of young children's digital technology practices with a global focus. By far the majority of the available research derives from the world's wealthier countries, but it is in the global South that the majority of children – including child internet users already live and, notably, where the majority of future users will live (Livingstone, Carr and Byrne, 2015). Our task is eased a little by the fact that the world's leading children's organisation, UNICEF, focused its annual investigation into *The State of the World's Children* at the end of 2017 on "Children in a digital world" (UNICEF, 2017), together with a companion report reflecting the voices of children themselves as they call especially for internet access as of a right,

complain about the digital access barriers they face, and muse over technology's excitements, horrors and absurdities (Third et al., 2017). But while this is a helpful overview of the evidence for older children and teenagers, to understand the situation for younger children, we had to conduct our own targeted literature search, combining the results with country case studies to explore contrasting contexts in greater depth.

Since most countries worldwide report on individual and household internet use to the United Nations' (UN) International Telecommunications Union (ITU), we start by examining their latest statistics (see Figure 1). It is significant that to construct this graph we did not select the countries included from a larger set because none exists; despite widespread use of terms such as "internet users" or "the population" or "digital natives", for the most part countries only collect data for those aged 14+ or 16+. Thus Figure 1 includes the only countries that report comparable statistics to the ITU for children aged under nine. We found no international sources of data for other digital technologies, so focus in this section on internet access.

- - - Figure 1 about here - - -

What does the graph tell us? First, it is clear that children from the world's poorer countries use the internet the least. Then, supporting the notion that youth (aged 15-24) are the early internet adopters, in every country where data are available, more 15- to 24-year-olds use the internet than either younger children or older adults. The situation for those younger than 15, however, is more variable (and, possibly, the data less reliable). Interestingly, in some countries, albeit to a lesser degree than among youth, children use the internet more than the adult population (in Belarus, Columbia, Ecuador, Georgia, Mexico, Thailand and Venezuela). But this is not the case in Bangladesh, Cambodia, Iran, Japan, Kazakhstan, Oman, Ukraine or Zimbabwe – though this may yet change. The former countries are generally wealthier, suggesting internet access, often through rising mobile device ownership among the growing middle class and a proliferating market in connectivity and services targeted at (or at least used by) children. However, the inclusion of Japan and Oman together with some of the world's poorest countries is puzzling, suggesting that the cultural position of children in society also influences the extent to which whether they are included in the digital world.

In many parts of the world, these are still early days when it comes to the use of digital technologies for learning and literacy. For example, a systematic review of the past decade's research in Southeast Asia, conducted to inform the ASEAN ICT Master Plan, noted that Cambodia, Laos, Myanmar and Vietnam only began to invest in digital infrastructures in recent years, though Thailand, the Philippines, Malaysia, Indonesia and Singapore have already developed ICT projects in education (Prajaknate, 2017). By contrast, literature reviews focused mainly on Europe and North America reflect an already-lively and well-advanced debate among scholars and practitioners regarding the nature, framing and potential of digital and multi-modal literacies. The importance of connecting sites of learning – particularly across home and school - is often emphasized, since "everyday cultural resources that originate outside school offer possibilities for multimodal creativity and identity play, as children consume, transform and produce multimodal texts" (Kontovourki et

al., 2017, p. 40; for related research on older children, see Ito et al., 2013).

As children under eight years old still heavily depend on and are subject to adults' supervision, their access to and adoption of digital technologies are strongly monitored by their parents/care-givers and teachers. But in countries where school provision is uneven, or where children more often use the internet outside the home than in it, research is needed to understand their contexts of access and use, and the range of mediators (beyond parents and teachers) that may shape the resulting opportunities and risks (Banaji et al., 2018). Indeed, a study conducted by TheAsianparent Insights (2014) on Southeast Asian parents with children aged 3-8 found that the children's digital device usage took place the most at home, sometimes in restaurants, while travelling, at friends' places, and the least at school because the inclusion of digital technologies into the Asian school curriculum was at a nascent stage. However, our review of existing literature shows that most studies on young children's use of digital technologies beyond the West focus on two settings: the school and the home and still neglect other contexts. Another recent research review focused on older children in low- and middle-income countries revealed that girls are subject to restrictions, responsibilities and exclusions that impede their use of digital technologies – not only from parents or caregivers and teachers but also from community access providers and older boys, and sometimes to gender-based violence when they do seek to use them in community or public spaces (Livingstone et al., 2017).

In what follows, we invert the more usual tendency of scholarship published in English to focus on teenagers in Western contexts, by examining what's known about young children's use of digital technologies in East Asia and the global South, drawing some comparisons with the West when informative, and with a specific focus on digital literacies and learning, as befits the focus of this volume.

## Enablers and barriers to children's digital literacy around the world

### *At school*

Most of the research we found was concerned with how teachers are incorporating digital technologies within the pedagogic process at school or with practices of parental mediation of digital technologies by young children at home. Little of this research addresses children's digital literacy directly, rarely debating definitions or engaging in conceptual debates. Rather, the focus is predominantly on digital provision, instrumental uses, rules and immediate educational or behavioural outcomes. Little research, too, has addressed children's lives holistically by connecting their digital literacy and learning across domestic, informal and formal settings or over time as children develop. However, there are intriguing signs of experimentation with digital learning around the world, some of it deploying advanced technologies. For example, working in a typical Chinese kindergarten in Hong Kong, Huang and Fong (2016) found that augmented reality technologies could enhance four- and five-year-olds' art education activities, generating considerable enthusiasm from the children, parents and teachers. Yilmaz (2016) adds from experiences in a Turkish class of five- to six-year-olds, while "poor interaction designs cause ineffective learning, leading to disorientation

and cognitive overload", augmented reality toys can be made to work well for children since, "while they are pointing (at) toys, responding to teachers and turning toys, they can describe what they see in detail. In addition, the more they comment and question, the more extensively they describe" (p. 246). At home, too, Cheng and Tsai (2014) explored the potential of Taiwanese parents reading an augmented reality picture book with their young children, finding that most learning occurred when the parent–child relationship was cooperative or even tipped in favour of child agency.

Less ambitious in technological innovation but perhaps more applicable in practice, Wang et al. (2016) experimented with the relative benefit of learning via touchscreen devices, finding that for Chinese five- and six-year-olds the interactivity this afforded improved children's learning to tell the time in a way that also transferred to other contexts (such as using a toy clock or a paper drawing of a clock). For many more practical suggestions designed to inspire educators everywhere, one might refer to Rogow's (2015) guidance on "inquiry-based technology integration" to facilitate critical thinking among five-year-olds. Indeed, touchscreen devices are particularly accessible for children still too young to competently manage either pen and paper or a computer keyboard and mouse (Seo and Lee, 2017; Wang, Towey and Jong, 2016). Also important for very young children, as Noorhidawati et al. (2015) revealed in their study of Malaysian preschoolers, is that mobile apps engage children through sensory and psychomotor skills (touching, looking, listening, gesturing) as well as emotional expression (facial expressions and noises) and verbal expression. In this way, they can also help teachers and parents visualise, externalise and so engage in children's learning, supporting what Siraj-Blatchford (2007) calls "sustained shared thinking" and thereby, parental activities of brokering and scaffolding learning through technology use (Barron et al., 2009).

Enthusiasm and motivation, interactivity with toys and devices, cooperation among peers, parents and teachers – all of these explain why digital technologies can serve as a "catalytic change agent" (Roberts-Holmes, 2014) for very young children. Cheung and Xu (2016) suggest that media literacy education can offer a distinctively child-centred, reflective and agentic mode of learning that connects school with the rest of children's lives and contrasts markedly with previous pedagogic traditions. The barriers to such initiatives are considerable, however, including first-order barriers (namely those external to teachers such as lack of access to hardware and software, lack of time, support, teacher training); second-order barriers (those internal to teachers such as their willingness, beliefs, competences, classroom practices); and third-order barriers (defined as preparedness to improve current situation and create what is desired) (Liu and Pange, 2015; see also Blackwell et al., 2013). For example, the Kenyan community-based initiative, Open Space Literacy, has worked in partnership with Plan International to develop children's digital literacy within the traditional primary school curriculum (Nethope Solutions Center, 2015). But as with many such initiatives, it was open to the critique that "simply adding ICTs to traditional curricula with no re-thinking of these curricula, no questioning of received teacher-centred methods, nor 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" (Livingstone

et al., 2017, p. 35). Other initiatives appear more successful but on a relatively small scale – for example, Najja7ni, an "m-learning" initiative for under-served populations in Tunisia (GSMA, 2014) – raising questions about whether and how the different levels of barrier can be overcome so as to reach more substantial proportions of the population in a sustainable way.

***At home***

Barriers also arise at home. One is that parents' optimism about the benefits of technological devices is counterbalanced by their concerns regarding the associated risks (Lim, 2016). Focusing on families in Singapore with children aged seven and below, Ebbeck et al.'s (2016) survey of parents and caregivers found that they recognised that touchscreen devices could benefit their children's physical development by enhancing their motor, psychomotor and sensory skills, that they could enhance their intellectual development in the form of improved academic outcomes and creative and interactive learning, and that they could also nourish their emotional and artistic side. However, they were also concerned about the negative impact including damage to eyesight and inculcating an inactive lifestyle, device addiction and overdependence, exposure to undesirable content, and stunted social and communication skills. Similarly, a study set in South Korea found that parents were concerned about the adverse impact of touchscreen devices on their children, including developing an unhealthy obsession, negatively impacting socio-emotional development, impeding the child's creativity or liveliness, and even physical damage to their eyesight and posture. However, their beliefs were not grounded in scientific knowledge (Seo and Lee, 2017). Due to their reservations, parents practise restrictive mediation as many feel that touchscreens do not lend themselves well to co-using the devices with their children, though this may also restrict children's learning opportunities. At the same time, parents often continue to grant their children access to touchscreens because they see it as a way to reward their children, and consequently this dissonance instils in these parents' feelings of guilt (Seo and Lee, 2017), itself reflecting an international discourse regarding 'screen time harms' (Blum-Ross and Livingstone, 2016).

Another is socio-economic inequalities. Although parents' rapid learning about and experience with digital media encourage them to mediate and support children's learning outcomes (see also Plowman, McPake and Stephens, 2010, and Livingstone et al., 2015, working with UK families with three- to four-year-olds), Shin and Li (2017) show how this differentiates among children, adding digital to other forms of social and economic advantage and disadvantage. For example, in the Thai government's "One Tablet Per Child" initiative, first grade students at urban schools gained more than those in rural schools because they came from homes already better equipped with digital technologies, and so were both more familiar with and less anxious about this opportunity (Pruet et al., 2016; see also Prajaknate, 2017). Advice from trusted authorities is also seldom mentioned by either parents or researchers, suggesting the presence of an expertise gap that only adds to parents' confusion and possible frustration. This has led to parents engaging in their own instinctive reasoning to assess the benefits and harms of these newer media technologies for their children,

influencing their mediation approach and reinforcing pre-existing inequalities.

Yet parents' concerns about mobile media devices also need to be seen in the context of perceived advantages. The user-friendly interface, coupled with the wide variety of ostensibly age-appropriate and educational content, seem to persuade parents of the benefits of new media technologies, despite their uncertainties over just what these might be (Blum-Ross and Livingstone, 2016). It can be surmised that the growing pervasiveness of new digital technologies at home, school and elsewhere is providing young children with new opportunities for learning and literacy. But in consequence, parents gain the additional burden of optimising their children's use of these devices as well as the challenge of negotiating and mediating the problems this may give rise to in the home. Looking forward, researchers at the Sesame Workshop recommend that community initiatives should (i) take stock of family engagement and offerings and online connectivity with an eye towards equity and diversity; (ii) develop professional learning programmes that train media mentors; (iii) invest in physical infrastructure that promotes connectivity and meaningful participation; and (iv) create a continuous cycle of improvement using research and evaluation (Guernsey and Levine, 2017).

## Cultural contexts in focus

Given the considerable diversity of cultural, economic and political contexts in which young children are using digital media at home and school around the world, we offer three contrasting country/region case studies of emerging markets for digital technologies to illustrate the importance of contextualisation and care in comparing across or generalising about children's experiences. Each serves to illustrate the tensions between efforts to 'modernise' a country or region through the adoption of digital technologies, promoting their role in educating the young generation, while negotiating the cultural and ethical consequences for childhood, pedagogy and family life. Each also raises questions about the societal infrastructure required to proactively harness the benefits of digital technologies for children rather than catch up with technology adoption patterns or market trends, requiring innovators and policy makers to look far beyond the individual child-device interaction to consider teacher training and curriculum development, internet governance and digital safety strategies, and parental/care-giver awareness-raising and guidance. They also provide insight into layers of mediation between the State and the unit of family as well as how State policy and infrastructural affordances structure access and parental aspirations that influence the role that digital media plays in the lives of children belonging to this age group.

### *Middle East and North Africa*

There were 365 million unique mobile subscribers across the Middle East and North Africa (MENA) by mid-2017, accounting for 63% of the population (GSMA, 2017), which makes the MENA region the second least connected region in the world. However, huge variation exists between countries across the region. As measured by digital consumer adoption, the United Arab Emirates (UAE), Qatar and Bahrain are the top countries in the world as regards smartphone penetration rates (over 100%) and social media adoption (over 70%),

outstripping even the United States (Benni et al., 2016). The MENA region is migrating towards mobile broadband with 3G coverage expanding in the area, an expected 20% 4G coverage by 2020, and UAE and Qatar will be among the first countries in the world to receive 5G in 2019 and 2020 respectively (GSMA, 2017). Lagging diffusion, uptake and adoption of digital technologies are a result of political instability in the region, with national media policies being reflective of the dominant religious identity in each country or the socio-political specificities.

Though data on young children's access to digital media in the region are sparse (The World Bank, 2014), Samaha and Hawi (2016) found that 59% of 6- to 11-year-old Lebanese children, especially boys, spent over two hours per day on digital screens. In his study on barriers to the use of technology in Jordanian preschools, Ihmeideh (2009) found that lack of funds, software and skills were the major barriers. The results also revealed that though preschool teachers saw the value in using technology in the learning process, principals were not certain about its benefits for children, and were concerned about the attendant risks (UNICEF, 2016). Sakr (2017) found that in the absence of locally produced content for children, international content is heavily censored by the State in line with cultural-religious norms (for example, removing romantic content, Christian references, swearing, family conflict, etc.) rather than, as in many countries, leaving such decisions to parents.

***China: local technology, local adoption, emerging social scaffolding***

After the reforms in 1978 to become a market-based economy, China has enjoyed the fastest sustained expansion by any major economy in history. The country now has 1.3 billion people and is the second largest economy in the world (The World Bank, 2017a). China's mobile electronics market quickly thrived, with smartphone and tablet penetration rates at 79% and 17% in 2017 (We Are Social Singapore, 2017). At the end of 2017, 91% of China's smartphone market was dominated by the top five companies – Huawei, Xiaomi, Apple, Vivo and Oppo – four of which are China-based, while South Korea's smartphone giant Samsung only accounted for 2.2% (Savov, 2017). Chinese smartphone brands even went beyond China to rapidly acquire more shares in Southeast Asia (Kotani, 2017).

Strongly influenced by Confucianism, Chinese children are traditionally expected to respect parents' authority, while Chinese parents are responsible for their children's moral development. The implementation of the one-child policy in 1978 may have caused childrearing in China to become more Westernised, overprotective and child-centred (Xu, Zhang and Hee, 2014). Research on and social scaffolding for digital media use by young children in China are now emerging, with the focus thus far on ICT integration or promoting media literacy education in preschools and primary schools (see Cheung and Xu, 2016; Liu and Pange, 2015; Zhang, Zhu and Sang, 2014). Notably, the Children's Media Literacy Education Research Centre of the China National Youth Palace Association was founded in 2013 (Children's Media Literacy Education, n.d.). Since then, the Centre has conducted various research projects on children and media, and organised activities related to children's online safety such as training courses for teachers and the Children's Internet Summit of China 2016 (Safer Internet Day, n.d.).

### *Vietnam: foreign technology, local adoption, inefficient social scaffolding*

Since its *Đổi Mới* economic reforms in 1986, Vietnam has experienced rapid economic growth with its status transformed from being one of the world's poorest countries to a lower middle-income country (The World Bank, 2017b). Vietnam's mobile electronics market has grown, making tablets and smartphones an electronic staple in the urban Vietnamese household. In the first half of 2015, 582,000 tablets were sold, 76% of which cost less than US$300 (Nguoi Dong Hanh, 2015). In 2016, 14 million smartphones were sold to a population of 92 million (Minh Do and Anh Duy, 2017; The World Bank Data, n.d.). Yet this rise in the number of electronic devices is largely driven by foreign manufacturers, with 60% of Vietnam's market dominated by South Korea's Samsung, China's Oppo and the US's Apple (Minh Do and Anh Duy, 2017).

The traditional Vietnamese family is highly Confucian and patriarchal. Education is emphasised as a key household priority. Parents make sacrifices for children's education by, for example, spending household income to send children to private tutoring classes, or "*học thêm*" (Mestechkhia, Nguyen and Shin, 2014; *Tuoi Tre News*, 2014). However, scientific research on digital media use by young children in Vietnam is sorely lacking. For instance, thus far the Vietnam Paediatric Association has received limited media coverage, and it focuses on nutrition-related initiatives (see *VnExpress*, 2016). In 2016, Pham and Lim (2017) conducted fieldwork in the South of Vietnam and found that Vietnamese parents of preschoolers strongly regard tablets and smartphones as home-based learning tools that give their children a distinct edge in education by complementing or replacing private tutoring classes. However, they hold some misconceptions about the benefits and risks of touchscreen devices, such as believing that the devices have very strong educational value, or that they emit harmful radiation that harm the child's development. Yet they receive very little to no official guidance from local schools or social scaffolding from the relevant government agencies regarding children's media use in general, and tablet use in particular.

## The global business of young children's digital literacy

Children's digital literacy has emerged as a crucial frontier for commercial interests as the trend towards intensive parenting grows (Faircloth, 2014), and the ranks of the middle class begin to swell in developed and even developing parts of the world. With the growing incorporation of digital media into the classroom, children's digital literacy is seen as a critical skill to be fostered if children are to perform well academically, and to keep up with, if not exceed, their peers. Parents who are anxious to equip their children for such a competitive academic landscape therefore buy into commercial entreaties that trumpet the virtues of acquiring digital literacy skills early and extensively. A wide range of products and services has since emerged to capitalise on the anxieties of such parents, including dedicated educational toys, also referred to as "electronic learning aids" (Shuler, 2007) or "smart toys" that are internet-connected and teach children digital skills ranging from robotics to programming to storytelling (Family Online Safety Institute, 2017). In addition to such hardware is an expanding market of apps, e-books and digital games designed to be used on the proliferating number of mobile devices such as smartphones, phablets and tablets (Vaala,

Ly and Levine, 2015). For example, over 80% of top-grossing paid apps in the 'education' category of the Apple App Store target children, of which 72% target preschool children specifically (Shuler, 2012). Another key market sector is that of services in the form of courses that aim to provide young children with digital literacy skills such as robotics, coding and animation.

Across the range of products, apps and services, therefore, several notable threads in the commercial discourse can be discerned in terms of the "hooks" that are used to appeal to parents around the world. Prior research has found that the purported educational value of these products and services is a common selling point that commercial entities seek to exploit. Be they educational toys, apps, software or virtual worlds, the language used to describe them centres round the fun and exciting learning experiences on offer, their interactivity and rich multi-media content, the inculcation of digital and literacy competencies, the development of school and homework skills, feedback provision and performance monitoring, and so on (Shuler, 2007). Besides merely offering informative and engaging content, therefore, these products and services are pitched as having the ability to enhance the child's learning capabilities in general, as well as their digital skills in particular. However, in the absence of voluntary or third-party regulatory standards for what constitutes an educational product, it is difficult for parents to make well-informed, independent judgements on the educational value of the products being marketed to them and their children (Marsh et al., 2015). Indeed, consumer advocates in the US have sought tighter government regulation of the companies that tout their apps for babies as having educational value, even though such claims are unsubstantiated by independent evidence (CCFC, 2013).

It would appear that businesses selling digital products and services address parents as anxious and highly aspirational, arguably prioritising individualised and competitive child-rearing – as is common in wealthy countries - over established or alternative ethics of childhood socialisation and learning. This raises pressing cultural and political questions about what digital literacy is for, and whose goals are thereby advanced. As our three regional case studies illustrate, the consequences of technology diffusion, whether promoted by business or government or both, risks generating cultural tensions in relation to long-established teaching and family practices. On the one hand, the growing availability of digital technologies and the emphasis on children's agency, interest-led learning and playful experimentation may be argued to promote children's best interests in the digital age. On the other hand, the new opportunities bring costs in terms of cultural traditions and values, and if not carefully thought through, hoped-for benefits especially for girls, poor or marginalised groups may not result, quite the contrary.

## Conclusions

> "The internet was designed for adults, but it is increasingly used by children and young people – and digital technology increasingly affects their lives and futures. So digital policies, practices, and products should better reflect children's needs, children's perspectives and children's voices." (Anthony Lake, until recently the Executive Director of UNICEF, quoted in Third et al., 2017, p. 18)

With smartphone and tablet penetration along with broadband connectivity rapidly rising in many parts of the world from West to East and including developing countries in South and Southeast Asia, as well as a proliferation of educational and entertainment apps, digital technology use by even very young children is on a sharp ascent. However, this chapter has revealed a lack of evidence regarding even the most basic facts and figures on young children's access to digital technologies in low- and middle-income countries, as well as early indications from qualitative research of considerable diversity in the values and practices that shape how young children are using digital media in different parts of the world. It has also found that the excitement over and hopes for digital literacy among young children is accompanied by persistent anxieties about the risk of harm, particularly among parents; while such concerns can be very practical, their widespread nature could also be seen as one way that deeper cultural and ethical anxieties about social change are expressed in a society.

Does it matter that children are going online at very young ages, often before the adults around them? How does the mode of access, i.e. mobile only (exclusively via mobile devices) or mobile first (via a range of devices but principally via mobile) translate into different patterns of use and parental supervision? To answer these questions, we need to know much more about the contexts, purposes and outcomes of children's access to digital technologies (Banaji et al., 2018; Livingstone et al., 2017). UNICEF (2017) draws attention to the stark contrast between the high hopes held out for children's opportunities, wellbeing and rights in a digital world, and the persistent digital inequalities that mirror or even exacerbate established inequalities in region, income, gender and language. Both sides of this equation are crucial, since ever more pervasive, complex, commercial and personalised digital technologies are becoming "embedded, embodied and everyday" (Hine, 2015), actively promoted by global business interests and by states and international bodies now that digital technologies are included in the delivery of the 2015 Sustainable Development Goals and mapped onto children's rights (Wernham, 2016).

Despite the diversity in digital literacy experiences, and the considerable gaps in existing research, several common factors emerge. These include the ways in which socio-economic inequalities generate digital inequalities, and the determined struggles of parents and teachers to overcome these and other cultural, conceptual and practical difficulties as they experiment with facilitating children's opportunities in a very fast-changing digital environment. As a result, the predominant trend, especially but not only in East Asia and parts of the global South, is of a highly instrumental orientation to learning outcomes and risk minimisation at home and school, with little evidence of ambitious steps towards participatory, critical, creative or child-centred conceptions of digital literacy (Banaji et al., 2018). This may be understandably pragmatic. But at the same time, this instrumental orientation can be reductive in effect, tending to prioritise the convenient delivery of narrowly conceived pedagogic goals yet undermining the deeper potential for children to enjoy distinct, meaningful and context-appropriate opportunities in the digital age. It is further important that such similarities across cultures do not legitimate the ungrounded conclusion that the "rest" of the world will follow norms and practices already emergent in

the generally privileged West.

A child-rights approach would consider more holistically how the deployment of digital technologies at the regional, national and individual level, are beginning to shape children's rights to provision, protection and participation within the particular contexts of economic development and socio-political privileges, priorities and stability that shape the regions in which they live (Livingstone et al., 2015; UNICEF, 2017). To advance this agenda, it will be important for research, policy development and practical interventions that in the future, government statistical offices collect data on children's engagement with digital technologies in ways that encompass the divisions and fractures both within and across countries. Equally important is that researchers henceforth conduct qualitative and ethnographic work to explore the meanings, dynamics and inequalities within families, communities and learning sites, to understand why everyday domestic meanings, values and practices complicate and reconfigure seemingly simple matters of "access", often inflecting children's experiences in ways strongly marked by generation, class, gender and culture.

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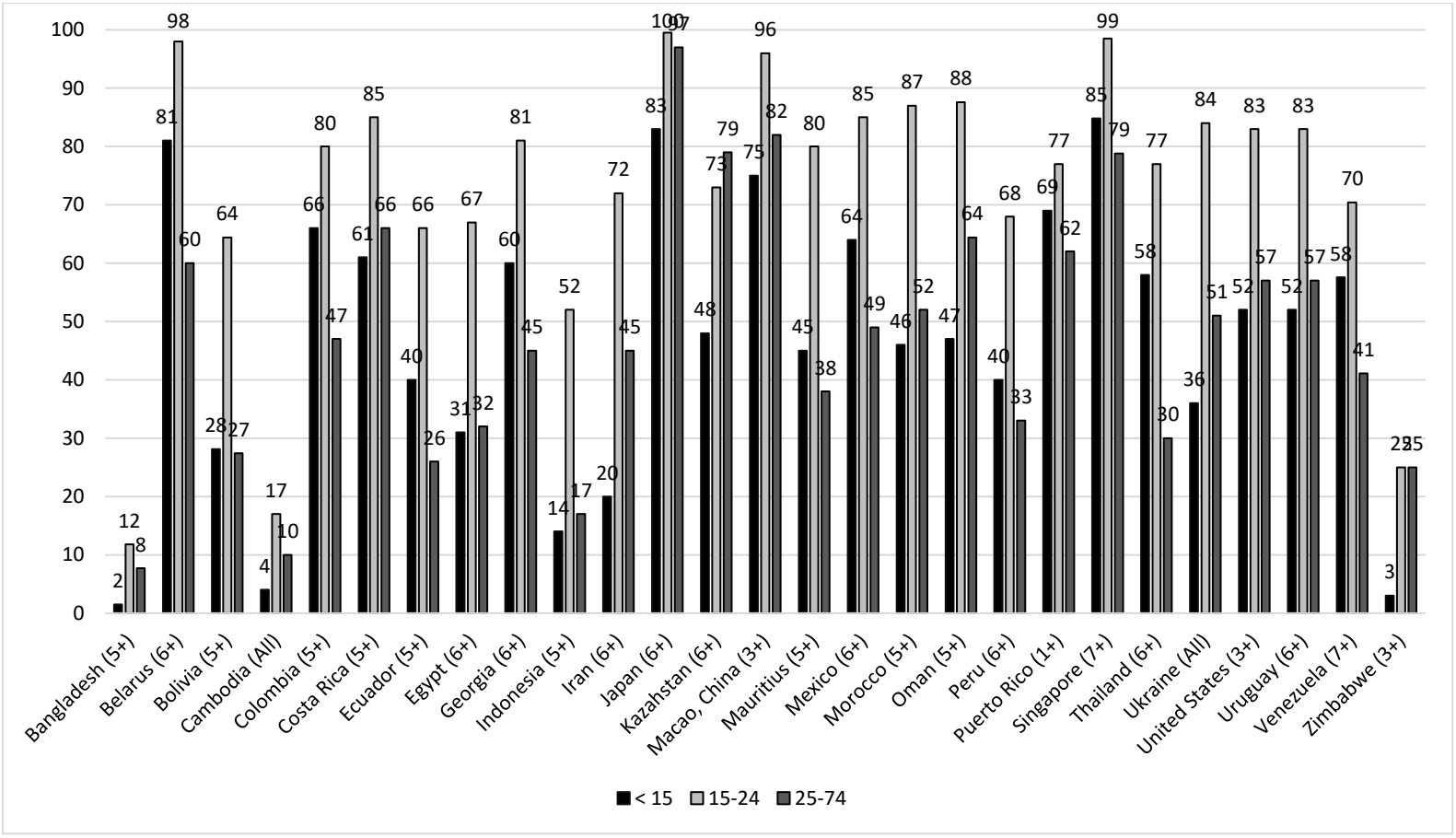
***Figure 1: Internet use, by age and country***




*Source*: International Telecommunications Union, 2017. *ICT indicators database*. Available at: www.itu.int/en/ITU-D/Statistics/Pages/stat/default.aspx