Internet in Developing Countries

Higher Education and the International Digital Divide

The advent of the Internet has stimulated fundamental change in higher and further education. Teaching and the transmission of knowledge need no longer be restricted to a university campus, as students may take part in lectures from hundreds of miles away, while researchers collaborate through a global network. For many this digital revolution is already familiar, an accepted part of daily life. For most of the world however, it remains an unrealized opportunity.

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On the one hand, the absolute number of people online in developing countries has long since surpassed those in the developed world – of the 3.5 billion online today approximately 2.5 billion are in developing countries (ITU 2016a, 4). On the other, coverage rates for the poorest populations remain very low. Again, while Internet access is a critical opportunity for higher and further education, technology alone cannot achieve stakeholders' ambitions to improve the quality and relevance of teaching and research to the benefit of students and society generally. This requires resource investment, staff training, and capacity building. Similarly, if the digital revolution is to bear common fruit, so-called 'analog complements' must also receive equal attention (World Bank 2016).

In considering these issues, we explore first the state of Internet access globally and the demographics of those that remain offline. The barriers hindering more rapid adoption are also explored. We then ask what the Internet means for higher and further education in developing countries in particular.

The state of Internet access

The spread of the Internet has been swift, connecting billions of users globally in the space of just a few decades. At the turn of the century 400 million people were connected to the Internet. By the end of 2016 there were 3.5 billion, a more than eightfold increase (ITU 2016b, 209). The Internet's development, particularly in developing countries, has outpaced the speed at which many other major technological innovations, including electricity, have been adopted. Nevertheless, despite the Internet's rapid spread, more than half the world's population remains offline. The distribution is not even with Internet access correlated strongly to a country's level of economic development. In the poorest countries (LDCs) only 15 percent of people are online, compared with 81 percent in developed countries.

In all regions of the world Internet use is greater for men than for women. Indeed, the global Internet user gender gap grew from 11 percent in 2013 to 12 percent by 2016. The regional gender gap at 23 percent is at its largest in Africa and smallest in the Americas at 2 percent (ITU 2016a, 3). Recent research by the Web Foundation shows that poor urban women are 50 percent less likely to be connected to the Internet than men of the same age group with similar levels of education and household income (World Wide Web Foundation, 2015). Other demographics, including urban vs rural residents, age, and household income, also show wide and persistent access and usage gaps.

Infrastructure: Huge investment in infrastructure, by both the public and the private sectors, has played a key role in the rapid development of the Internet. Fixed line access brought the Internet to millions of people, mostly in wealthier urban areas, but it remained prohibitively expensive for much of the world.

The mobile Internet, with its smart devices, has revolutionized access in developing countries and for those in rural regions. Seven billion people, or 95 percent of the global population, now live in an area covered by a mobile cellular network (ITU 2016a, 1).

This level of coverage is one reason why mobile-broadband is now the preferred method of accessing the Internet. Today there are 40.9 mobile-broadband subscriptions per 100 inhabitants in developing countries, compared with only 8.2 fixed-broadband subscriptions (ITU 2016a, 4). Availability and relative price are large drivers of this trend, though the quality of connections, network capacity, and the cost of internet-enabled devices remain challenges.

Quality and speeds: Given that mobile technology is now the world's favourite way of accessing the Internet, the quality of network coverage is increasingly important. According to a recent report by the GSMA, mobile broadband connections (3G and 4G technologies) accounted for almost 50 percent of total connections at the end of 2015, driven largely by growth in developing markets. The growth of these more advanced networks continues and is set to increase to more than 70 percent of total connections by 2020 (GSMA 2016, 11). The challenge is an Internet that is evolving continuously, content and applications keeping pace with advances in connection needs. The majority of the world's population will be covered by a faster 4G network by the end of the decade; but this is also when the next generation of '5G' mobile broadband is expected to become commercially available (Broadband Commission Sept 2016, 24).

Connecting the final 50 percent

Internet adoption lags behind other technologies that allow people to collect, store, analyze and share information digitally (World Bank 2016, 2). For instance, eight out of ten people in developing countries have a mobile phone, while Internet use is roughly half of that level. Furthermore, the growth in Internet use is slowing. Across the globe use grew by 7.4 percent in 2014, but by just 6.9 percent in 2015 (A4AI 2016, 8). The cost of access and people's view of the Internet's relevance to their own lives remain key obstacles to reversing this trend.

Price: In 2011 the Broadband Commission set an affordability target of an entry-level (500MB) internet package for 5 percent or less of average monthly income (GNI per capita). The drop in the unit cost with the simplification of digital technologies, particularly mobile phones, and an increase in competition among service providers, has helped in making progress towards this goal, but significant gaps remain. By the end of 2015, some 83 developing countries had achieved this target, although only five of these were LDCs (ITU 2016a, 5). In an extreme example, one month of internet access still costs more than 1.5 times the annual per capita income in the Central African Republic (World Bank 2016, 16). It is argued that this target is not sufficiently ambitious for today's digital world. The Alliance for Affordable Internet (A4AI) has a "1 for 2" target of 1GB of mobile broadband priced at less than 2 percent of average monthly income.

Mobile-broadband services have become, on average, half the cost of a fixed-broadband service (ITU 2016a, 5). But even as cost comes down, potential new users, who are increasingly those on low incomes, must make an informed decision about whether to spend limited income on an internet service. A study by Research ICT Africa surveyed non-users in six African countries to understand the reasons for being offline. It found that while the service being 'too expensive' featured heavily in all countries, this was not the most common reason. Having 'no interest' or not knowing how to use the service featured more prominently. It is clear from both this survey and other analyses that non-monetary factors come into play.

Literacy and language: The internet is global by its very nature, with content, in theory, available instantly to all citizens of the world. The language of internet content does not reflect this diversity however.

English accounts for the majority (54 percent) of websites globally, but only 25 percent of the Internet-connected global population has English as a native language. As more and more of the world goes online that discrepancy will widen, as English is the native language for only about 5 percent of the global population (Kende and Quast, 12). Chinese, Spanish, Japanese, and German represent the next largest languages online by website. This may be compared with native Hindi speakers who also number about 5 percent of the global population, yet only account for 1.8 percent of the internet-connected population; with the total Hindi-language content online being just 0.1 percent of the total (ibid).

Economic and social development

The importance of the Internet and of digital technologies for economic and social development is reflected in various international targets and normative instruments, including the current Sustainable Development Goals (SDGs) and their predecessors the Millennium Development Goals (MDGs). Although the latter did not refer directly to the Internet, MDG8 did call for a Global Partnership for Development between governments and the private sector with priorities that included access to new technologies. By the end of the MDG period in 2015, mobile-cellular and Internet penetration rates had increased significantly, but the digital divide between rich and poor populations was also growing (UN 2015, 67).

The SDGs were agreed in 2015. Unlike the MDGs, they make direct reference to the Internet, reflecting its increasing importance to all sectors, from health to good governance. Goal 9.c. aims to: "... significantly increase access to ICT and strive to provide universal and affordable access to the Internet in least developed countries by 2020." However, some estimates say that, given current trajectories, this will not be achieved until 2042 (A4AI, 2016, 4).

Beyond access: Analog Complements

The headline of Internet access does not necessarily result in digital dividends, such as economic growth, jobs, and better public services. Digital investments need the support of what the 2016 World Development Report called "analog complements" – other factors that underpin development. These include strengthening regulations that ensure competition among businesses, adapting workers' skills to the demands of the new economy, and ensuring that institutions are accountable (World Bank 2016, 5). In the absence of such complements results will disappoint. In fact, increased connectivity could have counterproductive outcomes, such as the concentration of market power, more inequality, and greater state control (ibid, 18). These present challenges to development and policy reform, often more difficult to tackle than Internet connectivity alone.

Impact on further and higher education

The Internet holds great promise for further and higher education globally and in developing countries in particular. The digital revolution is changing the traditional university model from pedagogy, learning, research, academic cooperation, skills development and lifelong learning, and is easing demand on limited facilities. For instance, Internet enabled ICTs in the classroom can support teaching and learning, while improved bandwidths open access to resources such as electronic journals. Most countries now have open universities that provide education via the Internet, while many conventional universities have expanded their offer through online courses. In technical and vocational education, well-designed Internet-based training can help workers upgrade their skills at lower cost and with more flexibility (World Bank 2016, 4). Given these possibilities, we consider an example of the Internet's impact on education, as well as some of the limits to its application.

Case study – Getting Senegal's universities online: Today only 6 percent of young people in Sub-Saharan Africa are enrolled in higher education, compared with a global average of 26 percent. Despite this low uptake, much of the continent's higher education infrastructure is struggling to cope with demand. There are 50 percent more students per professor on average at African universities compared with the global average (Africa-America Institute 2015, 10).

This is apparent in Senegal, where the country's higher education institutions (HEIs) struggle to keep pace with the demands raised by the 45,000 new students eligible for admission each year. Just a few years ago the country's universities had reached nearly 300 percent of their planned physical capacity (Broadband Commission Nov 2016, 22). In an effort to address this and related issues in Senegalese higher education, the World Bank approved a $101 million credit in 2011 to improve the efficiency, quality, and governance of the country's HEIs. A key intention of this project is to support virtual learning, modernize the universities' ICT infrastructure, and integrate ICTs into the teaching and learning process. Surveys carried out in advance of the project showed students identifying better learning facilities including access to ICT as a priority area for reform (World Bank 2011, 4).

Each of Senegal's five universities (Dakar, Saint-Louis, Thiès, Bambey, and Ziguinchor) are involved in the project. In addition to expanding on-campus facilities, the World Bank and the Ministry of Higher Education, together with the private sector, worked

References |

Africa-America Institute: State of Education in Africa Report 2015. New York 2015
Alliance for Affordable Internet (A4AI): Affordability Report 2015/16. Washington D.C. 2016
Broadband Commission: Enabling the Use of ICTs and Broadband: Understanding What Works to Stimulate ICT Adoption. Broadband Commission, Nov 2016
Broadband Commission: The State of Broadband: Broadband catalyzing sustainable development. Broadband Commission, Sept 2016
GSMA: The Mobile Economy. London 2016
Harle, J.: Growing Knowledge: Access to Research in East and Southern African Universities. The Association of Commonwealth Universities. London, Nov 2010
ITU: ICT Facts and Figures 2016. Geneva 2016a
ITU: Measuring the Information Society Report. Geneva 2016b

to make personal PCs more affordable to students through tax exemptions, scholarships, and loan guarantees. The cost of a personal computer may be spread over a year, with monthly payments as low as US $10, well below the market rate. Discounted mobile broadband is also offered. Meanwhile, the government is utilizing the improved ICT network to modernize the management, monitoring, and evaluation of the tertiary education system, and for distance learning opportunities (World Bank 2011, 6).

Since mid-2016 most students have a personal computer which they use in more digitized learning environments (ranging from 62–75 percent depending on the university), up from 15 percent at the start of the project. All universities are interconnected and linked to in-country and international digital libraries, while the bandwidth of schools has been increased significantly (World Bank July 2016, 1). The building of a model that was sustainable was key to the project's success (Broadband Commission Nov 2016, 23), with World Bank financial support expected to end in December 2017.

Importantly, the programme was not developed in isolation. As we noted earlier, such projects must address the 'analog complements' of digital technologies to be successful, backed by well-managed national strategies. In this case the Senegal Tertiary Education Governance and Financing for Results programme supports the government's Accelerated Growth Strategy (AGS); which includes goals for Human Resource Development, particularly in professional and university education (World Bank 2011, 8).

Limits to the Internet revolution: The Internet is not, of course, a panacea, and the needs of higher education and further vocational training cannot be met simply by providing more technology and better connectivity. The necessity of 'analog complements' discussed earlier is a case in point. Other areas of investment must not be overlooked, particularly the recruitment and development of high quality university and further education staff. Research and other analyses have shown that ICTs in the classroom are not a replacement for good teaching and can only complement and enhance the work of such professionals (UNESCO 2015, 54–56).

Even as Internet facilities are improved individual abilities to make effective use of e-resources need to be developed in step. This can mean that high-quality content and its best use are often lacking, while subscription resources, for which the university has often already paid, can remain neglected (Harle 2010, 17). Today's researchers are overwhelmed by information, which makes digital research skills and professional support, for example from librarians, equally important (ibid, 36).

As we noted earlier – too few people have access to a reliable and affordable Internet. The data suggests that schools and universities are important Internet access locations. This is especially the case in countries with low income levels. In Egypt for instance, more than half of all Internet users also go online at school or at higher education institutions (ITU 2016b, 182). If students are unable to access the Internet outside the classroom, their distance learning opportunities will be limited, as will the development of their personal ICT skills. The 500MB per month marker used by the Broadband Commission to measure affordable internet is related to this; especially as it is only enough to watch two minutes of high-quality video. This is obviously insufficient for in-depth distance learning, with videos and picture rich content.

Finally, education policy makers and planners face another challenge to the potential use of the Internet and ICTs more broadly in education in developing countries. This is because most research on their use is drawn from high-income countries (World Bank 2016, 146). The evidence base for developing countries is beginning to grow: for example, through the experience of initiatives such as that in Senegal outlined above. That said, success in one country or university should not be seen as a promise of similar success elsewhere. It is important that sufficient attention is paid to the requirements and conditions found in local contexts.

Conclusion

Decades after the world began to go online, for many people the Internet is still considered too costly, serviced poorly or irrelevant to their lives. Making the Internet accessible and affordable to all should be a priority for governments and other stakeholders globally. The realization of this aspiration would bring economic and social gains, promote inclusion and foster innovation. This is especially true for higher and further education in developing countries.

References continued |
Kende, M./Quast, B.: Promoting Content in Africa. The Internet Society, August 2016
UN: The Millennium Development Goals Report. New York 2015
UNESCO: Rethinking Education: Towards a global common good? Paris 2015
World Bank: Digital Dividends: World Development Report 2016. Washington D.C. 2016
World Bank: Project Appraisal Document for Tertiary Education Governance and Finance for Results Project. Washington D.C., May 2011
World Bank: Senegal Tertiary Education Governance and Financing For Results Implementation Status & Results Report. World Bank, Washington D.C., July 2016
World Wide Web Foundation: Women's Rights Online, Translating Access into Empowerment. Web Foundation 2015.