

## BRIDGING THE DIGITAL DIVIDE: SKILLS FOR THE NEW AGE

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### Abstract

The digital divide is a manifestation of exclusion, poverty and inequality and continues to be exacerbated due to the effects of unemployment, poorly functioning digital skilling programmes and socio-cultural norms in some economies, depriving women equal access to digital services. Digital skills provide the poor a catalyst to break out of the cycle of poverty and empower themselves. A three-pronged digital skills strategy is required for developing countries: (1) Identify the skills required for employment (2) develop a holistic digital skills upliftment strategy, and (3) address the social and cultural norms through which these skills and systems are mediated.

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### Challenge

An inclusive digital economy can lead to more trade, better capital use, improved efficiency, and accelerated innovation. To facilitate such benefits becoming a reality, the G20 nations must address the factors enabling the digital divide. Statistics highlight that only 40% of the globe has digital access (UN Division for the Advancement of Women, 2002). Globally, poorer communities and rural women in the developing world reap the least benefits from the ICT revolution. In South Africa, it was revealed that 35% of household saw no relevance in accessing the internet due primarily to their socio-economic circumstances (Statistics South Africa, 2015). In addition, 16% fewer women than men use the internet in low and middle-income countries and are also 21% less likely to own a mobile phone. Unless a concerted effort is made to educate the population in terms of the benefits of digital technologies and how to operate such facilities, the digital economy will exacerbate existing political and social inequities, particularly in the developing world.

The digital divide is centered on two crucial problems. Firstly, poorer communities have limited access to digital technologies due to high costs and a general lack of infrastructure, ranging from intermittent supply of electricity to limited availability of ICT facilities. The second problem, and core focus of this study, is the limited access to training in digital technologies, the poor attainment of digital skilling and the limited access to the opportunities that can be derived from possessing these skills. Providing state of the art infrastructure in communities most affected by the digital divide, will not alone resolve the problem of poor digital skills or lead to an immediate adoption of such facilities. For example, it was

found that in Brazil that despite providing more infrastructure, large parts of the population did not perceive a need for digital access (Marcus, Weinelt, & Goutrobe, 2015). Studies show that digital training is the vital ingredient in harnessing better use of ICT infrastructure investments made by both the public and private sectors (Bowles, 2013). Through greater training, the public will make better use of the tools available to them. The aim of this brief is to emphasise the skilling requirements in developing economies, particularly South Africa and India, as well as highlight opportunities for empowering women.

A digital skills upliftment strategy is urgently needed for the following reasons: (a) improved labor participation; (b) international competitiveness (c) female empowerment and inclusive and equitable access to digital economy gains.

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## Proposal

The G20 requires a holistic digital skills upliftment strategy which entails the following proposals: (1) identify the core digital skills required by employers, (2) establish a digital skills standard-setting body to balance the needs of institutions that demand and supply of digital skills, and (3) respond appropriately to socio-cultural norms which impede women's access to digital skills training and the resultant opportunities.

### Digital Skills – A catalyst to break the poverty cycle

There are three tiers to digital skills, viz., literacy, fluency, and mastery. If one is digitally literate, they are able to conduct basic functions using a range of technical tools. The digitally fluent user is more digitally capable than the digitally literate user as the user is able to analyse and process multiple streams of information. One attains a level digital mastery, when one is able to fully utilise the various digital tools at one's disposal and is able to produce new digital content (Ridsdale et al., 2015). This three-tiered structured approach emphasised by the OECD, identifies ICT generic skills, ICT specialist skills and ICT complementary skills Integrating and comprehending sensory experiences. The key distinction is that complementary skills are needed to reposition existing work using ICT mediums. To become proficient, requires a degree of digital fluency and mastery.

Whilst it is crucial for emerging economies to ensure training for disadvantaged groups to reach a state of digital literacy, the training that adds the most value enables people to integrate such tools seamlessly into daily operational tasks. Thus, any digital skilling strategy must consider the longer-term requirements for mastery and the ability to apply such complementary skills in other fields as well. At a minimum, entry level jobs, needed in the modern economy require ICT generic skills to use technologies for professional purposes. These are generally routine and manual tasks related to information and computer skill-sets. Depending on the sophistication of the task, intermediate or expert jobs require ICT specialist skills inclusive of programming, developing applications and managing networks. Those that have mastered these tools possess ICT complementary skills as they integrate and apply their expertise in problem solving and communication.

# G20

# INSIGHTS

Importantly, the core skills needed, particularly in developing countries are the generic entry level skills linked to the information and computer skill-sets. These skills are considered gateway skills, enabling the learner to better grasp entry level skills in other subject areas such as Media, Communication and Technology. The attainment of such digital skills, in addition to secondary schooling (Spaull, 2015) in South Africa, equips a learner to break out of poverty and access either semi-skill work opportunities, access to vocational training or universities. The absence of such skills denies the learner this vital initial foothold to gain access to formal employment.

Subject Area	Entry Level Jobs	Intermediate Level Jobs	Expert Level Jobs
<i>Skill Level</i>	<i>Literate</i>	<i>Fluent</i>	<i>Master</i>
<i>Type of task</i>	<i>Routine, manual</i>	<i>Non-routine manual</i>	<i>Non-routine, analytical, requires greater interaction amongst co-workers</i>
Information	Finding, evaluating, organising, using content;	Understanding the need for information; identifying what type of information is needed	Synthesising, creating information
Computer	Competence in using hardware and software tools; understanding access controls; Ability to publish and communicate using available tools; Using spreadsheets and word-processors	Using IT tools for research and scholarship,	Ability to evaluate the benefits of new technologies
Media	Access, navigating and edit text, sound, image and video media; Communicate via media platforms	Understanding graphic design principles, the combination of visuals and text, the use of sound; The nature of web authorship;	Critical analysis and evaluation of mass media; Production of multi-media content; Integrating and comprehending sensory experiences
Communication	Using and constructing hyperlinks between documents and/or images, sounds, movies, semiotic languages used in email, online chat space or in instant messaging	Producing 'non-linear' texts, navigating three-dimensional worlds online and so on	Ability to critically analyse and evaluate 'non-linear' texts and three-dimensional worlds online
Technology	Ability to use technology within life situations	Communicating and negotiating meaningful content through the medium of encoded texts within contexts of participation	Ability to adopt, adapt, invent, and evaluate technology to positively affect his or her life, community, and environment

Table 1: The scaling of digital skills

### Developing a holistic skills upliftment strategy

The challenge faced by all policy makers is determining how to ensure policy is agile to respond to the rapid pace of the changing needs of employers. The skill levels required in the digital economy keep moving forward, as such any minimum standards that are introduced for the purposes of digital education standards must be informed by a dynamic and responsive standard-setting body.

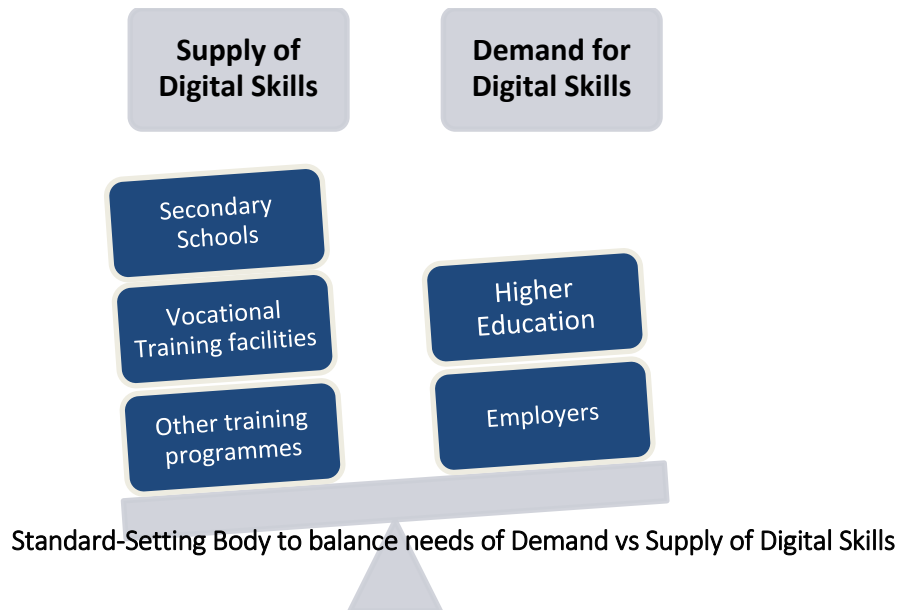
## Need for a digital skills standard-setting body

There is a need to introduce skills certification that is recognized by employers and higher education institutions. Such certification must be supported by an internationally recognized standard setting body that understands the fluid nature of digital skills and business related needs. It is vital to be aware that the digital skills can rapidly become obsolete due to changes in business approaches and the advances in technology. Training programmes and school curricula need to become more agile and responsive to this fluid state. In South Africa, it was found that there is a disconnect between the entrance requirements of higher education programmes and the Computer Applications Technology subject offered in secondary schools (Mdlongwa, 2012). Greater alignment is needed.

Emerging and developing economies should develop and adopt a holistic digital skills upliftment strategy. The strategy could include 3 core dimensions, viz., (a) developing relevant skills, (b) ensuring a skills supply and (c) ensuring that skills are put to effective use. These dimensions highlight the need to promote long-term skills planning and effectively utilizing the skills that are produced through the training programmes. Requirement components of the skills strategy would include:

- Certification and standards, including measurement indicators for digital skills
- Continuous training and skilling programs
- Specific targeted skilling strategy for women, elderly, marginalized groups

The OECD further argues that compulsory education should provide learners a good level of such digital skills. For this to occur, member countries need to reduce school dropout, target grade-repetition and to promote good practices in schools. However, in emerging and developing economies not all schools provide digital training to learners and in addition such training, when available, may not be compulsory. Drop out rates are high, quality and infrastructure of schools is poor, and girls often do not receive schooling due to a combination of social and cultural norms (Spaull, 2015). To mitigate the gap in training for girls emerging and developing economies should provide vocational digital skills training outside of schools.



Internationally, it was found that ICT based employment often requires a level of skill above that provided by secondary school but less than that offered in universities. This suggests the need to balance the demands of the employer with the curricula offered by secondary schools, vocational training facilities and digital training programmes. Among others, key skills demanded, but often lacking in many sectors include information, document and computer use. Furthermore, jobs positioned at the intermediate level in Canada, were found to be more in demand but lacked a supply of trained employees. In the USA, intermediate positions account for 48% of all jobs. 80% of these jobs require skills such as spreadsheet, word-processing and other middle-tier skills (Asliturk, Cameron, & Faisal, 2016). This points to the need for employers promoting life-long learning in companies, to ensure employees are able to transition from entry level positions to intermediate level positions, and onto expert levels. Such a strategy will promote the organisation's ability to remain competitive in the fluid digital economy.

### **Effective management of digital skills training programmes**

In South African secondary schools, one curriculum stream for the final 3 years offers "Computer Applications Technology" (CAT) as a subject for grades 10 to 12 (South African Department of Basic Education, 2010). Only students choosing this stream are trained in basic ITC skills. The CAT subject provides training in Solution Development, Systems Technologies, Network Technologies, Internet Technologies, Information Management and Social Implications of ICT use. Despite the relevance of this course, many schools are unable to offer such training due to a lack of facilities. In order for a school to offer this programme, the school requires the necessary infrastructure including a computer for each learner, network printers, trained instructors, software, a hardware maintenance plan, internet connectivity and insurance to combat effects of theft. Each of these requirements have associated costs, which is often unaffordable in poor schools. Thus, a holistic approach is needed to ensure that more schools are enabled to offer such training.

Khakaza (2010), in her study of the effectiveness of school training programmes in South Africa, also argued that the schooling system had to do more to equip learners with digital skills before entering the job market or higher education institutions. The ineffectiveness of the current training becomes apparent when one considers that nationally in South Africa only 26.5% of schools offer such training programmes (Mdlongwa, 2012). Furthermore, CAT teachers providing the training were often ill-equipped to teach the subject, not possessing sufficient knowledge or were not qualified in the subject area (Mdlongwa and Pasensie, 2010). Educators thus require at least an intermediate or expert level of digital skills to conduct such training. . Lastly, maintenance of the equipment is crucial to ensure that facilities are fully utilized. Often simple problems such as a lack of passwords prevented learners from using the machines. In addition, it is important that education departments provide IT administrative staff to support the rollout of hardware , to ensure that computers are properly serviced and operational.

### **New education paradigms**

Given the complexity of the issues new education paradigms may have to be explored. . Alternative training programmes such as Massive Open Online Courses (MOOCs) could be considered. These could be used to provide new forms of project based learning, critical and creative skills needed to navigate knowledge economy. Training programmes offered by Skills India or Northstar in the USA could be considered examples for further consideration.

### **Responding to socio-cultural norms**

The impact of ICTs in some developing countries is not gender neutral largely due to entrenched socio-cultural norms and beliefs.. In these cases men tend to dominate access to employment, education and income sources and opportunities (Hilbert, 2011). However, as Hilbert suggests, an inclusive digital skills training programme could provide opportunities to young girls to access the relevant basic skills valued by employers. Hilbert's findings from Latin America and Africa suggest that women were found to embrace digital tools more rapidly than their male counterparts if they were given opportunities to access such tools. In other words with provision of access and equipped with relevant skills, women stand a better chance to attain entry-level positions in employment later in life. However, without deliberate and focused programs for women and girls , the new digital economy will be exclusionary and reinforce existing gender and cultural disparities.

### **Gender biased belief and value systems**

Gender biased beliefs and value systems excluding women are amongst the main reasons for current gap in access to education and certain skills. Son preferences within family units, community expectations and cultural norms of female contributions in addition to the female's role in the household duties and chores increases the opportunity cost of sending a girl to school. In India, 23% of girls drop out of school before they reach puberty. Due to the lack of exposure, women are often not familiar with ICTs and do not realize the value and empowering potential of ICTs (Gurumurthy & Chami, 2014). Lower levels of education for females, also contribute to the ICT gender gap. Furthermore, access to English language education is essential for obtaining skill-sets such as literacy and the

technological and scientific knowledge that is necessary for harnessing ICTs. Unfortunately, newer forms of ICT content are only available to a limited extent in local languages.

There are other socio-cultural factors limiting women's access and use of ICTs which include discriminatory attitudes against women's access to technology and technology education (Geertsema Sligh, 2006). Negative questions that are often repeated are '*What would a woman farmer want with a computer?*'. Further, compared to men, rural women are less likely to own communication assets, such as a radio or mobile phone. Rural women are less likely to allocate their income to use in public communication facilities, except when they need to communicate with family or to arrange for income transfers (Deen-swaray & Gillwald, 2012). These attitudes and general lack of access must be addressed by policy makers.

### **Gender parity for accessing digital training centres**

Importantly, most ICT training centres are run from public spaces. Rural women are often reluctant or not allowed to visit "cyber cafes," public internet centres, or community training centres that are often owned by men or visited predominantly by men. Further, training programmes often fail to take women's 'time poverty' into account (Desai, 2016). 'Time poverty' is defined as scarcity of time rural women face because of their multiple roles and heavy domestic responsibilities that limit the time they can allocate to learning and using ICTs. When training programmes run during early morning, or late evening hours, limit women's participation in training and education. There will be a greater chance for success if these factors are taken into account when designing digital training programmes.

For instance, Google, in association with TATA Trusts India, launched the 'Internet Saathi' campaign in July 2015 to bring 5 million women from villages online over a period of 18 months by teaching them how to use tablets and smartphones (Google India, 2015). While the exact number of women trained in sustained and productive usage of the internet is unavailable, the programme was successful in familiarising and making the rural population comfortable with hardware and the internet. What set the Internet-Saathi model apart was the fact that it only used local women as trainers. Having local women trainers ensured continuity in the process of learning and imparting hands-on training to women and children in villages. This approach made it a highly scalable and sustainable programme.

### **Digital need-specific training programmes**

When designing digital training programmes, simply making these programmes accessible to women is unlikely to yield the desired results. The programmes must be context, and need-specific. For instance, investing in efforts to minimise the gender gap in science and technology education through such 'ICTs in public schooling' initiatives can be beneficial in urban contexts. At the same time, considering that a significant number of girls drop out of formal schooling post puberty (Gurumurthy & Chami, 2014), it is important to explore the potential of ICTs for educating out-of-school adolescent girls and supporting the learning-action processes of adult women who may not be textually literate.

Today, new technology itself can be a skill-provider. When such tools are made available to women, it can reduce the gaps created through the formal education system. For instance, Barefoot College, a



school in the northwestern state of Rajasthan, India provides professional training for rural women to use cell phones through innovative techniques where formal education or reading skills are not a prerequisite (Barefoot College, 2015). In this way, even illiterate, older local women entrepreneurs can use it in the marketplace.

#### **Digital training to access E-commerce opportunities for women**

In addition to generic digital skills training, there is a need to offer digital skills training programmes that highlight how women entrepreneurs can use and benefit e-commerce services. E-commerce offers women the opportunity and flexibility to work from home. It eases not only the selling of products and services online, but can also promote the productivity and competitiveness of women entrepreneurs in rural and urban areas. This is done by linking producers and traders directly to markets at national, regional and even global levels, allowing them to restructure their economic activities and bypass intermediaries and the male-dominated and exploitative market structure (UNCTAD, 2002).

For instance, the Self-Employed Women's Association (SEWA) Trade Facilitation Centre (STFC) in India showcases members' products online, facilitates business-to-consumer sales, and builds business-to-business links through the use of ICTs and E-commerce (Self Employed Women's Association, 2014). However, the extent to which women can control the transactions is unclear, making SEWA an intermediary as well. This necessitates research into what digital software applications and training capacities are needed to ensure that urban and rural women e-traders retain their agency, and avoid the same obstacles present in the economy in general.

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## Existing Initiatives & Analysis

### Implementation Overview

- Develop a holistic and aligned digital skills training programme encompassing for all role players based on the the core digital skills required by employers at present.
- Introduce a holistic digital skills attainment strategy which encompasses:
  - Introduce an international standards setting body to monitor business's digital skill requirements, responsible for skills certifications and alignment of training programmes.
  - Promote effective management of digital training programmes
- Businesses are urged to promote life-long digital learning in their organisations to ensure that existing staff are suitable trained to adapt to changing business requirements
- Ensure socio-cultural norms in communities which impede digital inclusion are addressed

The detailed study into Digital Skills can be found here:

<http://www.bricsresearch.org.za/interface.php?p=crumb&type=593>

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## Existing Agreements

### G20 2014 Brisbane Communiqué

(Paragraph 9) There was commitment to the goal of reducing the gap in participation rates between men and women in G20 countries by 25% by 2025. However, the summit did not mention the digital economy or potential of ICTs (Plan et al., 2014).

### W20 2015 – Introduction of Women20

The G20 under Turkey's Presidency inaugurated the first Women20 or W20 Summit.

### G20 2015 – G20 Skills Strategy

The strategy discusses the development and better use of relevant skills (G20 Leaders, 2015b). The strategy does not refer explicitly to digital skills or Digital Literacy needs.

### G20 2015 Antalya Communiqué

(Paragraph 26) There is a commitment from G20 Leaders to bridge the Digital Divide, but lacks any explicit references to digital skills. (G20 Leaders, 2015a)

### G20 2016 Hangzhou Communiqué

(Paragraph 14) - The G20 leaders continue their commitment to foster favourable conditions to address the digital divide. Highlighted the need to address the digital divide and promote women's equal participation in the digital economy. It delivered the the G20 Digital Economy Development and Cooperation Initiative, which builds on the work begun in Antalya. (G20 Leaders, 2016).

(Paragraph 11, 12) - Recognition is offered to the need for skills training in the G20. This may implicitly refer to enabling digital skills training programmes.

NB: The G20 focus to date pertaining to the Digital Economy and Digital Divide has centered on digital trade, financial inclusion and infrastructure development. There are no specific agreements on measuring or promoting Digital Literacy.

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## Existing Policies and Monitoring

### South African Government Department of Education - E-Education White Paper

South Africa's E-Education Programme is more than ten years old and describes the content of E-Education in South African Schools (Department of Education, 2006).

### Digital Agenda for Europe

The European digital agenda is primarily aimed at boosting Europe's economy by delivering sustainable economic and social benefits from a market perspective. The agenda forms part of the Europe 2020 framework. (see Helsper & Van Deursen, 2015 p137)

### Digital India

Digital India is a campaign to ensure that Government services are made available to citizens electronically by improved online infrastructure and by increasing Internet connectivity or by empowering the country through technology (see: <http://digitalindia.gov.in/>).

### Skill India

Skill India is a campaign that aims to train over 400 million people in India in different skills by 2022. It includes various initiatives of the government like "National Skill Development Mission", "National Policy for Skill Development and Entrepreneurship, 2015", "Pradhan Mantri Kaushal Vikas Yojana (PMKVY)" and the "Skill Loan scheme." (see <http://skillindia.gov.in/>)

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## Research Partners

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