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BRIDGING THE
GENDER DIGITAL DIVIDE

Challenges and an Urgent Call for Action for Equitable Digital Skills Development

Acknowledgements

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On 7 April 2021, Hala, 15, teaches her younger sister and brother how to use a tablet in their home in the Za'atari Refugee Camp in Jordan.

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Abbreviations

DHS	Demographic and Health Surveys
ICT	Information and communication technology
ITU	International Telecommunication Union
MICS	Multiple Indicator Cluster Surveys
MICS EAGLE	MICS Education Analysis for Global Learning and Equity
OECD	Organisation for Economic Co-operation and Development
RAPID	Reach, assess, prioritize, increase, develop
SDGs	Sustainable Development Goals
SIGI	Social Institutions and Gender Index
STEM	Science, technology, engineering and mathematics
UNESCO	The United Nations Educational, Scientific and Cultural Organization
UNICEF	The United Nations Children's Fund
USAID	United States Agency for International Development

Executive Summary

In response to the COVID-19 pandemic, countries implemented various remote learning strategies that required access to devices and varying levels of digital proficiency. Digital proficiency, defined as individual ability to leverage the use of technologies to accomplish tasks and increase personal efficiency, played a pivotal role while learning and working from home during the COVID-19 lockdowns. As countries accelerate learning recovery and adopt the RAPID (reach, assess, prioritize, increase, develop) framework (UNICEF, 2022), it is crucial to determine how investments in remote learning as part of their education strategies can benefit all children, with close attention to supporting actions that address gender inequality.

In 2020, UNICEF and ITU reported that only 37 per cent of youth aged 15 to 24 years has internet access from home (UNICEF and ITU, 2020). However,

measuring the share of youth who live in households with internet access conceals stark gender disparities relating to device access, internet usage and digital skills within the home. Even once the barrier to accessing digital devices and the internet is crossed, having access to the internet does not always translate to its actual usage by individuals, and digital competency is also highly gendered.

This is the second global report within the MICS EAGLE initiative, a framework that utilizes MICS data to support countries in efficient education sector analysis and planning.[1] The report highlights that a majority of youth in low- and middle-income countries are not connected to the internet, have limited digital skills, and do not own a mobile phone. Adolescent girls and young women are especially disadvantaged. When it comes to digital devices,

adolescent girls and young women face distinct barriers owning, using and being enabled to develop skills on an equitable footing with adolescent boys and young men. Evidence shows that 9 out of 10 adolescent girls and young women are offline in low-income countries. Even within the same households, adolescent girls and young women have less access to, and fewer skills to make use of, the internet and digital technologies than male household members of the same age, suggesting the pervasiveness of gender biases that restrict girls' and women's digital inclusion and skills development. This is of great concern as our world becomes increasingly reliant on digital skills to access employment and key services, risking an ever-deepening state of gender inequality across multiple outcomes and perpetuating gaps in the labour market.

This report brings to light a pressing, multi-sectoral issue that requires urgent action from governments, the private sector, international organisations and civil society alike, including stakeholders across the digital, innovation, IT, education, skills and gender equality networks. We must bridge this digital divide and promote universal, equitable digital inclusion and skills for both girls and boys, if we are to achieve equitable and inclusive human capital development and fulfill the basic human rights of children and youth.

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1. Released in March 2020, the first MICS EAGLE global report "Are Children Really Learning? Exploring foundational skills in the midst of a learning crisis" utilized MICS data to shed light on equity issues faced by children in terms of access to education and learning in low- and middle-income countries.

Key Findings

In the vast majority of countries, **gender disparities** place adolescent girls and young women at a disadvantage with regard to internet use (SDG17.8.1)

- Among 54 countries and territories analysed, only eight have achieved gender parity in internet use among youth. 41 countries and territories show marked disparities against adolescent girls and young women while only five demonstrate disparities against adolescent boys and young men. The median gender parity ratio is only 71, highlighting a pervasive gender gap in internet usage: for every 100 adolescent boys and young men who use the internet, only 71 adolescent girls and young women do.

- In low-income countries, 90 per cent of adolescent girls and young women aged 15-24 (almost 65 million individuals) are offline, compared to 78 per cent of adolescent boys and young men of the same age (almost 57 million individuals) who do not use the internet. Moreover, for every 100 adolescent boys and young men in low-income countries who do use the internet, only 44 adolescent girls and young women do. Among regions, the largest gap is observed in South Asia, favouring adolescent boys and young men by 27 percentage points.

Adolescent girls and young women are being left behind and shut out when it comes to **digital skills** (SDG4.4.1)

- While internet access at home is important, it does not guarantee that youth acquire digital skills. In most of the 32 countries and territories for which data were available, the share of youth with internet access at home is much higher than the share of youth with digital skills, with this pattern holding true for both female and male youth.

- Within the same households, adolescent girls and young women have a significantly lower prevalence of digital skills than their male counterparts, per analysis of SDG4.4.1 that outlines nine key digital activities performed by individuals in the past three months. Besides the concerning issue of young people lacking even the most basic digital skills necessary for their inclusive socioeconomic participation, acquisition of these skills has thus far been inequitable, disadvantaging female youth. The median gender parity ratio is 65, meaning that for every 100 male youth who have digital skills, only 65 female youth have them.

- The median values for digital skills are 9 per cent and 20 per cent, respectively, for female and male youth, indicating that male youth are twice as likely to possess these skills. In Central African Republic, Chad, Sierra Leone, Malawi, and the Pakistan province of Balochistan, digital skills among adolescent girls and young women aged 15-24 are almost non-existent (i.e., below 3 per cent). Youth in lower income settings experience substantial challenges in terms of developing their digital skills, starting from the very basic ones that include simple activities like copying or pasting files or folders, sending emails, or transferring files.

- While girls perform better than boys in foundational reading skills, this advantage does not translate into digital skills. Furthermore, even in national contexts where girls outperform boys in foundational numeracy, it does not necessarily build a pathway for young women to develop digital skills, limiting their ability to pursue education and careers in STEM-related fields.

- Family environment plays a critical role in influencing who acquires digital skills within a household. Parents, caregivers and other family members perpetuate gender biases that favour adolescent boys and young men in most of the analysed countries. In a comparison of female and male youth from the same household (to account for family background), female youth have a lower likelihood of having digital skills compared to their male counterparts in 22 of the 30 countries and territories analysed.

- Gender gaps vary by the socioeconomic status of the household. In the vast majority of countries analysed (24 out of 30), gender gaps in digital skills actually increase for wealthier families, indicating access to the internet and digital resources does not guarantee equitable digital skills development.

Mobile phone ownership overwhelmingly disadvantages adolescent girls and young women (SDG5.b.1)

- Among the 41 countries and territories examined, gender disparities in mobile phone ownership within families overwhelmingly disadvantage female youth. Across the countries analysed, in households in which at least one 15- to 24-year-old male and one 15- to 24-year-old female reside, the median value suggests that female youth are nearly 13 per cent less likely to own a mobile phone, limiting their ability to participate in the digital world.

Two months ago, Haifa joined an English language course at a UNICEF -supported centre.
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An urgent call for action

Ensuring that **girls and young women can succeed** in an increasingly global, digital and hyperconnected world requires multiples efforts to bridge the gender digital divide, both between and within households, including:

- Providing equitable access to digital devices and the internet in schools, community youth centers, and at home to promote digital inclusion, including considering the provision of low-cost devices to marginalized communities.

- Equipping schools to build boys' *and* girls' digital skills equally, with context-specific analysis of barriers to girls' skills acquisition in school and the consideration of girl-targeted after-school IT clubs or other modalities that address their exclusion.

- Supporting adolescent girls and young women to develop digital skills out of school, including offering digital skills training at safe spaces and community centres catering to girls and young women.

- Ensuring adolescent girls' and young women's safety online, including through virtual safe spaces, strong safeguarding policies, and the strengthening of laws and partnerships with government and the private sector to address online violence of all kinds.
- Promoting positive gender socialization around boys' *and* girls' digital inclusion within families, and investing in evidence-based action to address the harmful gender norms that continue to underpin the many barriers to digital access, internet usage and skills acquisition faced by adolescent girls and young women.

- Investing in sex-disaggregated data collection in low- and middle-income countries to monitor progress in gender-equitable digital inclusion at the global, regional and country level.

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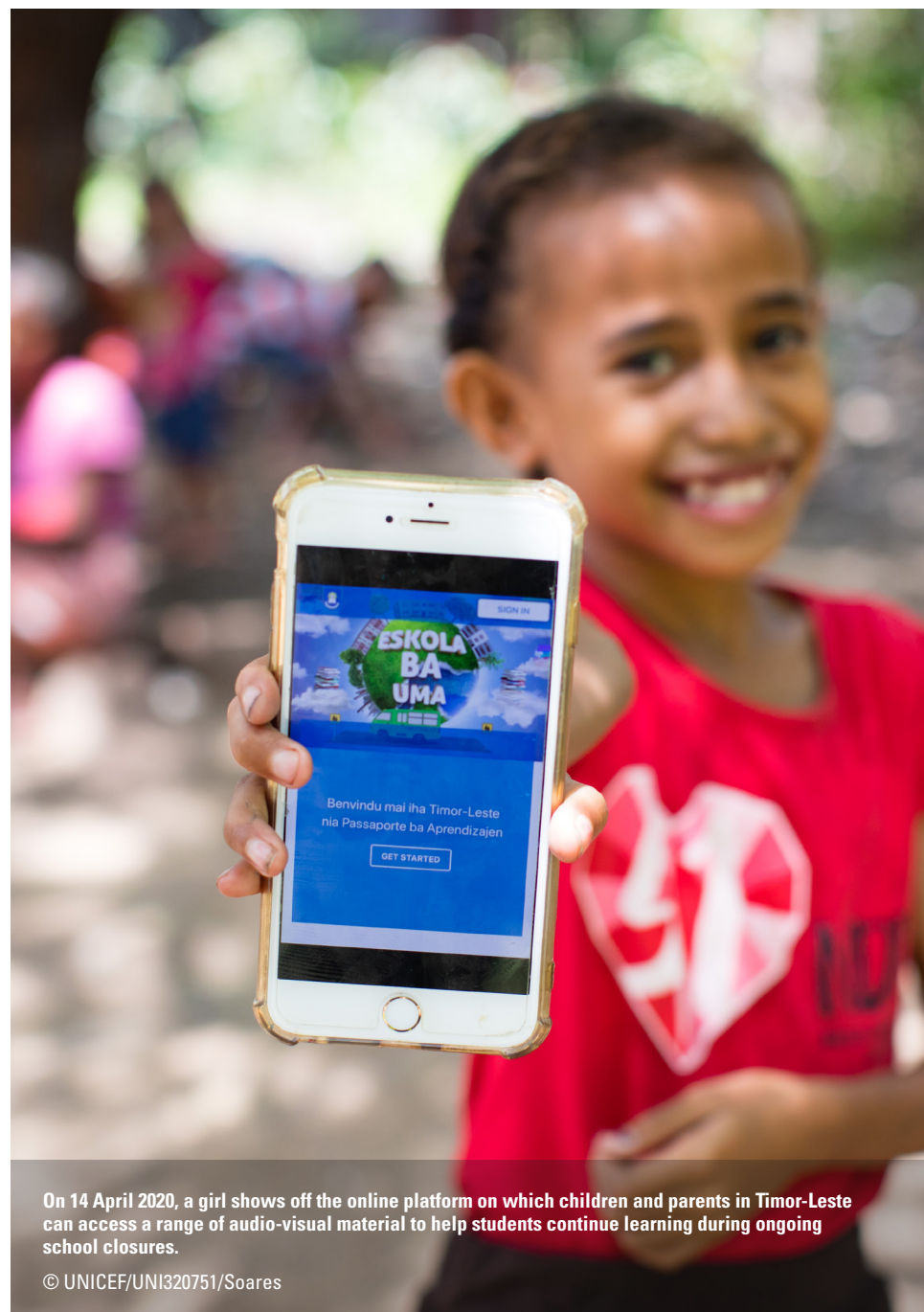
On 14 April 2020, a girl shows off the online platform on which children and parents in Timor-Leste can access a range of audio-visual material to help students continue learning during ongoing school closures.

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Introduction

Amplified by the COVID-19 pandemic, during which remote work and learning quickly became the norm for many people, digital inclusion – including access to the internet and the digital skills needed to meaningfully and safely use it – has become an increasingly important part of everyday life, needed for success in both the classroom as well as the world of work, and in some contexts increasingly important for accessing services. Digital skills have been linked to higher earnings potential and new economic opportunities, with an estimated 90 per cent of jobs globally having a digital component (United Nations, 2018). Internet access and digital skills are important not only for education and employment but are also essential for accessing information related to health and well-being, and civically engaging and connecting with others, both locally and globally. To succeed in an increasingly global, digital and hyperconnected world, it is essential for all adolescents and young people to meaningfully and safely access the internet and develop digital skills – including adolescent girls and young women.

In 2022, the U.N. Secretary General convened the Transforming Education Summit in response to the global crisis in education caused by the COVID-19 pandemic, and its Action Track 4 envisages universal access to internet at home and closing of the digital divide (United Nations, 2022). In addition, UNESCO and UNICEF launched Gateways to Public Digital Learning,

a global, multi-partner initiative supporting countries to establish and technically support an international movement to ensure high-quality and curriculum-aligned digital education contents, to advance the generation of evidence, data and best practices to promote digital learning, and to promote norms and standards in this area.

However, even basic skills, such as sending an email with an attachment or copying a file, are beyond the reach of many young people in low- and middle-income countries, raising questions about how effective countries' attempts to roll out remote digital learning during the COVID-19 pandemic were. This dearth of digital skills is due, in part, to limited digital connectivity in households. Globally, for example, only 37 per cent of youth aged 15-24 years live in households connected to the internet, a number that declines to merely 8 per cent in low-income countries (UNICEF and ITU, 2020). Without internet connectivity at home, young people have fewer opportunities to access and use the internet and in turn, to develop digital skills.

Yet, as recognized in the 2030 Sustainable Development Agenda (see Box 1) as well as the Secretary General of the United Nations' recent call for the development of a Global Digital Compact that outlines shared principles for an open, free and

secure digital future for all (United Nations, 2023), household digital connectivity does not guarantee equal access to, and use of digital tools by, all members of the household. Indeed, a substantive body of literature has documented that resources are not allocated equally within households and that one dimension along which resources may be distributed is gender (Quisumbing and Maluccio, 2000). As such, comprehensive sex-and-age disaggregated data are needed, alongside in-depth analysis, to more fully measure and monitor the digital inclusion of young people from a gender perspective in order to better understand what is driving inequitable access and use and tailor interventions, accordingly.

As countries transition to learning recovery and acceleration and implement the RAPID framework (World Bank, 2022), which tackles the learning losses caused by the pandemic, as well as building better education systems and practices, it is critical to understand how the investments made in remote learning can continue to be relevant as an integral part of existing education, skills and gender equality strategies. To date, there is very little evidence of the level of readiness countries had to roll out these remote learning strategies, and a broad feeling that those strategies were not effective because low levels of internet access

and digital skills among youth limited students' capacity to learn remotely. Moreover, important questions were raised about whether adolescent girls and young women would fall behind their male peers due to differential access to, and skills to navigate, digital technologies.

This report is the first attempt to fill these gaps, by providing the most comprehensive analysis of pre-pandemic levels of, and gender gaps in, digital use and skills among youth, using data from Multiple Indicator Cluster Surveys (MICS) and Demographic and Health Surveys (DHS). Further, recognizing that the home environment is a crucial space for accessing digital technologies and developing skills and that such opportunities may well be allocated on the basis of gender, the report examines gender gaps in mobile phone ownership and digital skills among young people living in the same households. Finally, to provide further insights into the gender barriers that impede the acquisition of digital skills among young people, the report spotlights the stories of adolescent girls and young women who have surmounted gender biases in their efforts toward digital inclusion.

This report is timely as it provides a strategic context against which global, regional and national digital learning strategies should be perceived, discussed and advocated in the international development sector's engagements such as the SDG Summit, the Summit of the Future, and others.

TABLE 1: Digital inclusion in the 2030 Sustainable Development Agenda

Goal	Target	Indicator
Goal 4: Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all	**Target 4.4:** By 2030, substantially increase the number of youth and adults who have relevant skills, including technical and vocational skills, for employment, decent jobs and entrepreneurship	**Indicator 4.4.1:** Proportion of youth and adults with information and communications technology (ICT) skills, by type of skill
Goal 5: Achieve gender equality and empower all women and girls	**Target 5.b:** Enhance the use of enabling technology, in particular information and communications technology, to promote the empowerment of women	**Indicator 5.b.1:** Proportion of individuals who own a mobile telephone, by sex
Goal 17: Strengthen the means of implementation and revitalize the Global Partnership for Sustainable Development	**Target 17.8:** Fully operationalize the technology bank and science, technology and innovation capacity-building mechanism for least developed countries by 2017 and enhance the use of enabling technology, in particular information and communications technology	**Indicator 17.8.1:** Proportion of individuals using the internet

For girls in Viet Nam, virtual reality is a tool for building digital skills

Si, an 11-year-old girl from the small village of Ham Rong in Viet Nam, loves STEM subjects, and recently she's been applying her interest to learning about augmented virtual reality (AVR), which combines a view of the real world with computer generated elements.

Si's teacher has noted that due to biased gender norms and stereotypes that suggest girls are unsuited or not skilled enough to handle STEM subjects, girls in the class often underestimate their abilities, lack confidence, and lose interest in these areas.

UNICEF is working with the Ministry of Education and Training and civil society organizations to break these gendered stereotypes about girls and STEM. That's why girls like Si have been introduced to AVR in their classrooms. The programme also trains and empowers teachers to use innovative technologies such as AVR to encourage students, especially girls, to participate in STEM subjects. The programme is part of the Skills4Girls initiative, which supports the development of digital literacy and skills of adolescents, especially ethnic minority girls.

Gender disparities in internet use among youth – SDG17.8.1

The internet offers many opportunities almost unimaginable a generation ago. It has the power to transform youths' lives, enabling them to learn new things, develop new skills, earn money, make new social connections and have their voices be heard. In particular, the internet may provide a path to narrowing gender gaps that women and girls experience in real life, such as those related to educational and employment opportunities (OECD, 2018). Yet, to benefit from the internet, youth must be able to access and use it regularly.

The analysis presented in this section of the report explores gender gaps in internet use among youth in 54 countries and territories worldwide, mostly representing low- and lower-middle income economies.[2] It finds that across all regions and income groupings with available data, adolescent boys and young men are more likely to use the internet than adolescent girls and young women – and the gender gaps are markedly large (Figure 1). For example, in low-income countries, only 10 per cent of adolescent girls and young women aged 15-24 years use the internet compared to 22 per cent of adolescent boys and young men of the same age. In other words, 9 out of 10 adolescent girls and young women are offline. While the shares of female and male youth using the internet increase substantially in lower-middle income

countries, the gender gap widens, with 38 per cent of adolescent girls and young women using the internet compared to 61 per cent of adolescent boys and young men (a difference of 23 percentage points).

Among geographic regions with available data, the largest gender gap in internet use is observed in South Asia, favouring adolescent boys and young men by 27 percentage points (40 per cent for female youth vs. 67 per cent for male youth). The lowest proportion of internet use for both male and female youth is found in Eastern and Southern Africa, where only 18 per cent of adolescent girls and young women and 29 per cent of adolescent boys and young men use the internet. Similar proportions are observed in West and Central Africa, where 19 per cent of adolescent girls and young women use the internet compared to 32 per cent of their male counterparts.

> In low-income countries, 90 per cent of adolescent girls and young women (or almost 65 million individuals) are offline, compared to 78 per cent of adolescent boys and young men (almost 57 million individuals) who do not use the internet.

Adolescents with disabilities receive Conditional Cash Transfer skills training as well as counselling from EU supported social workers.
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2. Country income groupings are defined using the World Bank country income classifications.

FIGURE 1: Internet use among youth aged 15-24, by sex and select income groups and regions
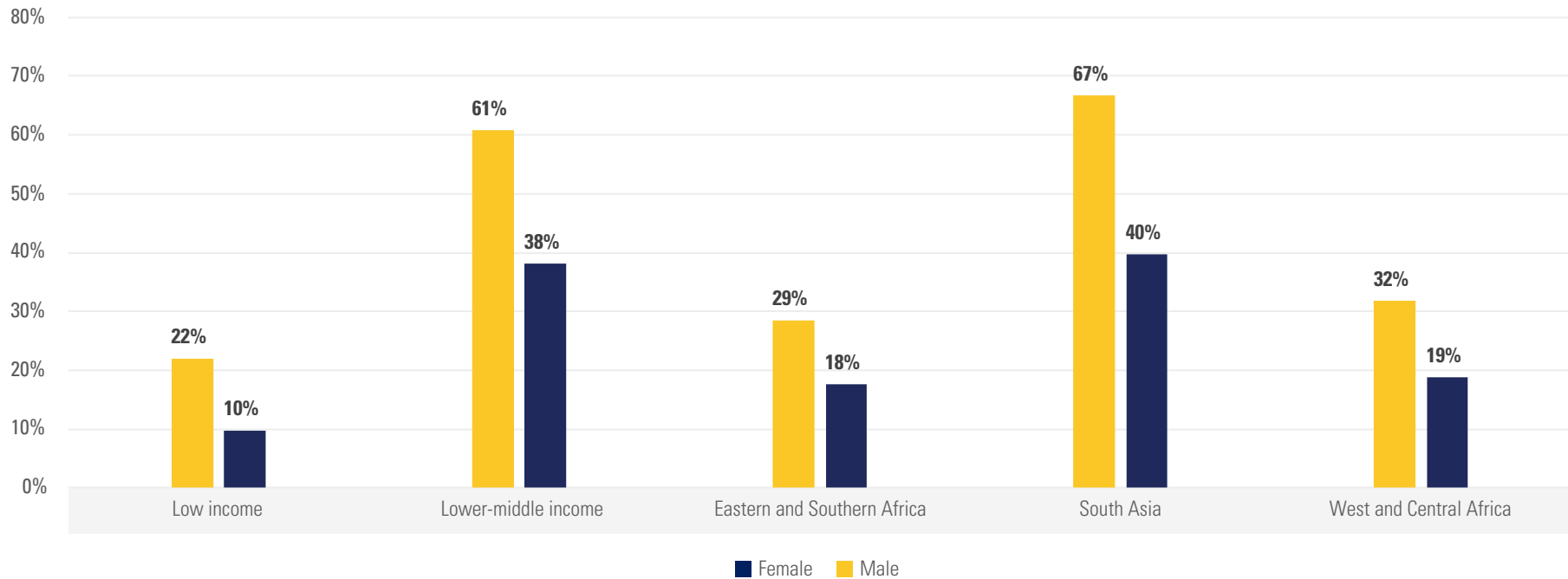
Source: Authors' calculations based on Multiple Indicator Cluster Surveys (2017–2021) and Demographic and Health Surveys (2015–2021).

Note: All estimates are population-weighted averages covering at least 50 per cent of the youth population of each country and regional classification.

Gender disparities can also be assessed through the calculation of the gender parity ratio, which is obtained by dividing the share of adolescent girls and young women who use the internet by the share of adolescent boys and young men who do. A ratio of 1 means perfect gender parity, i.e., the same number of male and female youth use the internet. In our analysis, a gender parity ratio of internet use below 1 indicates female disadvantage, and a gender parity ratio above 1 indicates male disadvantage. As per the SDG standard definitions, a gender parity ratio between 0.97 and 1.03 (inclusive) indicates gender parity.

For every 100 adolescent boys and young men who use internet in low-income countries, only 45 adolescent girls and young women do.

3. The aggregated estimates presented in this report are based on the latest available household survey data for each country. The household surveys cover the period between 2015-2021, with 2020 as the mode year. While it is acknowledged that the COVID-19 pandemic may have had an impact on internet use worldwide and that ICT statistics may have changed substantially for countries with data from earlier years, the use of household surveys remains an essential method for estimating gender differences and other factors associated with disparities in internet use. Although most of the data used for the analysis refers to the pre-pandemic period, these household surveys still provide critical information needed to understand the broader trends and patterns in internet use among youth by sex across different countries.

Figure 2 reveals large gender disparities in internet use among youth in low-income countries, where the gender parity ratio equals to 0.44, meaning that for every 100 adolescent boys and young men aged 15-24 years who use internet, only 44 adolescent girls and young women of the same age do. In other words, in low-income countries the odds of internet use among adolescent girls and young women are reduced by 56 per cent compared to adolescent boys and young men. Though the gender disparity decreases once we look at lower-middle income countries, it is still large, with a value of 0.63, meaning that for every 100 adolescent boys and young men who use internet, only 63 adolescent girls and young women do.

Interestingly, despite a substantial difference in the prevalence of internet use among youth in Eastern and Southern Africa and Western and Central Africa as compared to youth in South Asia, the degree of gender inequality measured by the gender parity ratio is approximately the same for all three regions, ranging from 0.59 to 0.62. The data on disparities by country income group and region are presented in Figure 2.

Since aggregate estimates based on region and income group mask gender disparities in internet use that are observed within and between countries, Figure 3 presents the gender parity ratios for 54 countries and territories with data.

> Only 8 of 54 countries and territories analysed have achieved gender parity in internet use among youth. In five countries, internet use favours adolescent girls and young women but in all other countries assessed, adolescent girls and young women are disadvantaged.
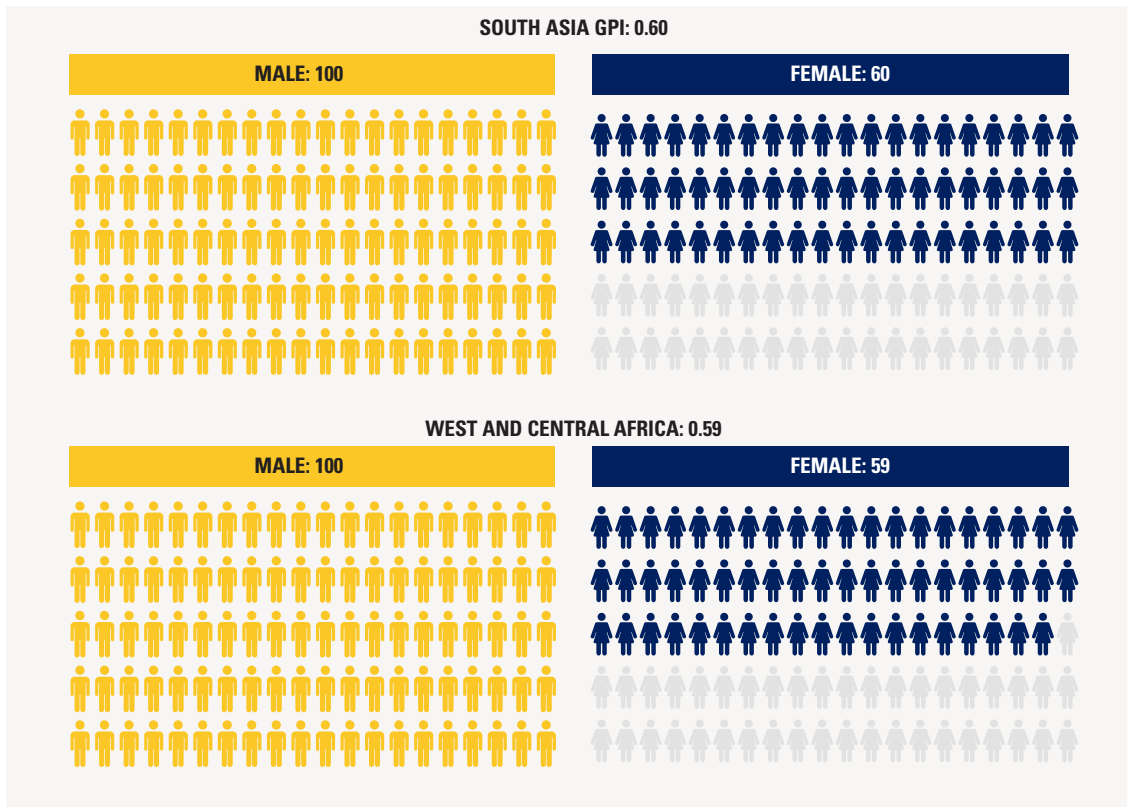
FIGURE 2: Gender gap in internet use, by select income groups and regions

LOW INCOME GPI: 0.44
MALE: 100   FEMALE: 44

LOWER-MIDDLE INCOME GPI: 0.63
MALE: 100   FEMALE: 63

EASTERN AND SOUTHERN AFRICA GPI: 0.62
MALE: 100   FEMALE: 62

SOUTH ASIA GPI: 0.60

MALE: 100	FEMALE: 60

WEST AND CENTRAL AFRICA: 0.59

MALE: 100	FEMALE: 59

Source: Authors' calculations based on Multiple Indicator Cluster Surveys (2017–2021) and Demographic and Health Surveys (2015–2021).

Gender parity in internet use among youth has been achieved in only 8 of 54 countries and territories analysed. These countries are Viet Nam, Turks and Caicos Island, Fiji, Maldives, Armenia, South Africa, Suriname, and Tuvalu. In five countries and territories – Lesotho, Kiribati, Mongolia, Lao PDR and Cuba – adolescent girls and young women are more likely to use the internet. For example, in Lesotho, the country exhibiting the most advantage for adolescent girls and young women, 116 female youth use the internet for every 100 male youth who do. But in all other countries and territories with available data (41), the gender disparity favours adolescent boys and young men, with stark disparities observed in some locations. In Chad, for example, only 15 adolescent girls and young women use the internet for every 100 adolescent boys and young men who do. The Pakistan provinces of Balochistan and Khyber Pakhtunkhwa also reveal a great deal of inequity, as only 18 and 21 adolescent girls and young women, respectively, use the internet for every 100 adolescent boys and young men. However, the median gender parity ratio for the full sample of countries and territories analysed is 0.71, indicating that for every 100 adolescent boys and young men who use the internet, there are only 71 adolescent girls and young women who do.

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FIGURE 3: Gender parity ratio in internet use among youth aged 15-24, by country

Internet use ratio in favour of adolescent girls and young women, i.e., a higher share of this group uses the internet than adolescent boys and young men.

Internet use ratio in favour of adolescent boys and young men, i.e., a higher share of this group uses the internet than adolescent girls and young women.

Children learn with tablets and computers in the Public Melen School of Yaoundé, the capital of Cameroon.
© UNICEF/UN0551729/Dejongh

Gender Parity

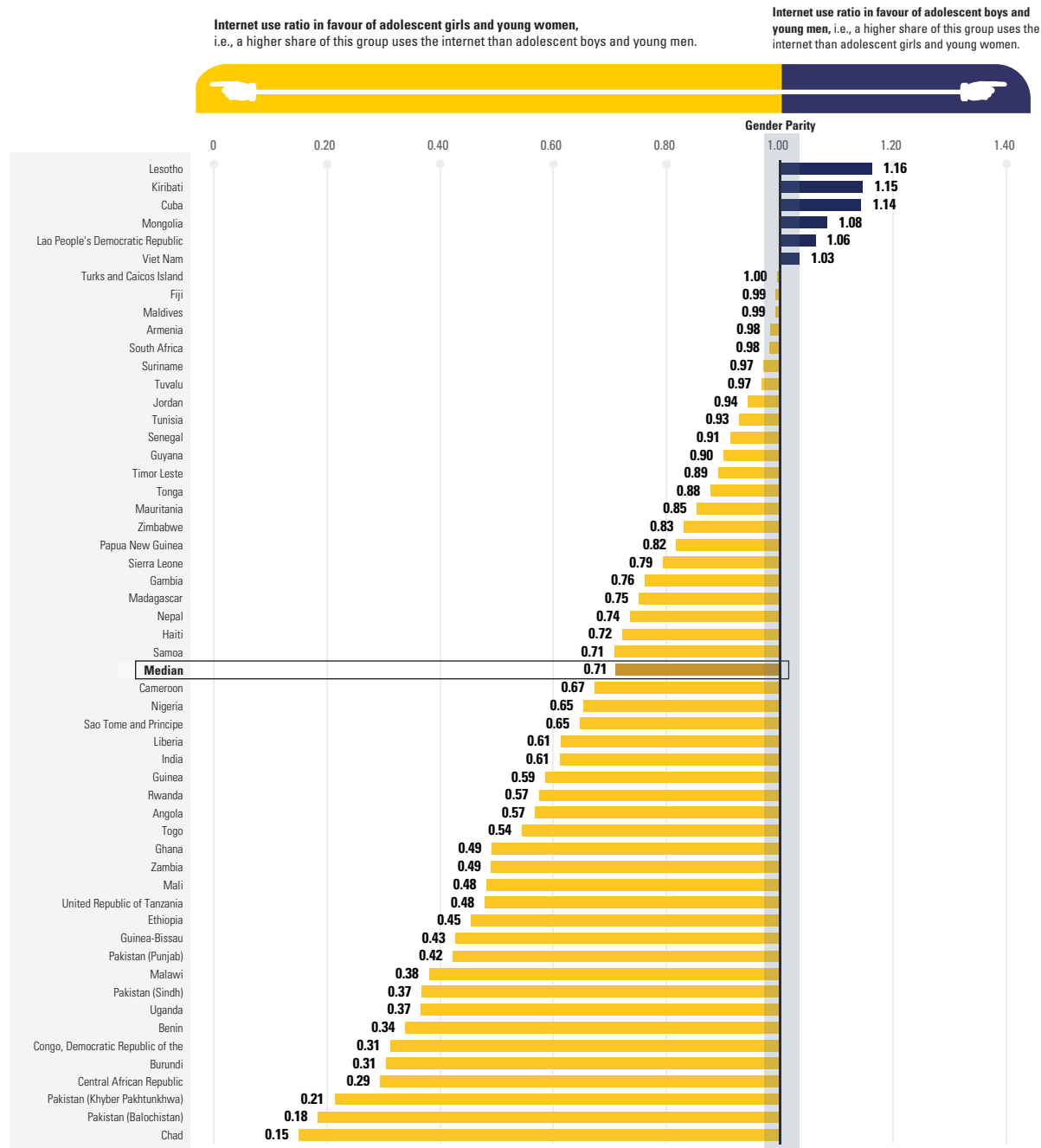| Country	Value
Lesotho	1.16
Kiribati	1.15
Cuba	1.14
Mongolia	1.08
Lao People's Democratic Republic	1.06
Viet Nam	1.03
Turks and Caicos Island	1.00
Fiji	0.99
Maldives	0.99
Armenia	0.98
South Africa	0.98
Suriname	0.97
Tuvalu	0.97
Jordan	0.94
Tunisia	0.93
Senegal	0.91
Guyana	0.90
Timor Leste	0.89
Tonga	0.88
Mauritania	0.85
Zimbabwe	0.83
Papua New Guinea	0.82
Sierra Leone	0.79
Gambia	0.76
Madagascar	0.75
Nepal	0.74
Haiti	0.72
Samoa	0.71
Median	**0.71**
Cameroon	0.67
Nigeria	0.65
Sao Tome and Principe	0.65
Liberia	0.61
India	0.61
Guinea	0.59
Rwanda	0.57
Angola	0.57
Togo	0.54
Ghana	0.49
Zambia	0.49
Mali	0.48
United Republic of Tanzania	0.48
Ethiopia	0.45
Guinea-Bissau	0.43
Pakistan (Punjab)	0.42
Malawi	0.38
Pakistan (Sindh)	0.37
Uganda	0.37
Benin	0.34
Congo, Democratic Republic of the	0.31
Burundi	0.31
Central African Republic	0.29
Pakistan (Khyber Pakhtunkhwa)	0.21
Pakistan (Balochistan)	0.18
Chad	0.15

Source: Authors' calculations based on Multiple Indicator Cluster Surveys (2017–2021) and Demographic and Health Surveys (2015–2021).

Note: The shaded area along the vertical line indicates the range of parity (0.97 to 1.03 inclusive).

E-UPSHIFT programme in Sierra Leone encourages girls to become entrepreneurs

Edith, an energetic 20-year-old student from Freetown, Sierra Leone, is balancing her university studies in applied accounting with learning the intricacies of operating an online business selling hair extensions.

Through her participation in E-UPSHIFT, a computer-based youth social innovation and social entrepreneurship programme designed to build digital skills and opportunities for young people, especially those coming from disadvantaged households, Edith has the chance to pursue her dream of becoming an entrepreneur.

Edith uses her free time to visit the computer lab at the university and go through the digitized, self-paced E-UPSHIFT curriculum to learn the skills she needs to build her business and make it competitive. "This is the first time I am doing computerized learning and the experience has been eye-opening, rewarding, and exciting."

UNICEF in Sierra Leone has been working closely with the Directorate of Science, Technology and Innovation to support young peoples' access to UPSHIFT. The programme is currently being scaled up to other university hubs throughout Sierra Leone so that more students like Edith can benefit.

Gender disparities in digital skills – SDG4.4.1

Access to the internet is not enough. Young people – including adolescent girls and young women – need the technical know-how to navigate the internet, synthesize and adapt information and create the world they want to see online. Without digital skills, they risk being excluded from the socioeconomic benefits of engaging online. For adolescent girls and young women in particular, digital skills may offer the opportunity to overcome or mitigate gender-based barriers they face in the physical world (UNICEF, 2021). As such, digital skills, including the entry-level skills required to make basic use of digital devices and online applications, have become as critical in the digital era as reading, writing and numeracy skills.

Digital skills are broadly defined as a "range of abilities to use digital devices, communication applications, and networks to access and manage information" that "enable people to create and share digital content, communicate and collaborate, and solve problems for effective and creative self-fulfillment in life, learning, work, and social activities at large" (UNESCO, 2022). To successfully strive and achieve in modern economies, digital skills must be developed alongside foundational skills (such as literacy and numeracy), socio-emotional skills (communication skills, perseverance, self-control, etc.), and other key components critical for a literate workforce. Box 1 outlines how digital skills are measured by SDG4.4.1, a framework adopted by the sixth round of the Multiple Indicator Cluster survey used for this analysis.

On 14 April 2020, two girls view the online platform on which children and parents in Timor-Leste can access a range of audio-visual material to help students continue learning during ongoing school closures.
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Box 1. Understanding digital skills as defined by the 2030 Sustainable Development Agenda

This report uses the digital skills framework for SDG4.1.1, which measures the proportion of young people and adults with different digital skills. As measurement of digital skills based on self-reported assessment can be subject to potential bias, the framework adopts an approach that measures digital skills based on asking individuals if they have recently performed nine activities related to the use of digital tools that are needed to facilitate sustainable and inclusive socioeconomic development. To ensure internationally comparative reporting, these activities have been grouped together by degree of comprehensiveness into three broader categories of skills: basic skills, standard skills, and advanced skills.

As shown in Table 2, basic skills refer to simple tasks such as moving files or folders, while standard skills include working with spreadsheets, creating presentations, or configuring software. Finally, advanced skills highlight the ability to write programming code. Questions record whether the respondent did each of the nine activities over the past three months. As such, individuals who are proficient in ICT skills but have not used them in the past three months are considered to not possess ICT skills.

TABLE 2: Digital skills outlined by the SDG4.4.1 framework

Skill level	Activity
Basic skills	Copying or moving a file or folder
	Using copy and paste tools to duplicate or move information within a document
	Sending emails with attached files
	Transferring files between a computer and other devices
Standard skills	Using basic arithmetic formulas in a spreadsheet
	Connecting and installing new devices
	Creating electronic presentations with presentation software
	Finding, downloading, installing and configuring software
Advanced skills	Writing a computer program using a specialized programming language

The acquisition of skills requires practice. Learning by doing is critical to developing a wide range of skillsets, including digital skills. Indeed, evidence suggests that children who engage in more online activities tend to have better digital skills than those who participate in fewer online activities (UNICEF, 2019b; UNICEF, 2019c). Because adolescent girls and young women are far less likely than adolescent boys and young men in low- and middle-income countries to use the internet, as demonstrated earlier in this report, they also have less opportunity to develop and grow the digital skills needed for a rapidly advancing digital world. Using available data from 32 countries and territories collected during the sixth round of MICS, the analysis presented in this section of the report examines gender gaps in digital skills among youth.[4] A young person is considered to have digital skills if they performed at least one of the nine activities outlined in Table 2.

4. The following countries and territories are included in the analysis, broken down by geographic area: sub-Saharan Africa (the Central African Republic, Chad, the Democratic Republic of Congo, the Gambia, Ghana, Guinea-Bissau, Lesotho, Madagascar, Malawi, Nigeria, Sao Tome and Principe, Sierra Leone, Togo, Zimbabwe); Latin America and the Caribbean (Cuba, Guyana, Suriname, Turks and Caicos Islands); South Asia (Nepal, Balochistan (Pakistan), Khyber Pakhtunkhwa (Pakistan), Punjab (Pakistan), Sindh (Pakistan)); East Asia and the Pacific (Fiji, Kiribati, Lao PDR, Mongolia, Samoa, Tonga, Tuvalu, Viet Nam); and Middle East and North Africa (Tunisia)).

Digital skills (SDG4.4.1): Key for human capital formation, substantial in terms of gender gaps

Among the 32 countries and territories included in the analysis, the median values for the share of female and male youth who have digital skills are 9 and 20 per cent,[5] respectively, a difference of 11 percentage points (Figure 4). For adolescent boys and young men, the values range from a low of 2 per cent in Chad to a high of 64 per cent in Turks and Caicos, while for adolescent girls and young women, the values range from a low of 1 per cent in Chad to a high of 72 per cent in Turks and Caicos. In 17 countries, fewer than 10 per cent of female youth possess digital skills and in some of these countries, nearly no girls possess such skills. For example, the share of adolescent girls and young women with digital skills does not even reach 3 per cent in Chad, Central African Republic, Sierra Leone and the Pakistan province of Balochistan.

When it comes to the gender parity analysis of digital skills, only four countries – namely, Viet Nam, Mongolia, Samoa, and Lesotho – demonstrate gender parity in digital skills (Figure 5). In seven countries – Tunisia, Suriname, Turks and Caicos

Islands, Fiji, Tuvalu, Cuba, and Tonga – female youth are more advantaged than male youth, whereas in 21 countries female youth are disadvantaged. The median value for the gender parity ratio for the 32 countries and territories included in the analysis is 0.65, meaning that the likelihood of having digital skills for female youth are less than half in comparison to their male counterparts.

Youth in lower income settings experience substantial challenges developing digital skills. Furthermore, in addition to the fact that young people are not gaining even the basic digital skills necessary for inclusive socioeconomic participation, the existing gains are inequitable, mostly to the disadvantage of adolescent girls and young women. This points out the need for policies focused on human capital gains to be gender responsive to ensure that all young people, including adolescent girls and young women, are equipped with necessary skills that could open up better educational and labour market opportunities.

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5. Here and throughout the report, a person is considered to have digital skills if at least one out of nine activities outlined by the SDG4.4.1. taxonomy was performed in the last three months.

A girl using a laptop computer to access the learning passport in a classroom at Oasis Primary school in Hartcliffe, Harare, Zimbabwe on 1 December 2020.
© UNICEF/UN0410322/Tinago
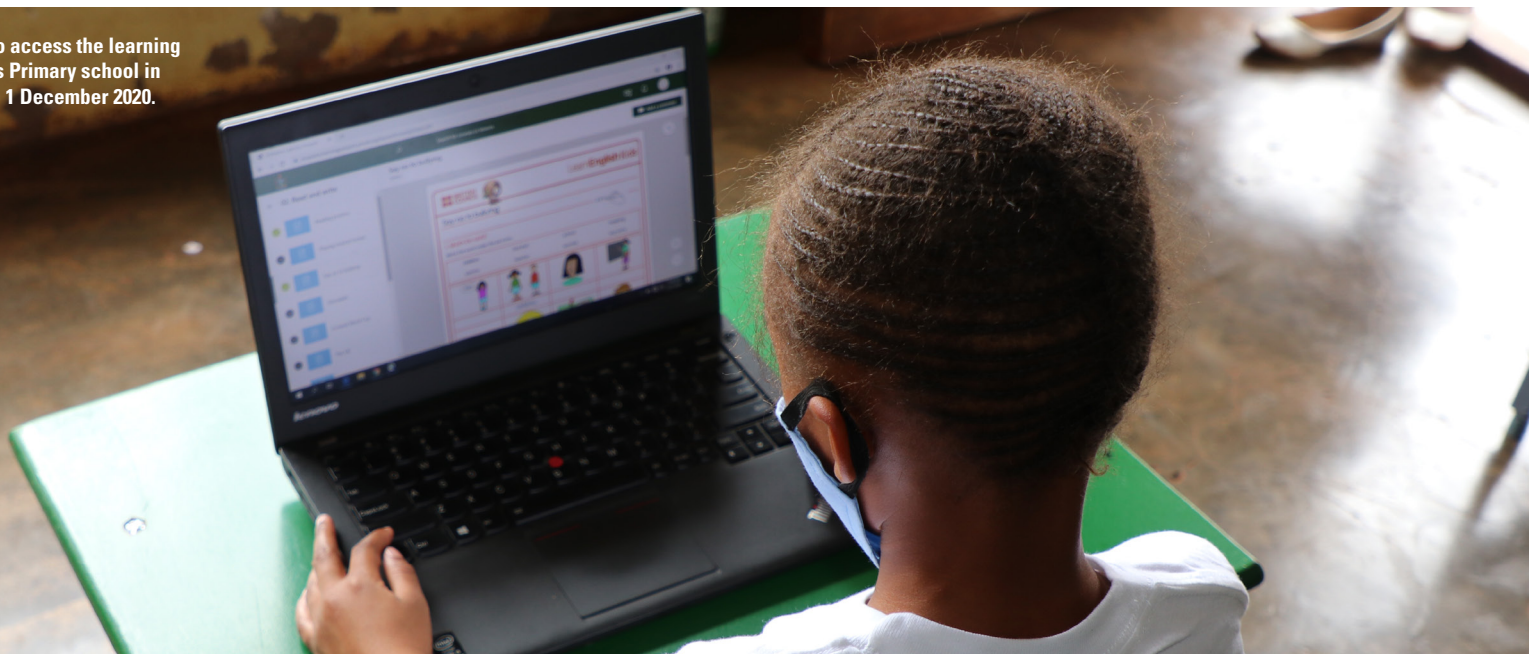
FIGURE 4: Percentage of youth aged 15-24 with digital skills (SDG4.4.1), by sex and country

Country	Female	Male
Turks and Caicos Islands	72%	64%
Cuba	59%	48%
Tuvalu	52%	44%
Tonga	52%	25%
Fiji	44%	37%
Mongolia	43%	45%
Tunisia	43%	42%
Suriname	41%	38%
Viet Nam	39%	39%
Guyana	38%	46%
Kiribati	30%	32%
Samoa	23%	21%
Sao Tome and Principe	20%	35%
Zimbabwe	15%	22%
Lesotho	15%	14%
Nepal	10%	20%
Median	9%	20%
Lao People's Democratic Republic	9%	11%
Pakistan (Punjab)	8%	20%
Ghana	8%	22%
Gambia	7%	17%
Nigeria	6%	9%
Pakistan (Sindh)	5%	15%
Madagascar	5%	8%
Guinea-Bissau	4%	13%
Togo	4%	9%
Congo, Democratic Republic of the	4%	13%
Pakistan (Khyber Pakhtunkhwa)	3%	13%
Malawi	3%	7%
Sierra Leone	2%	4%
Central African Republic	1%	4%
Pakistan (Balochistan)	1%	11%
Chad	1%	2%

■ Female   ■ Male

Source: Authors' calculations based on Multiple Indicator Cluster Surveys (2017–2021) and Demographic and Health Surveys (2015–2021).

Note: The shaded area along the vertical line indicates the range of parity (0.97 to 1.03 inclusive).

FIGURE 5: Gender parity ratio of digital skills (SDG4.4.1) among youth aged 15-24, by country

	FAVOURS MEN	FAVOURS WOMEN

Gender Parity

Country	Value
Tonga	2.08
Cuba	1.22
Tuvalu	1.17
Fiji	1.16
Turks and Caicos Islands	1.13
Samoa	1.09
Suriname	1.08
Lesotho	1.06
Tunisia	1.02
Viet Nam	0.99
Mongolia	0.96
Kiribati	0.93
Guyana	0.82
Lao People's Democratic Republic	0.77
Nigeria	0.69
Zimbabwe	0.65
Median	**0.65**
Madagascar	0.64
Sao Tome and Principe	0.58
Sierra Leone	0.49
Nepal	0.49
Togo	0.45
Gambia	0.43
Pakistan (Punjab)	0.42
Chad	0.42
Malawi	0.37
Pakistan (Sindh)	0.34
Guinea-Bissau	0.34
Ghana	0.33
Central African Republic	0.33
Congo, Democratic Republic of the	0.32
Pakistan (Khyber Pakhtunkhwa)	0.27
Pakistan (Balochistan)	0.10

Source: Authors' calculations based on Multiple Indicator Cluster Surveys (2017–2021) and Demographic and Health Surveys (2015–2021).

A girl uses a tablet to access teaching and learning platform "Khang Panya Lao" developed with UNICEF's support in a school in Vientiane.

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Box 2. Does internet access always translate into acquisition of digital skills?

It is fair to assume that availability of an internet connection at home is necessary to gain digital skills. Moreover, young people aged 15-24 years can and should acquire and advance digital skills beyond the household, for instance, at school or in the workplace. However, the available data confirm this is not always the case. Figure 6 presents the relationship between the percentage of females and males with internet access at home on the x-axis, and the percentage of females and males with digital skills on the y axis, separated by sex. The dashed diagonal line indicates a perfect linear relationship, in which all young people who have internet at home also have digital skills. Countries below the dashed line are those in which more youth have internet access at home than have digital skills, suggesting that household internet connectivity does not lead to the development of digital skills. Conversely, countries above the dashed line are those in which more youth have digital skills than have internet access at home, suggesting that young people are acquiring and developing digital skills outside their homes.

> While connecting all households to the internet is crucial, this does not always lead to the acquisition of digital skills among female and male youth.

As Figure 6 illustrates, in most of the countries analysed, both female and male youth aged 15-24 are more likely to have internet access at home than digital skills. The opposite situation, in which more youth have digital skills than have internet access at home, is observed in only three countries for female youth and six countries for male youth. Moreover, in some countries the discrepancy between household internet skills and digital skills acquisition for adolescent girls and young women is particularly striking. For example, in the Gambia and Nepal, more than 50 per cent of adolescent girls and young women have internet access at home, but only 10 per cent or fewer have digital skills.

These findings have several important policy implications. First, while advancing digital infrastructure and universalizing access to the internet at the household level is important, this does not always lead to the acquisition of digital skills among youth. Second, it is necessary to ensure that adolescent girls and young women have equitable opportunities in acquiring digital skills beyond the home.

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Nupur takes computer training with the CCT she receives. She regularly goes to the computer training centre and is trained by skilled trainers.
© UNICEF/UN0547484/Mawa

FIGURE 6: Association between internet access from home and digital skills (SDG4.1.1) among youth aged 15-24, by sex and country
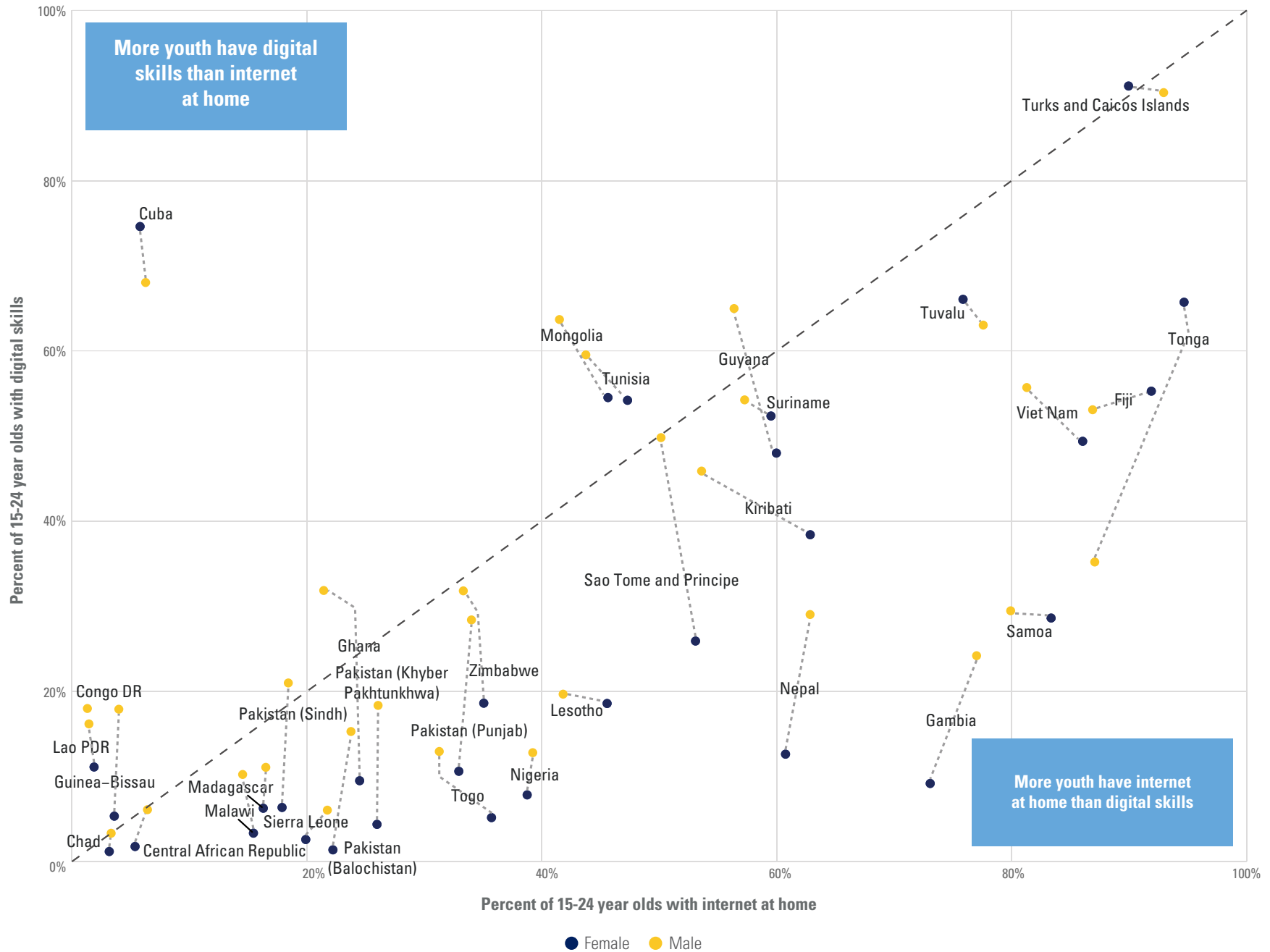
Source: Authors' calculations based on Multiple Indicator Cluster Surveys (2017–2021) and Demographic and Health Surveys (2015–2021).

Box 3. Spotlight on gender differences in digital skills in the United Kingdom

While the primary focus of this report is on gender differences in digital skills in low- and middle-income countries, the case of the United Kingdom demonstrates that gender disparities in digital skills are also found in high-income contexts, where access to the internet is almost universal. When controlling for age, educational attainment, and income, significant gender gaps in digital skills among youth aged 15-24 are observed, particularly for more complex skills. While there is no gender gap in basic skills, adolescent girls and young women are less likely to report any standard skill (by 10 percentage points). For advanced skills, the probability decrease is even greater, at 15 percentage points. The findings indicate that even in a high-income country such as the United Kingdom, policy efforts must focus on achieving gender parity in digital skills acquisition among young people.

FIGURE 7: Change in probability of female youth demonstrating digital skills (SDG4.1.1) relative to male youth, aged 15-24, by skill level, in the United Kingdom
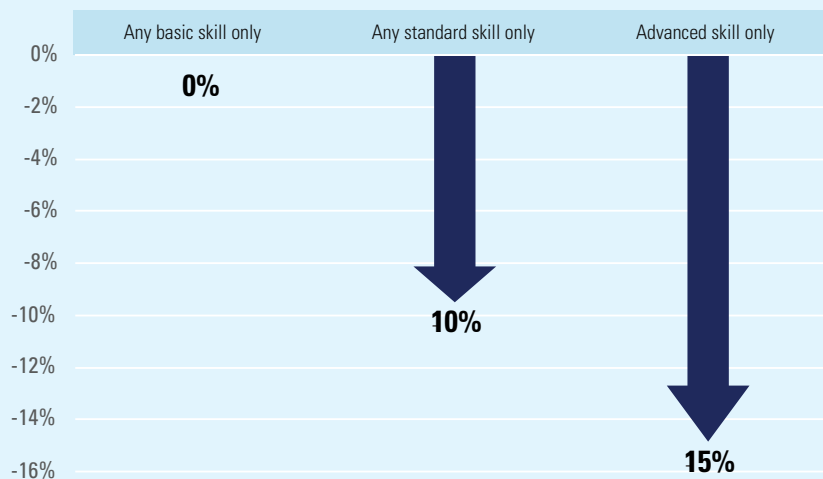

Source: Authors' calculations using the UK Opinions and Lifestyle Survey (2016), marginal effects based on logistic regression.

Comparing gender gaps in foundational learning skills and digital skills

Reading and numeracy skills are foundational to the acquisition of a range of skills needed for 21st century learning and employment, including digital skills. Gender-equitable education systems should equip both girls and boys with the skillsets necessary for success in school, work, and life throughout the education cycle. With countries globally committed to gender-equitable education, it is important to compare the gender gaps in digital skills acquisition among youth against gender gaps in foundational skills acquisition in early schooling years. MICS' data about foundational learning and digital skills reveals a contrasting picture from what is observed in the digital skills acquisition.

On average, across countries with available data, female students outperform their male peers in foundational reading skills (UNICEF, 2022). However, the results for foundational numeracy skills are mixed with girls having an advantage in some countries and boys in others. These findings suggest that gender disadvantage for girls in STEM (science, technology, engineering and mathematics) -related fields may manifest early on.

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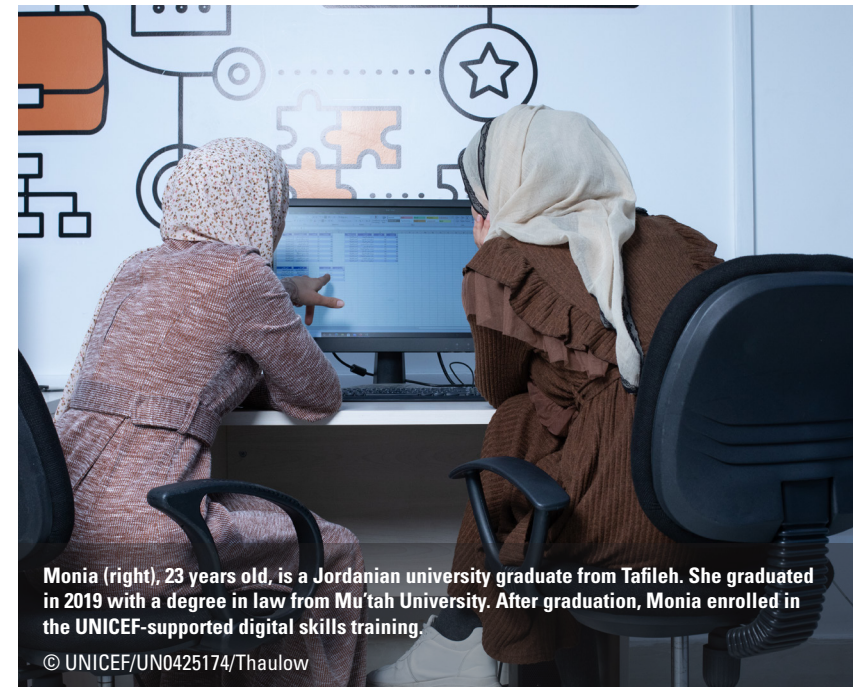
Monia (right), 23 years old, is a Jordanian university graduate from Tafileh. She graduated in 2019 with a degree in law from Mu'tah University. After graduation, Monia enrolled in the UNICEF-supported digital skills training.
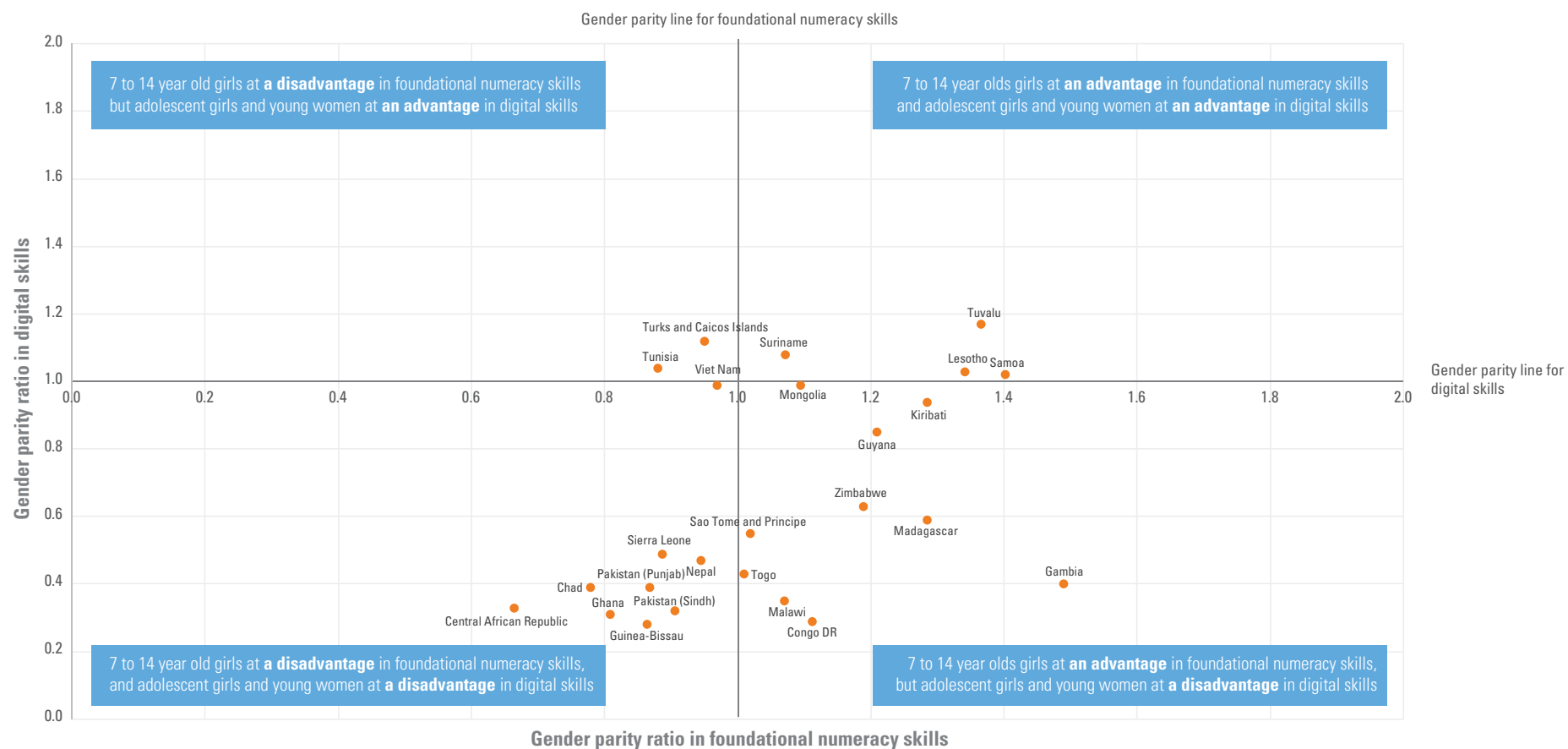© UNICEF/UN0425174/Thaulow

Foundational numeracy skills

Figure 8 presents a comparison between the gender parity ratio in foundational numeracy skills among 7-14-year-olds and the gender parity ratio in digital skills among 15-24-year-olds. The graph shows that countries are more or less equally spread out horizontally from the vertical gender parity line for numeracy. This indicates that there is no strong evidence to suggest that gender plays a significant role in numeracy skills acquisition across the countries included in the analysis, as countries that favour boys and those that favour girls are equally distributed.

However, the situation differs for digital skills. Most countries are located below the horizontal gender parity line for digital skills, meaning that adolescent girls and young women are disadvantaged in digital skills acquisition, including in most countries in which younger girls are advantaged in numeracy skills. In contrast, in most countries, adolescent boys and young men are advantaged in digital skills acquisition, even in most countries in which boys are disadvantaged in numeracy skills. Only Mongolia is close to achieving gender parity in both foundational numeracy and digital skills.

FIGURE 8: Scatter plot of gender parity ratio in digital skills among youth aged 15-24 and gender parity ratio of foundational numeracy skills among children aged 7-14, by country
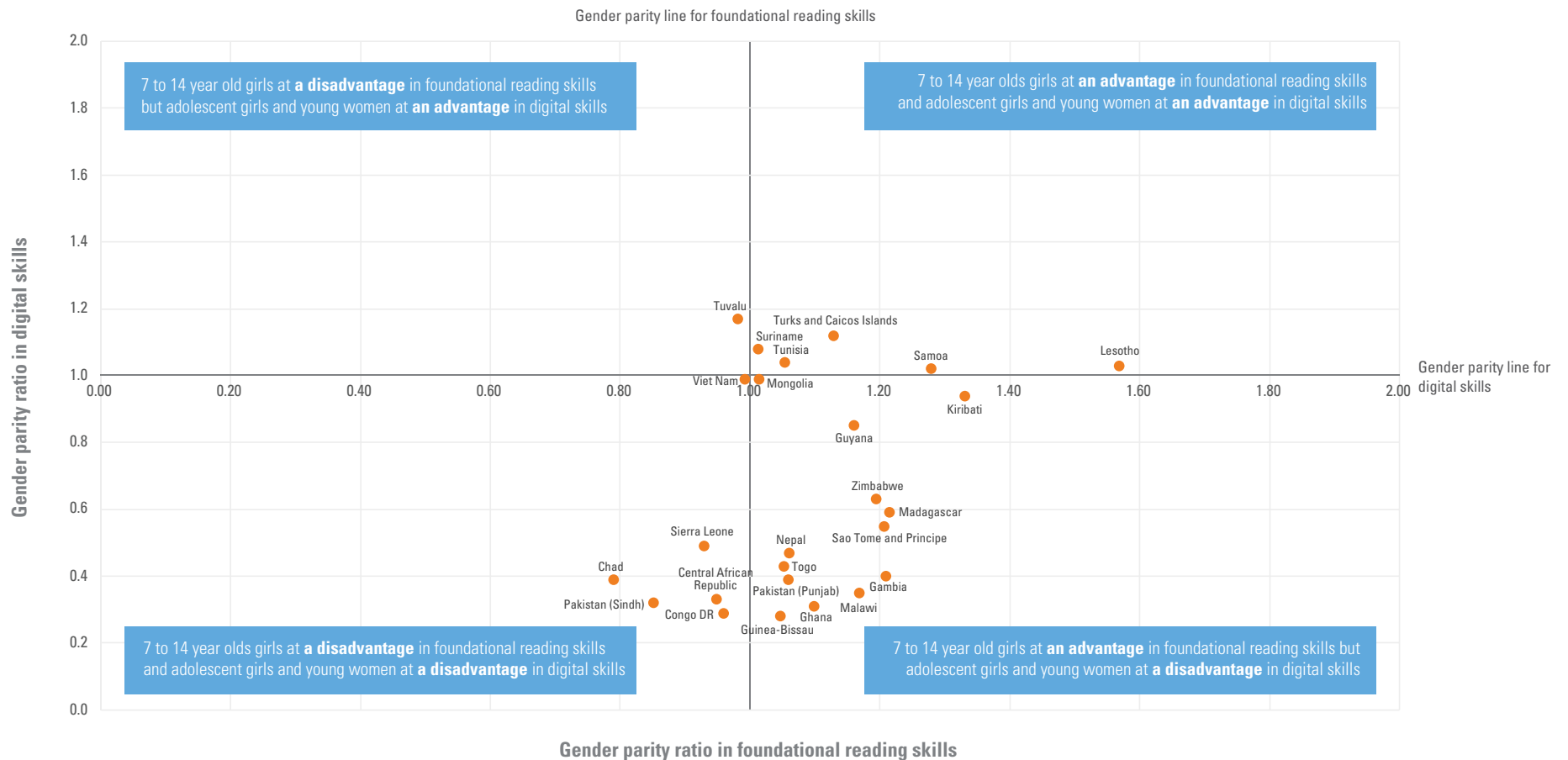

Source: Authors' calculations based on Multiple Indicator Cluster Surveys (2017–2021) and Demographic and Health Surveys (2015–2021).

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Foundational reading skills

Figure 9 depicts a comparison between the gender parity ratio in foundational reading skills among 7-14-year-olds and the gender parity rartio in digital skills among 15-24-year-olds. While in most countries, girls aged 7-14 perform better than boys in foundational reading skills (i.e., most of the countries are located to the right of the vertical gender parity line for foundational reading skills), adolescent boys and young men aged 15-24 tend to outperform their female peers in digital skills (most of the countries are below the horizontal gender parity line for digital skills, indicating a lower level of digital skills for girls).

Only in Mongolia and Viet Nam is gender parity observed in both foundation reading skills and digital skills. This indicates that in these countries, girls and boys aged 7-14 are acquiring foundational reading skills at similar rates, and adolescent girls and boys, as well as young men and women aged 15-24, are acquiring digital skills at comparable rates. However, achieving gender parity does not necessarily imply that the skills are prevalent in the population. For instance, in Viet Nam, while 83 per cent of 7-14-year-olds have acquired foundational reading skills, only about 36 per cent of 15-24-year-olds have acquired digital skills. Thus, although parity has been achieved, there is still a long way to go before all youth acquire the necessary skills for employment and higher earnings.

FIGURE 9: Scatter plot of gender parity ratio in digital skills among youth aged 15 to 24 and gender parity ratio of foundational reading skills among children aged 7 to 14, by country

Source: Authors' calculations based on Multiple Indicator Cluster Surveys (2017–2021) and Demographic and Health Surveys (2015–2021).

In five countries and territories, namely Sierra Leone, Chad, Central African Republic, Pakistan (Sindh), and the Democratic Republic of the Congo, females are at a disadvantage in both foundational skills among 7-14-year-olds and digital skills among 15-24-year-olds. In these countries, girls are left behind in their early years, and the disadvantage persists in the acquisition of digital skills among adolescents and young women.

The analysis presented in this section paints a concerning picture. First, adolescent girls and young women are less likely to exhibit foundational numeracy and digital skills essential for the digital economy and STEM careers. Moreover, the achievement of foundational numeracy and reading skills in girlhood, while crucial,

is not a stepping-stone to the development of digital skills for adolescent girls and young women. Indeed, findings from the Programme for International Student Assessment (PISA) suggest that by the time girls and boys reach 15 years of age, gendered stereotypes may influence expectations of their careers and future (OECD PISA, 2018). Boys may be more likely to respond to expectations to pursue STEM-related careers while lower expectations of girls' performance in subjects other than reading can become a barrier for girls to develop essential skills for future careers, such as digital or STEM skills. Gender-responsive education systems must be aware of the gendered expectations that differentially impact girls' and boys' skills acquisition and address them, accordingly.

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Skills4Girls programme in Lao PDR promotes digital skills for girls

A group of 32 students from the SOS Boarding School on the outskirts of Vientiane, the capital of Lao PDR, recently gathered for a "digital literacy camp" sponsored by the Ministry of Education and Sport and funded by the EU and the Skills for Girls initiative. During the camp, students such as 16-year-old Sengmany, who dreams of a career in e-commerce, received tablets and instruction in online safety, and were introduced to the national e-learning platform, Khang Panya Lao ("Lao Wisdom Warehouse").

Khang Panya Lao is based on the Learning Passport, a partnership between UNICEF and Microsoft, and was initially introduced as the first-ever national digital teaching and learning platform in response to the school closures during the pandemic. Today, it reaches 333,000 users throughout the country.

Camps such as these provide vital opportunities for primary and secondary students like Sengmany develop the digital skills they need to succeed, which is critical since most do not have computers or smart devices, and otherwise would not have access to digital literacy classes.

Gender gaps in digital skills: a within-family perspective

While the previous analysis examined overall gender disparities in digital skills among youth, this section delves into the role of family environment in skills acquisition. Parents, caregivers and other family members play a crucial role in shaping the skills of children, adolescents, and young people throughout their lives. They are also the primary agents of gender socialization in the early years of children's development and may perpetuate gender biases within households through differentiated allocation of resources or decision-making based on gender.

This analysis aims to estimate the gender gap in digital skills between male and female youth from the same household to assess the impact of the family environment on observed gender gaps in digital skills. By focusing only on gaps within households, the potential impact of household and individual-level factors that vary across households, such as household wealth, area of residence, age of household members and so on are eliminated. This allows for an examination of the impacts of unobserved family factors, such as the social values and attitudes that families hold regarding what is acceptable behaviour for males and females, on gaps in digital skills acquisition. While the available data do not allow for direct measurement of these factors, the analysis quantifies the degree to which they contribute to observed gender biases in digital skills acquisition among youth within households. In other words, it reveals the overall impact of the family environment on gender gaps in digital skills.

> Family environment plays a critical role in the effect of gender on the possession of digital skills, favouring the acquisition of these skills among adolescent boys and young men aged 15-24 in most of the analysed countries.

The results shown in Figure 10 depict how gender affects the likelihood of possessing digital skills (any of the nine digital activities presented in Table 2) for female youth living with male youth in the same age range (15-24 years). A value less than zero indicates that female youth are less likely to have digital skills, whereas a value greater than zero indicates that female youth have an advantage. Upon analyzing digital skills, it is observed that in 22 of the 30 countries and territories analysed, female youth have a lower likelihood of having digital skills compared to their male counterparts in the same household.

Several countries, particularly those in sub-Saharan Africa, have smaller disadvantages for adolescent girls and young women, ranging from 1 to 5 percentage points, possibly due to low digital skills among both genders in the region. However, in Sao Tome and Principe, Ghana, Guyana, Pakistan (Punjab) and Zimbabwe, female youth have a substantial disadvantage of 11 to 20 percentage points in digital skills. Additionally, the analysis

indicates that seven countries exhibit no gender gap in digital skills. Moreover, Tonga stands out as a unique case where female youth have an advantage over male youth in digital skills within the same household.

This analysis suggests that beyond factors such as household wealth or area of residence, gender differences in digital skills are influenced by the family environment, including the social values and attitudes families hold about the digital inclusion of household members based on gender. These factors may also be shaped by parental concerns about online safety including cyber-bullying, sexual abuse, and online stalking, particularly of girls and young women (The Web Foundation, 2020).

Yet, the variability in gender gaps observed across countries also suggests that social values and attitudes differ across countries – and potentially within- meaning that they are not static and may be malleable to change with the right interventions. Qualitative and formative research, respectively, can shed more light on the underlying factors driving observed gender gaps within households and what works to change them, highlighting the unique case of Tonga as a potential example of positive deviation.

FIGURE 10: Gender gap in digital skills: probability difference for female youth aged 15-24 in comparison to male youth aged 15-24 within the same household, by country

Country	Value
Sao Tome and Principe	-20%
Ghana	-14%
Guyana	-11%
Pakistan (Punjab)	-11%
Zimbabwe	-11%
Pakistan (Sindh)	-8%
Pakistan (Khyber Pakhtunkhwa)	-8%
Guinea-Bissau	-8%
Kiribati	-7%
Togo	-7%
Nepal	-5%
Gambia	-5%
Pakistan (Balochistan)	-5%
Malawi	-5%
Lesotho	-4%
Lao People's Democratic Republic	-4%
Nigeria	-4%
Congo, Democratic Republic of the	-3%
Madagascar	-3%
Central African Republic	-3%
Chad	-1%
Sierra Leone	-1%
Fiji	0%
Mongolia	0%
Cuba	0%
Tunisia	0%
Suriname	0%
Samoa	0%
Viet Nam	0%
Tonga	17%
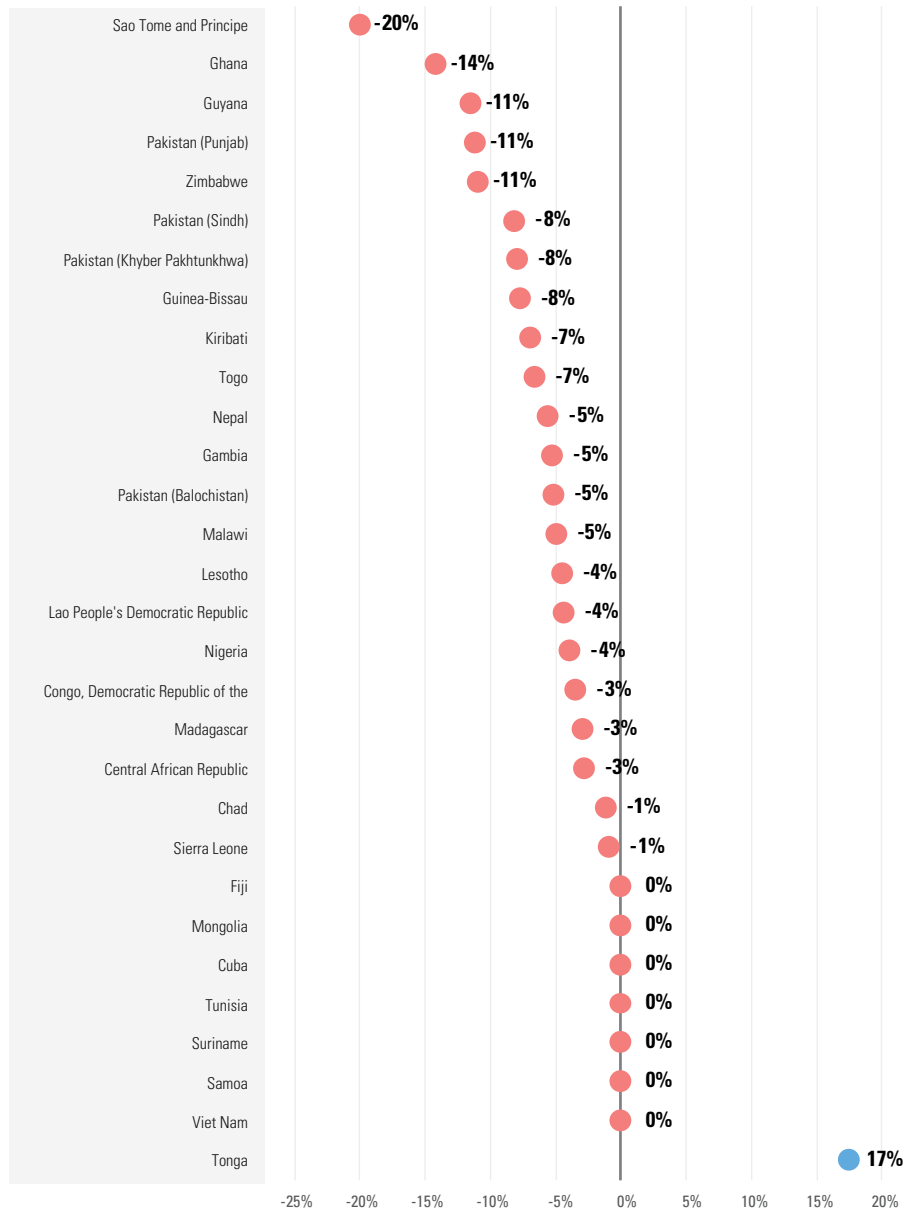
Altynay Segizbay conducts an online lecture on climate change. Almaty, Kazakhstan.
© UNICEF/UN0699708/unknown

Note: Turks and Caicos Islands and Tuvalu were excluded from the within-household analysis as the sample size for female and male respondents aged 15-24 years from the same household was below 50 unweighted observations per group. The estimated differences for Viet Nam, Suriname, Samoa, Mongolia, Fiji, Cuba and Tunisia were not statistically significant and are expressed as zero in this chart.

Gender gaps in digital skills: do the poorest or richest suffer the most?

While the previous analysis explored the gender gap in digital skills among youth from the same households across 30 countries, the gaps could be even wider for sub-groups of adolescent girls and boys with different family socioeconomic status. Figure 11 presents the effects of gender for female youth in relation to male youth from the same households for the 15- to 24-year-old population in 30 countries. The chart depicts the disparity in digital skills between female and male youth across five groups of socioeconomic status, by presenting the percentage difference in likelihood of having digital skills for female youth compared with male youth. For instance, a value of -10 indicates that female youth are 10 per cent less likely than male youth to possess digital skills. The results of the estimation show that in the vast majority of countries, gender gaps in digital skills increase for wealthier families, indicating access to the internet and digital resources does not guarantee equitable digital skills development.

It is worth noting that in countries like the Democratic Republic of the Congo, the Gambia, Ghana, Guinea-Bissau, Malawi, Nigeria, provinces of Pakistan, Togo and Zimbabwe, gender gaps in digital skills sequentially increase as households shift from the poorest to the richest wealth quintile, indicating that girls face a higher disadvantage in acquiring digital skills in wealthier families. This pattern can be explained by the overall low prevalence of digital skills among youth in poorer households, which lack access to the internet and do not have computers at home. Since the overall skills level is too low to observe the gender impacts on digital skills for these households, the true gender gaps potentially existing for all households become clearer in wealthier households. Furthermore, while the estimation model in the previous section did not capture significant differences in digital skills in countries like Cuba, Fiji, Mongolia, Samoa, Suriname, Tunisia and Viet Nam, Figure 11 demonstrates that the effect of gender tends to vary across wealth quintiles, suggesting the importance of interventions for female youth despite their socioeconomic status. For instance, adolescent girls and young women from wealthier families have around 10 per cent lower likelihoods of having digital skills in countries like Samoa, Tunisia and Viet Nam. Finally. Chad represents another interesting example with the minimal, almost non-existent gender gap in digital skills across all wealth quintiles, which is explained by the fact that the overall prevalence of digital skills among youth is just 2 per cent for males and 1 per cent for females.

In the photo, Tan Thanh Hien (left) 11 years old and her friend Tan Thi Hang (right) 11 years old, students of Bat Xat Secondary and High school in Lao Cai province, were trying the AR technology on the tablet supported by UNICEF in Viet Nam.

© UNICEF/UN0610423/Le Vu

FIGURE 11: Gender gap in digital skills: probability difference for female youth aged 15-24 in comparison to male youth aged 15-24 within the same household, by wealth quintile and country

Source: Authors' calculations based on Multiple Indicator Cluster Surveys (2017-2021), a three-level multilevel regression model with a random intercept term for household ID and a random slope term for sex by wealth quintile, using a pooled sample of females and males from the same household.

Note: Turks and Caicos Islands and Tuvalu were excluded from the within-household analysis as the sample size for female and male respondents aged 15-24 years from the same household was below 50 unweighted observations per group.

Girls in Science programme encourages STEM for girls in Kyrgyzstan

In Ak-Orgo Suburb, Bishkek in Kyrgyzstan, Gulshan, an eighth-grade student, was delighted to have been selected to participate in the Girls in Science programme, which is part of Skills4Girls and aims to empower over 15,000 adolescent girls from new settlements and rural areas in the country to advance their STEM knowledge and skills.

The programme offers mentorship, skills development and professional coaching for girls. Since Gulshan's favourite subjects in school are mathematics and computer science, she is delighted to have been given this opportunity to learn even more. As part of the project, she will also become a peer educator and role model for younger girls in her community.

Gulshan advises other girls not to be afraid of the word STEM, as she finds it "inspiring, engaging, and not scary at all." Her goal during the programme is to develop her first mobile application. She adds that in addition to providing her with knowledge and skills, the programme has also increased her confidence, helped her to show empathy to others, and encouraged her to think creatively. Now she knows what she wants to do in the future: conquer the IT sphere and create robots that will improve the quality of people's lives.

Gender bias in resource allocation within families: the case of mobile phone ownership – SDG5.b.1

Mobile phones, including smartphones, are vital tools for digital connectivity and can be transformative in people's lives. Among children, they are one of the most common ways for accessing the internet (UNICEF, 2019a). During lockdowns due to the COVID-19 pandemic, mobile devices became even more crucial, offering people a means to carry on with their daily lives, stay connected to family and friends, access vital information and services, and pursue educational and economic opportunities.

Mobile phone ownership, in particular, can provide adolescent girls and young women with greater autonomy and may be associated with improved outcomes in their well-being, including better reproductive, maternal, newborn and child health (BMJ Global Health, 2020). By facilitating connectivity, mobile technology enables individuals to maintain their jobs or income, receive necessary services like education and healthcare, search for reliable information and procure essential goods.

Previous studies have highlighted the gender digital divide in mobile phone ownership across households (GSMA, 2020b). This section goes a step further to unpack whether the gender digital divide in mobile phone ownership also exists within households. This would occur if mobile phones are unequally allocated to male and female members of the household.

There may be many reasons why this happens. For example, qualitative interviews with women and men across five states in India reveal that gender norms related to notions of adolescent girls' purity and subservience prior to marriage serve as barriers to adolescent girls' use and ownership of phones (Barboni et. al, 2018). Examining differential resource allocation within households on the basis of gender, particularly among youth, is important because unequal household investments in young people tend to carry over into adulthood (Rodríguez, 2016). Moreover, identifying who within households has access to mobile phones can help tailor interventions so that they reach the household members most in need.

Figure 12 highlights that, in all but one of 41 countries and territories included in the analysis, gender disparities in mobile phone ownership within families disfavour female youth. This means that in households with at least one adolescent boy or young man aged 15-24 and one adolescent girl or young women aged 15- to 24, the latter is less likely to own a mobile phone. The largest gender gaps are observed in the Pakistan provinces, where being female decreases the likelihood of owning a mobile phone by up to 60 per cent compared to males of the same age in the same household. These findings have significant implications, as adolescent girls and young women's limited access to mobile phones restricts their ability to access education, employment and other essential services critical for their well-being.

Amal (13, left) and Sarah (13, right) play educational games on their solar-powered tablet in the UNICEF-supported e-learning center in Jabalain, White Nile state, Sudan.
© UNICEF/UN0753327/Bos

FIGURE 12: Gender gap in mobile phone ownership: probability difference for female youth aged 15-24 in comparison to male youth aged 15-24 years within the same household, by country
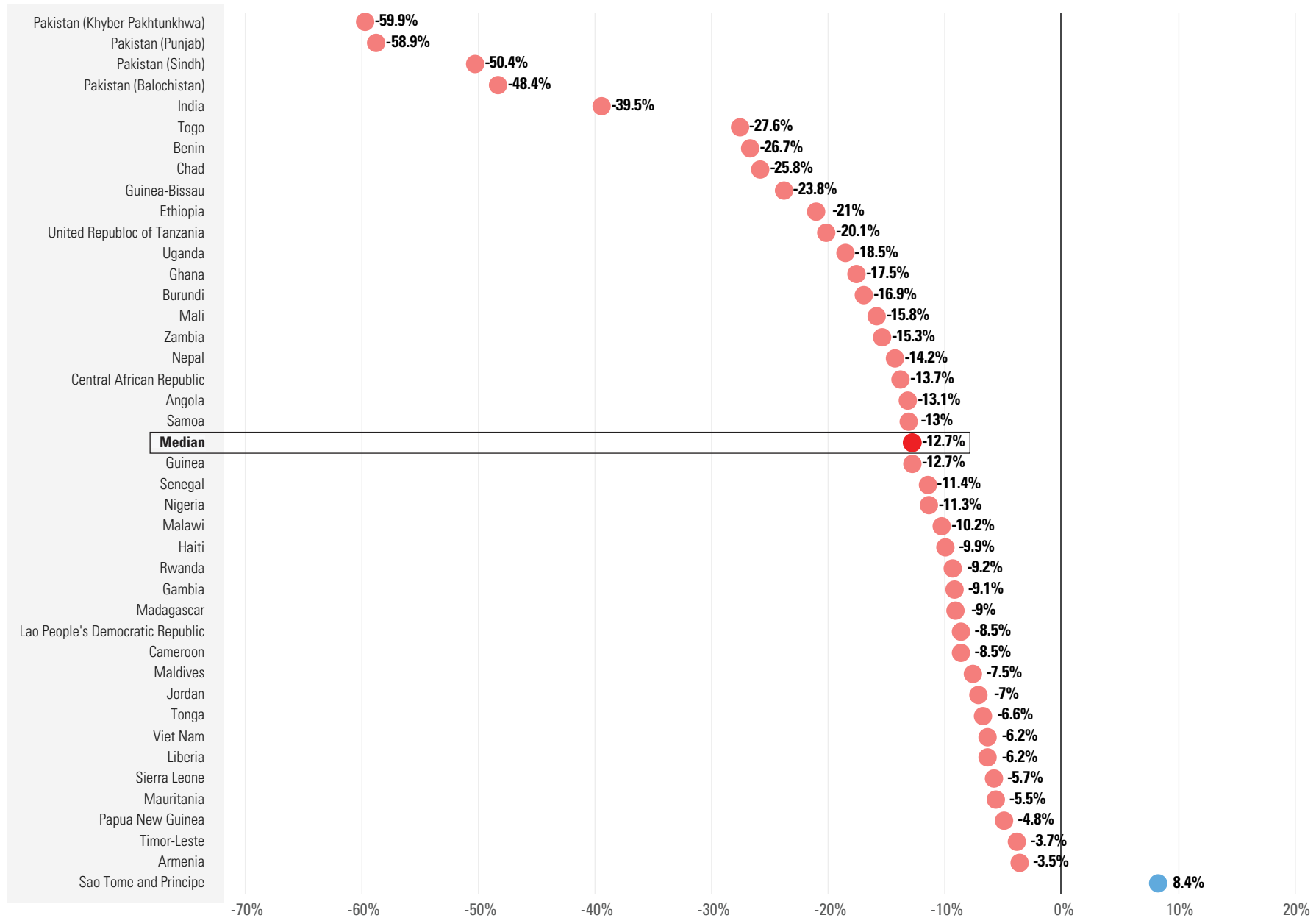
Source: Authors' calculations based on Multiple Indicator Cluster Surveys (2017-2021) and Demographic and Health Surveys (2015-2021) using fixed effect regression models with household fixed effects based on the sample of females and males belonging to the same household.

Gender inequality online is driven by gender inequality offline

The internet can provide a pathway for mitigating the gender inequality adolescent girls and young women experience offline, but gender inequality offline can also drive the gender inequality they face online. Figure 13 presents the gender parity ratio in digital skills against the level of gender inequality for each country as measured by the Social Institutions and Gender Index (SIGI). Developed by the Organization for Economic Co-operation and Development (OECD), the SIGI measures discrimination in social institutions through information on laws, attitudes, and practices across four domains: discrimination in the family, restricted physical integrity, restricted access to productive and financial resources, and restricted

liberties. Higher SIGI values indicate higher levels of gender discrimination against women and girls.

The figure reveals a negative relationship between the gender parity index for digital skills and the SIGI. This means that in countries with higher levels of gender discrimination, the gender parity index for digital skills tends to favour male youth, suggesting that fostering adolescent girls' and young women's digital inclusion must start with addressing the discriminatory laws, attitudes and practices they face offline.

FIGURE 13: Association between the OECD Social Institutions and Gender Index and the gender parity ratio in digital skills among youth aged 15-24, by country
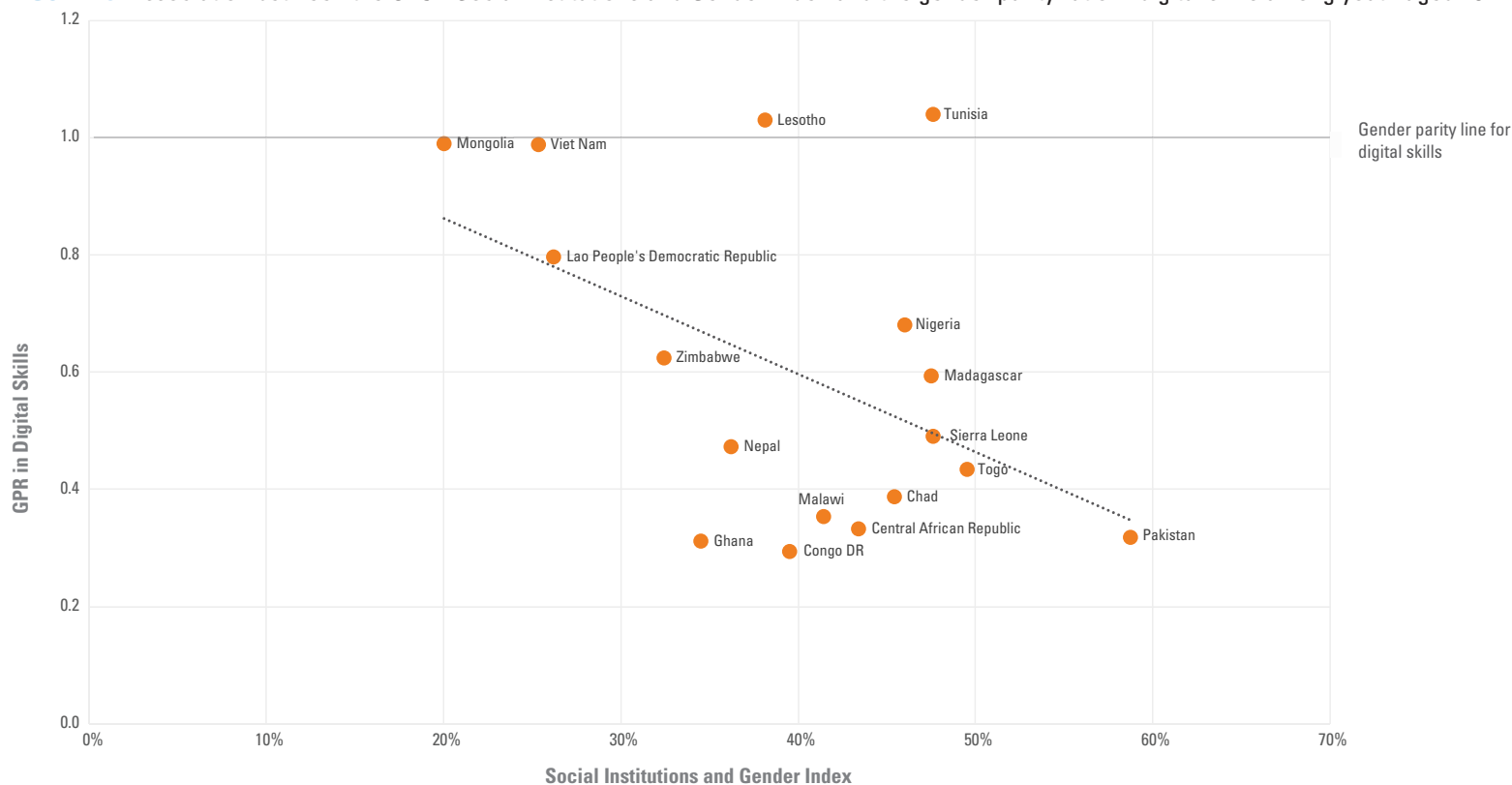
Source: Authors' calculations based on the data from the OECD SIGI (2019) and Multiple Indicator Cluster Surveys (2017-2021).
Note: Higher SIGI index values indicate higher gender discrimination against women and girls.

Improving accessibility to digital technology for girls with disabilities in India and Uganda

The digital divide grows even wider when considering girls with disabilities, as challenges to access, accessibility and usability create further barriers to digital inclusion. As a result, people with disabilities are less likely to own a smartphone than people without disabilities.

In India for example, 40 per cent of men without disabilities owned a smartphone, compared to just 5 per cent of women with disabilities (GSMA, 2020a). And in Uganda, more than two-thirds of women with disabilities surveyed did not believe a mobile phone's content, products or services were relevant for them. As a result, these women are missing out on many of the benefits that mobile phones could bring, including the potential to act as assistive products, such as a screen reader or message transcriber, that can improve the functioning of people with different types of impairments.

Digital skills education programs that help people with disabilities understand how to use smartphone accessibility features could greatly increase their tendency to use these devices to enhance their lives.

An urgent call for action

Despite perceptions that younger generations use and understand digital technologies more than older adults, this is not a universal truth. This report highlights that a majority of youth aged 15-24 in low- and middle-income countries are not connected to the internet, have limited digital skills and do not own a mobile phone. But the challenges to adolescent girls' and young women's digital inclusion are even greater. As this report reveals, 9 out of 10 adolescent girls and young women in low-income countries are offline.

Moreover, even within the same household, adolescent girls and young women have less access to digital technologies and the internet and fewer skills to navigate them to their full potential than their male counterparts, suggesting the pervasiveness of gender biases that restrict girls' and women's digital inclusion and skills development. Bridging the gender digital divide – within and between households – and ensuring that adolescent girls and young women can succeed in an increasingly global, digital and hyperconnected world requires multiple efforts, including:

Ensuring equitable access to the internet in schools, community youth centers, and at home to promote digital inclusion, including the provision of low-cost devices to marginalised communities

Ensuring that every young person has reliable access to the internet regardless of their or where they live should be a top priority. This is especially true in low-income countries where only 22 per cent of male youth and 10 per cent of female youth use the internet. But getting youth, particularly adolescent girls and young women, online entails more than expanding broadband access in households and placing modems in schools. As the findings in this report demonstrate, in regions with higher shares of internet use among youth, such as in South Asia, the gender gap actually widens. Moreover, the gender gap in digital skills also widens in wealthier households. This suggests that ensuring connectivity must go hand-in-hand with strategies to eliminate the gender gap in internet use. Furthermore, it is essential to promote context-specific technology and digital solutions within indigenous communities while accounting for the lived realities of such communities, for instance, teachers with limited or low digital skills, lack of appropriate infrastructure, or insufficient numbers of schools with digital tools.

To address these issues, UNICEF and ITU are working to connect every school to the internet by 2030 through the Giga initiative, as well as engaging key stakeholders with evidence-based social behaviour change programming to shift pervasive beliefs that internet access – and digital skills and technology more broadly – is a male-only privilege. Additionally, UNICEF is ensuring that its digital learning platforms such as the Learning Passport are linked to community engagement and parenting initiatives that shift social norms and promote girls' access to ICT and education. Social protection and other programmes can be designed to ensure low-cost devices get in the hands of young women and girls, especially those in the most marginalised communities.

Equipping schools to build boys' and girls' digital skills equally, with context-specific analyses of barriers to girls' skills acquisition in school and the consideration of girl-targeted after-school IT clubs or other modalities that address their exclusion

While providing access to the internet and digital technologies is a crucial first step, it is insufficient for ensuring meaningful digital participation. Adolescents and young adults in low- and middle-income countries need to master digital skills, starting from the most basic ones, such as copying a file or adding an attachment to an email, to more complex skills, such as performing calculations in a spreadsheet or preparing electronic presentations, to better prepare them for the increasingly digital world of work. In low-income countries, school is often the first place where children are exposed to, and have the opportunity to develop, these skills. Moreover, as digital technologies become core to school curricula in the wake of the COVID-19 pandemic, it is crucial that girls and boys have the digital skills to benefit equally from them to advance their learning.

However, it is not enough to simply send girls and boys to school and assume they will equally develop digital skills. Challenging gender stereotypes, educators should proactively engage and connect girls to lessons that build their digital literacy and promote online safety. Moreover, developing digital skills should not be standalone initiatives, but rather should be part of a comprehensive plan grounded in proven strategies. This includes tailored mentorship, safe learning environments, and integrating digital skills-building into literacy, numeracy, and life skills curricula. Girl-focused and girl-only digital and STEM skills-building programmes may be appropriate in some contexts, to ensure girls get the skills they need, whilst training of teachers and counsellors and adaptation of curricula may be needed to address and counterbalance gender biases.

UNICEF's Reimagine Education, a global initiative on digital learning and skills which aims to enable every child and young person (3.5 billion individuals by 2030) to access world-class digital learning solutions, is integral to the effort to engage schools as a place for digital learning. UNICEF's Skills4Girls programme is reaching six million girls in 22 countries with girl-centred packages of skills programming, including life skills, vocational skills and STEM skills.

Supporting adolescent girls and young women to develop digital skills out of school, including **offering digital skills training at safe spaces and community centres** catering to girls and young women

Adolescent girls and young women must be provided with opportunities to develop, and practice, digital skills outside of school, as well. Digital skills training targeted at and for girls via after-school clubs, safe spaces, community centres, summer camps and other fora have all been shown to be effective, especially in combination with mentoring. Moreover, such modalities are often critical to the acquisition of advanced skills, such as the ability to code.

Adolescent girls and young women must be supported to develop advanced digital skills so that they can create online content and digital technologies that reflect their lived experiences and that are devoid of gender bias. For example, with the support of UNICEF and partners, girls have co-created Oky, the world's first menstruation tracker app created by and for girls. UNICEF is also teaming up with gaming and tech experts to launch the Game Changers Coalition to equip a generation of girls with the skills and experiences to become the coders, designers, and leaders of a more inclusive, diverse, and safer video game industry. Through this initiative, girls are not only developing advanced digital skills for the gaming industry, but also skills transferrable to other industries within and beyond the STEM sector.

Ensuring adolescent girls' and young women's safety online, including through virtual safe spaces, strong safeguarding policies and the strengthening of laws and partnerships with government and the private sector to address online violence of all kinds

While digital spaces offer new opportunities for adolescent girls and young women, they also generate new ways to harm them and to amplify existing forms of abuse. Although all internet users are at some risk, and data gaps preclude comprehensive analysis of online and technology-facilitated violence, evidence suggests that when women and girls access the internet, they face online violence, such as physical threats, cyber-stalking and sexual harassment more often than men and boys (UN Women, 2020).

Because internet users with limited digital skills are at increased risk of online violence, equipping adolescent girls and young women with knowledge and skills for navigating the internet and using digital devices safely is essential. But the onus to stay safe cannot be placed on women and girls. Governments must introduce and implement legal and regulatory frameworks to address online and technology-facilitated violence that ensure protection from harm while not restricting opportunities for positive engagement with the digital environment. Parents need to be empowered to enable safe internet access for their children, and technology companies must apply their expertise and capacity for innovation to design solutions to mitigate online and technology-facilitated violence. The WeProtect Global Alliance, a public-private partnership to combat online child sexual exploitation and abuse, is one promising example.

It is critical that all stakeholders step up to address the stark set of issues around adolescent girls' and young women's safety online. This includes providing virtual safe spaces, developing strong safeguarding policies platform-by-platform, strengthening laws and partnerships with governments and the private sector to address online violence of all kinds, including gender-based violence (such as sexual extortion, cyberstalking and cyber flashing), and provision of training/education to support the online safety of children, adolescent girls and young women.

Promoting positive gender socialization around girls' digital inclusion within families and investing in evidence-based action to address the harmful gender norms that continue to underpin the many barriers to digital access, internet usage and skills acquisition faced by adolescent girls and young women

Parents, caregivers and families are the primary agents of socialization in the early years of children's development and often inadvertently perpetuate gender biases within households through differentiated messages, methods of care and allocation of resources for girls and boys. For example, parents and caregivers who fear that the internet is unsafe for adolescent girls and young women may restrict or control their access to digital technologies while allowing boys and young men to engage online (USAID, 2022).

The analyses presented in this report show that within the same households, adolescent girls and young women are less likely to own mobile phones – one of the most common ways to go online – and less likely to possess digital skills than adolescent boys and young men. While the findings are unable to pinpoint the specific mechanisms that drive these discrepancies, they suggest that with the right support, families can play a pivotal role in bridging the gender digital divide within households. For example, digital literacy programmes for families that emphasize the benefits of adolescent girls' and young women's digital inclusion can foster more positive perceptions of digital technologies among parents. Likewise, introducing safeguards and controls that mitigate the risks of harm online may shift parental beliefs and behaviours away from practices that restrict adolescent girls' and young women's digital engagement. UNICEF's Skills4Girls Programme fosters family support for girls' sustained participation in literacy and numeracy classes, entrepreneurship training and digital skills relevant to STEM-related fields.

Invest in sex-disaggregated data collection in low- and middle-income countries to **monitor progress in gender-equitable digital inclusion** at the global, regional and country level

While the findings presented in this report provide the most comprehensive analysis of gender gaps in internet use and digital skills among youth to date, expanded data collection is needed to fully monitor national, regional and global progress in digital inclusion as outlined by the 2030 Sustainable Development Agenda. Where data are absent, countries should commit to measuring internet use and digital skills in nationally representative household surveys, and all countries should aspire to collect these data for younger adolescents aged 10-14 given that children are growing up in an increasingly connected world.

At the same time, complementary indicators and corresponding data collection, both quantitative and qualitative, are needed to better understand the barriers to adolescent girls' and young women's meaningful digital inclusion as well as to ensure their privacy and protection in the digital landscape. Adolescent girls and young women need to be front-and-centre in these efforts as they know intimately the barriers they face and are best placed to inform efforts to ensure that the digital world does not leave them behind.

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Learning Passport opens doors in a refugee camp in Jordan

Despite having to flee violent conflict and live in the Azraq Refugee Camp with her nine family members, 19-year-old Amani has always loved education. Resisting pressures to marry early like her sisters, Amani remained steadfast in her commitment to getting an education and graduated from high school with high marks.

Now, thanks to UNICEF's Learning Passport, Amani is part of a programme that uses smartphones to provide education for displaced and refugee children and encourages high school graduates like her to continue their education. In addition to English courses and digital literacy content, the Learning Passport platform also provides content created specifically for girls, such as promoting gender equality in STEM, preventing gender-based violence, and comprehensive sexuality education.

For Amani, the platform "changed everything for us" and facilitated her enrollment in university, where she's currently pursuing her degree in nursing. She's looking for the platform to evolve along with her, and to include more healthcare courses.

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Straight Talk Foundation (STF)Õs Junior Journalist Ikedu Esther Aremo in Kaabong District exploring the digital life skills website to meet with digital livelihood challenges in their community, especially during the COVID-19 lock down. The digital livelihood challenge and training is part of Irish Aid funded interventions for young people in partnership with UNICEF, implemented by Straight Talk Foundation (SFT). Through the programme, the young people have been empowered with life skills for a better future.

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Methodology note

The findings presented in this report are based on a statistical analysis of household survey data from 54 countries, primarily Multiple Indicator Cluster Surveys and Demographic and Health Surveys, from the period of 2015 onward, with a modal year of 2020. This report focuses on youth aged 15-24 years old, consistent with the Sustainable Development Goals' definition of this demographic. The use of household survey data was indispensable for conducting an equity analysis and understanding the extent to which internet use, digital skills, and mobile phone ownership are influenced by gender, controlling for various factors such as age, wealth, area of residence, and educational attainment.

To produce regional estimates of internet use, population-weighted averages were used, with country-level data being weighted by the total size of the youth population. Estimates were produced for UNICEF regions and World Bank country income groups where data were available to cover at least 50% of the total youth population.

To explore gender differences in digital skills and mobile phone ownership within households, this report employed regression models that incorporated household fixed effects.

Furthermore, the sample size was limited to households where at least one male and female aged 15-24 were present. By focusing on within-household differences, the report provides a nuanced understanding of the impact of gender on digital skills acquisition and mobile phone ownership. The fixed effect models also controlled for educational attainment and for age using dummy variables, as factors that vary between individuals from the same household. The use of fixed-effect regressions for each country separately provides robust and country-specific results that enable a comparative analysis of the influence of various factors on digital skills and mobile phone ownership.

To investigate the interaction of gender and wealth quintiles on digital skills within households, this report used a multilevel (mixed effects) model. This model was based on a pooled dataset of youth aged 15-24 from the same household across all countries. The model included a random intercept term for household ID and a random slope term for sex by wealth quintile. This approach enables a comprehensive understanding of the impact of wealth quintiles on the relationship between gender and digital skills, and mobile phone ownership.

Data Table

Country/Territory	Internet Use: Females 15-24 Years Old	Internet Use: Males 15-24 Years Old	Mobile Phone Ownership: Females 15-24 Years Old	Mobile Phone Ownership: Males 15-24 Years Old	Survey Source	Survey Year
Angola	27%	48%	48%	62%	DHS	2015-16
Armenia	94%	96%	96%	98%	DHS	2015-16
Benin	9%	25%	39%	63%	DHS	2017-18
Burundi	6%	19%	21%	37%	DHS	2016-17
Cameroon	31%	46%	55%	66%	DHS	2018
Central African Republic	2%	6%	17%	30%	MICS	2018-19
Chad	1%	7%	27%	57%	MICS	2019
Congo, Democratic Republic of the	6%	20%	29%	43%	MICS	2018
Cuba	54%	47%	77%	75%	MICS	2019
Ethiopia	7%	16%	33%	51%	DHS	2016
Fiji	85%	86%	63%	65%	MICS	2021
Gambia	43%	56%	65%	72%	MICS	2018
Ghana	19%	39%	55%	63%	MICS	2017-18
Guinea	23%	39%	65%	75%	DHS	2018
Guinea-Bissau	15%	34%	54%	76%	MICS	2018-19
Haiti	35%	48%	49%	59%	DHS	2016-17
Jordan	84%	89%	87%	85%	DHS	2017-18
Kiribati	61%	54%	49%	46%	MICS	2018-19
Lao People's Democratic Republic	44%	41%	76%	80%	MICS	2017
Lesotho	54%	47%	80%	76%	MICS	2018
Liberia	28%	45%	39%	45%	DHS	2019-20
Madagascar	11%	14%	30%	37%	MICS	2018
Malawi	7%	21%	25%	37%	DHS	2015-16
Maldives	93%	94%	90%	92%	DHS	2016-17
Mali	20%	42%	58%	73%	DHS	2018

Country/Territory	Internet Use: Females 15-24 Years Old	Internet Use: Males 15-24 Years Old	Mobile Phone Ownership: Females 15-24 Years Old	Mobile Phone Ownership: Males 15-24 Years Old	Survey Source	Survey Year
Mauritania	41%	48%	68%	71%	DHS	2019-21
Mongolia	90%	83%	87%	81%	MICS	2018
Nepal	51%	69%	74%	84%	MICS	2019
Nigeria	22%	34%	46%	55%	MICS	2021
Pakistan (Balochistan)	4%	19%	21%	68%	MICS	2019-20
Pakistan (Khyber Pakhtunkhwa)	7%	35%	21%	75%	MICS	2019
Pakistan (Punjab)	15%	36%	23%	75%	MICS	2017-18
Pakistan (Sindh)	11%	31%	26%	71%	MICS	2018-19
Papua New Guinea	20%	25%	35%	41%	DHS	2016-18
Rwanda	17%	29%	41%	48%	DHS	2019-20
Samoa	56%	78%	59%	73%	MICS	2019-20
Sao Tome and Principe	46%	71%	59%	46%	MICS	2019
Senegal	51%	56%	60%	69%	DHS	2019
Sierra Leone	9%	11%	42%	51%	MICS	2017
South Africa	62%	63%	85%	81%	DHS	2016
Suriname	84%	87%	87%	90%	MICS	2018
Timor Leste	36%	40%	66%	67%	DHS	2016
Togo	13%	24%	46%	60%	MICS	2017
Tonga	79%	90%	68%	79%	MICS	2019
Tunisia	71%	77%	91%	92%	MICS	2018
Turks and Caicos Islands	98%	99%	97%	100%	MICS	2019-20
Tuvalu	87%	90%	80%	85%	MICS	2019-20
Uganda	12%	32%	33%	51%	DHS	2016
United Republic of Tanzania	12%	24%	41%	53%	DHS	2015-16
Viet Nam	92%	89%	92%	87%	MICS	2020-21
Zambia	15%	30%	43%	54%	DHS	2018-19
Zimbabwe	27%	32%	57%	55%	MICS	2019

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