Edinburgh Napier
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School of Computing,
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Computing in Contemporary Society

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The Digital Divide

Lecture three

Jyoti Bhardwaj

Last lecture

- We examined several schools of ethical thinking which guide how we behave morally and how we view technology

This lecture

- We explore relationship between technology and society, focusing on the digital divide and reasons for digital exclusion, both globally and in the UK

This week's reading

- Read "Nearly half of UK families excluded from modern digital society, study finds", newspaper article from March 2024
- Read "Kerala is rolling out free broadband for its poorest citizens," Guardian article from June 2023
- Visit Good Things Foundation the UK's biggest digital inclusion charity
- Visit the Lloyds Bank UK Consumer Digital Index 2024

This week's lecture is about

- The global digital divide
- Digital exclusion around the world
- Difference in access speeds
- The digital skills divide in the UK

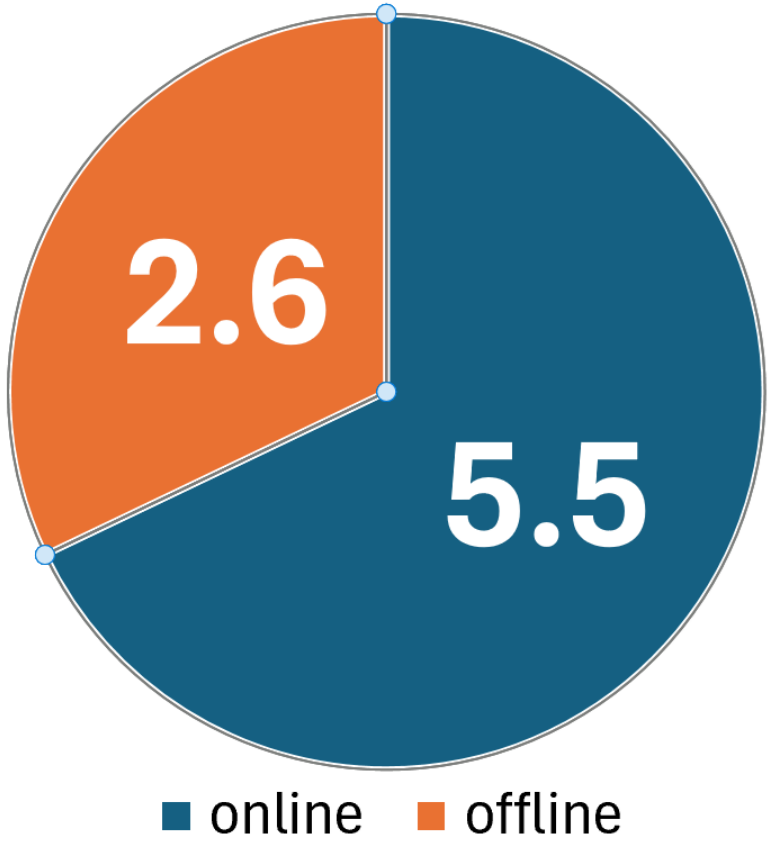
The global digital divide

- Tavani (2016) offers a working definition: “The perceived gap between those who have and do not have access to “information tools” and between those who have and do not have the ability to use those tools”
- Rooks and Weckert (2007) described it as a “notoriously muddy term”, implying that the gap is troubling
- Suggests there are many “divides”:

–between nations (global digital divide) and within nations

–between rich and poor, educated and less educated, people with and without disabilities, men and women

Fig 1: Number of people in the world offline and online in 2024, in billions (ITU, 2025)



- Between 2005 and 2019, the number of Internet users grew on average by 10% every year, with a pandemic boost
- The rising trend masks rising inequality between the developed and less developed world
- 96 per cent of the 2.6 billion people still offline are living in the developing world (all figures from ITU, 2025)

Fig 2: Individuals using the internet (ITU, 2025)

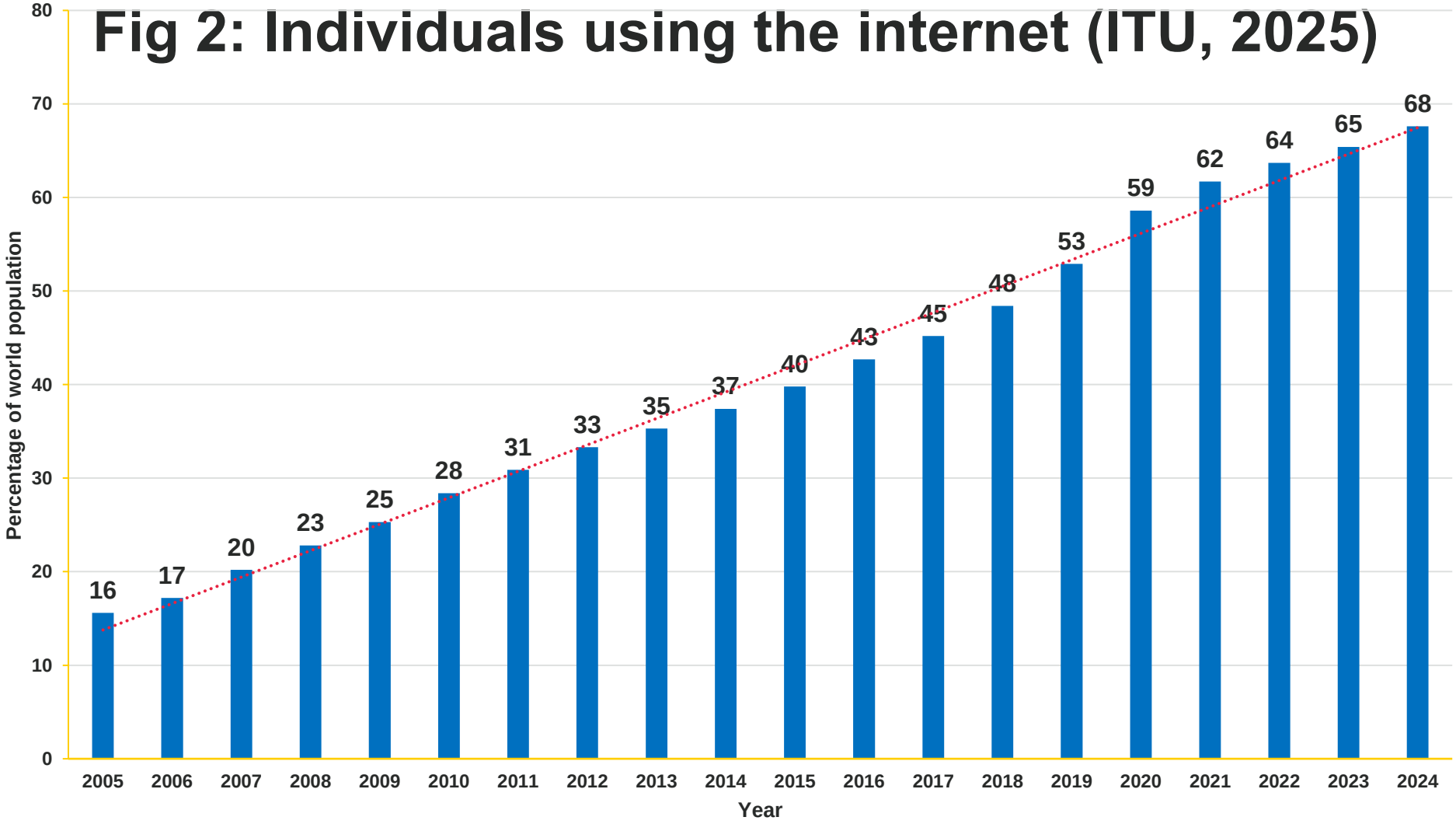
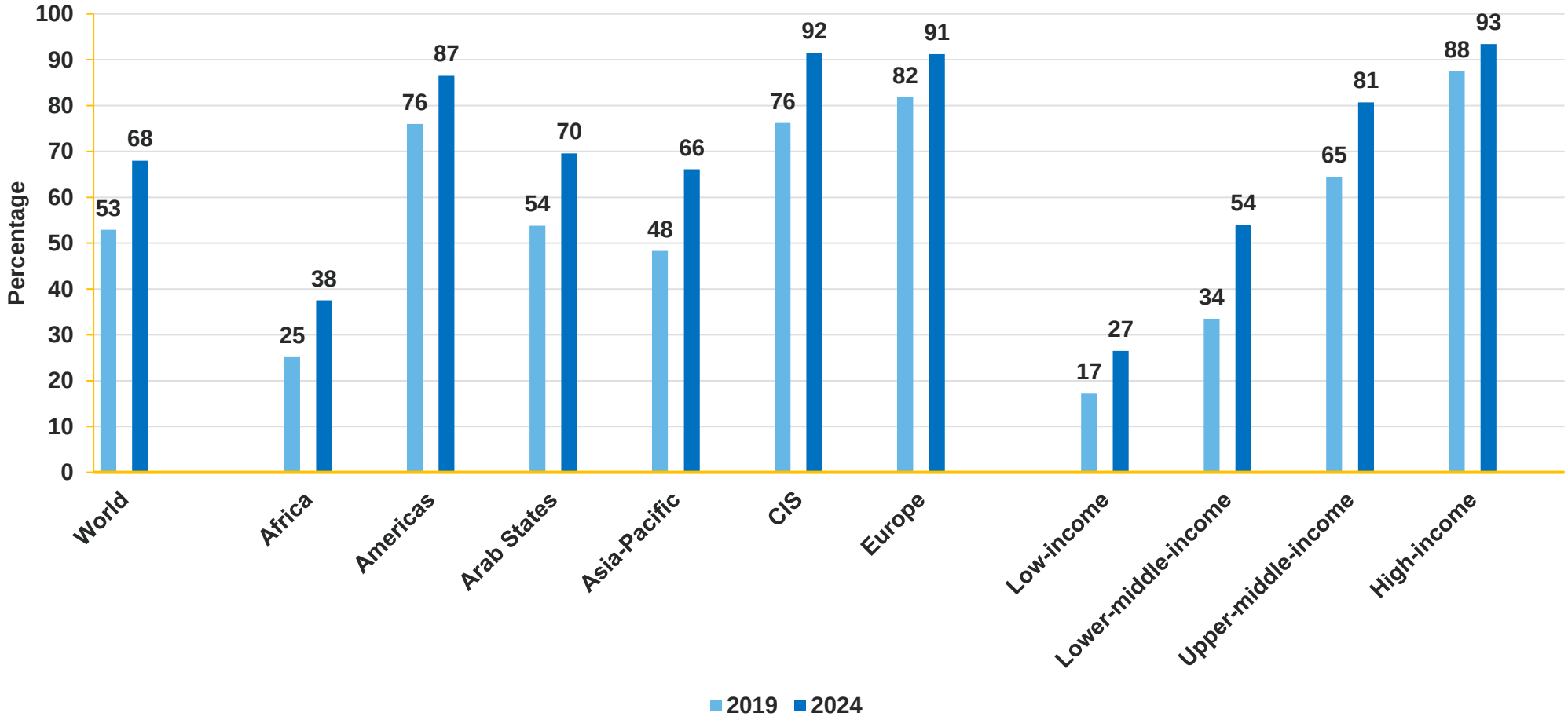


Fig 3: Percentage of individuals on the Internet, by geographical area and country's income (ITU, 2025)



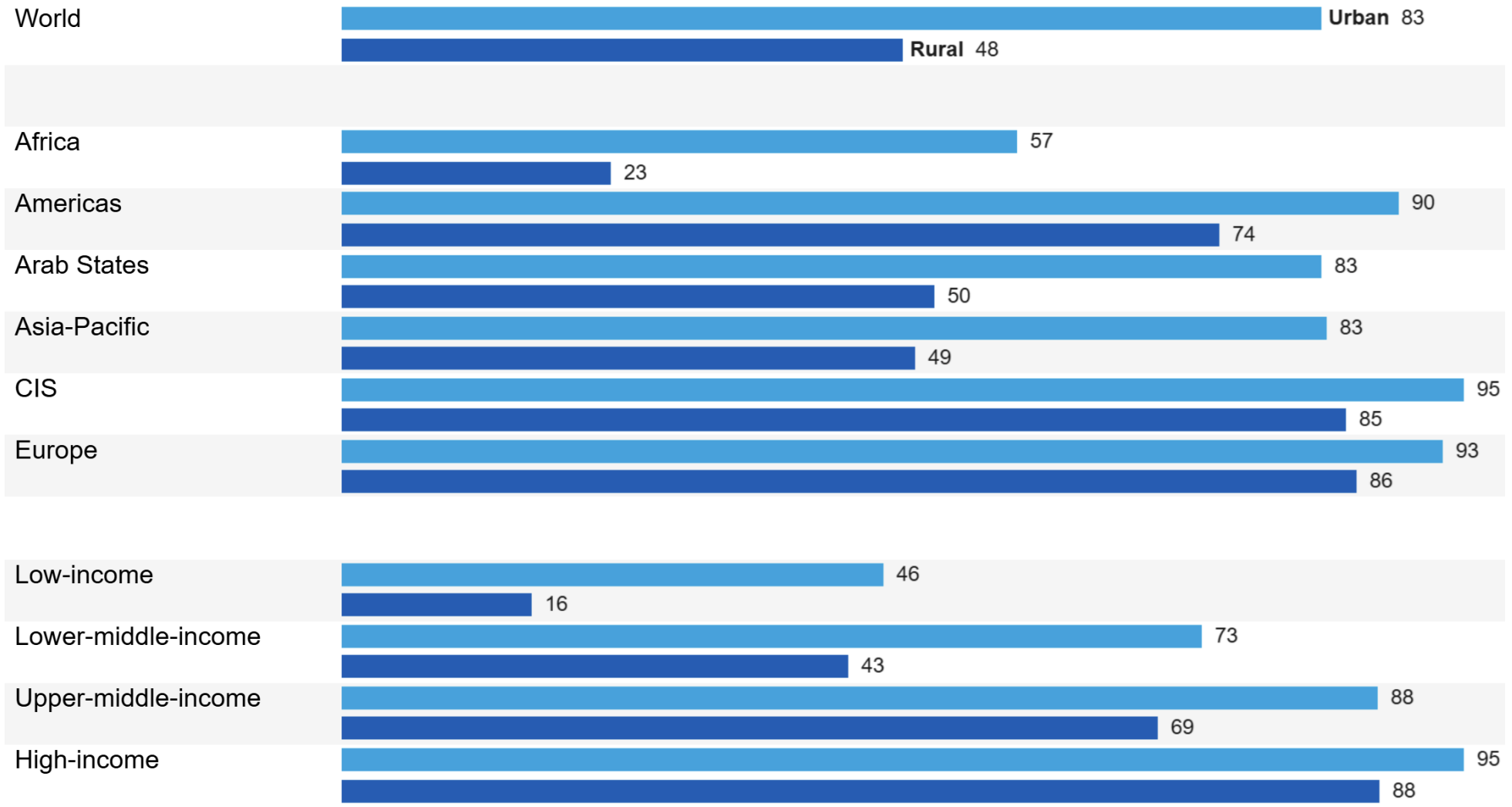
Trends in global internet usage

- After years of steady growth, numbers rose considerably during a “pandemic boost” in 2020 and 2021; however, this was short-lived
- Inequality between the developed and less developed world means some users are rarely able to be online
  - Poor connectivity and slow speeds
  - Intermittent access to electricity
  - Access is more expensive as a proportion of earnings
- The **digital gender gap** is growing fast in developing countries

The urban vs rural digital divide

- It is more expensive to convey the Internet to the scattered population in rural areas because of the high cost of infrastructure used for long distances, such as fibre optic cabling
- Despite the sharp rise in internet usage during the Covid-19 pandemic, the urban-rural gap remains **severe** (globally 83% of urban dwellers compared to 48% of rural inhabitants) in 2024
- Even in Europe, 86% of rural dwellers against 93% of urban dwellers use the internet, often with much poorer speeds

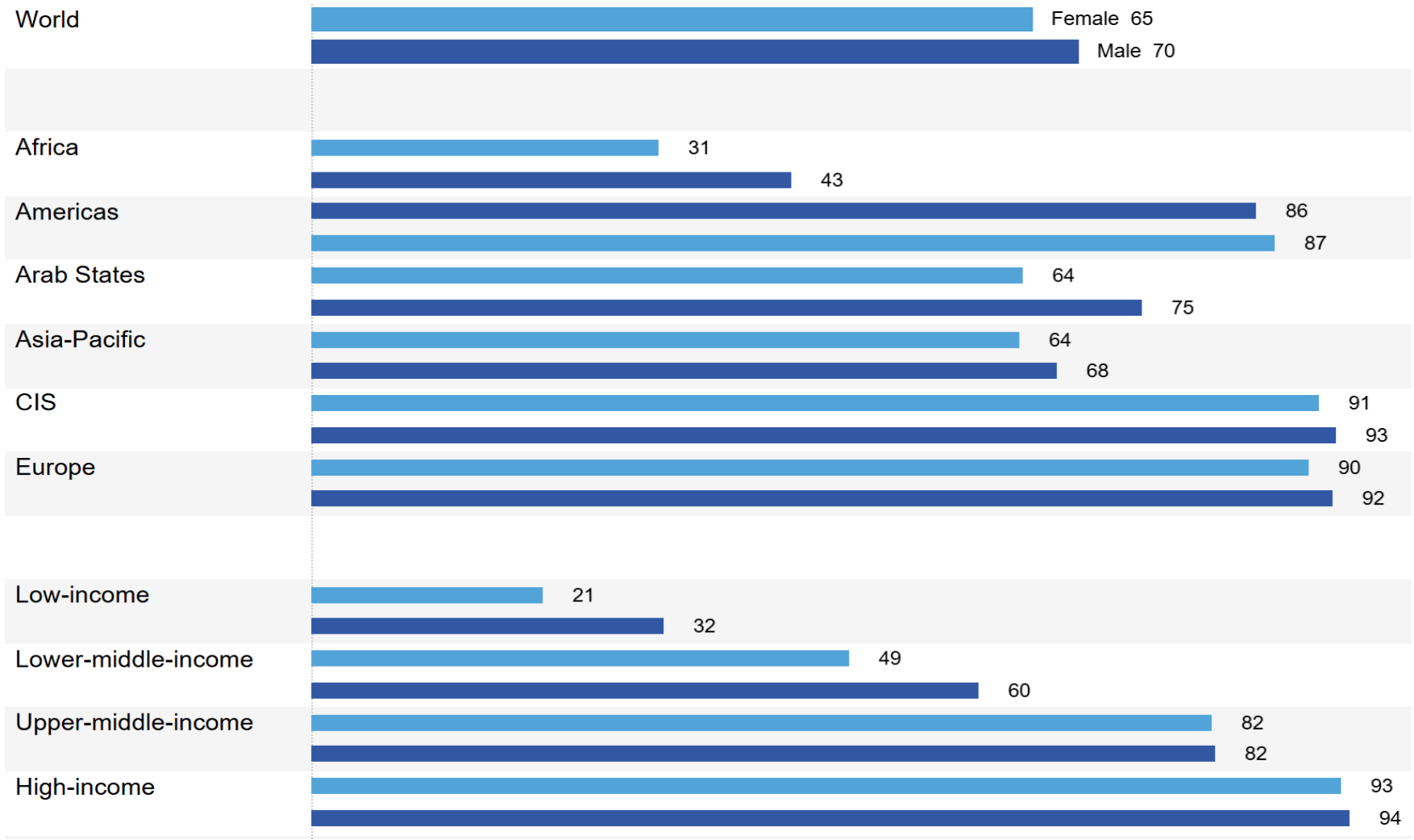
Fig 4: Percentage of individuals using the internet in urban and rural areas, 2024 (Source: ITU, 2025)



The digital gender gap

- The proportion of women using the Internet globally is 63%, compared to 69% of men
- The gap is small in developed countries (92% vs 93%), larger in developing countries, most in Least Developed Countries (21% vs 32%)
- The proportion of women using the Internet is higher than that of men in only 8% of countries, while gender equality in Internet use is found in just over one-quarter of countries
- In the Arab States, Asia and the Pacific, and Africa, the gender gap has been growing

Fig 5: Internet penetration rate for men and women, 2024 (Source: ITU, 2025)



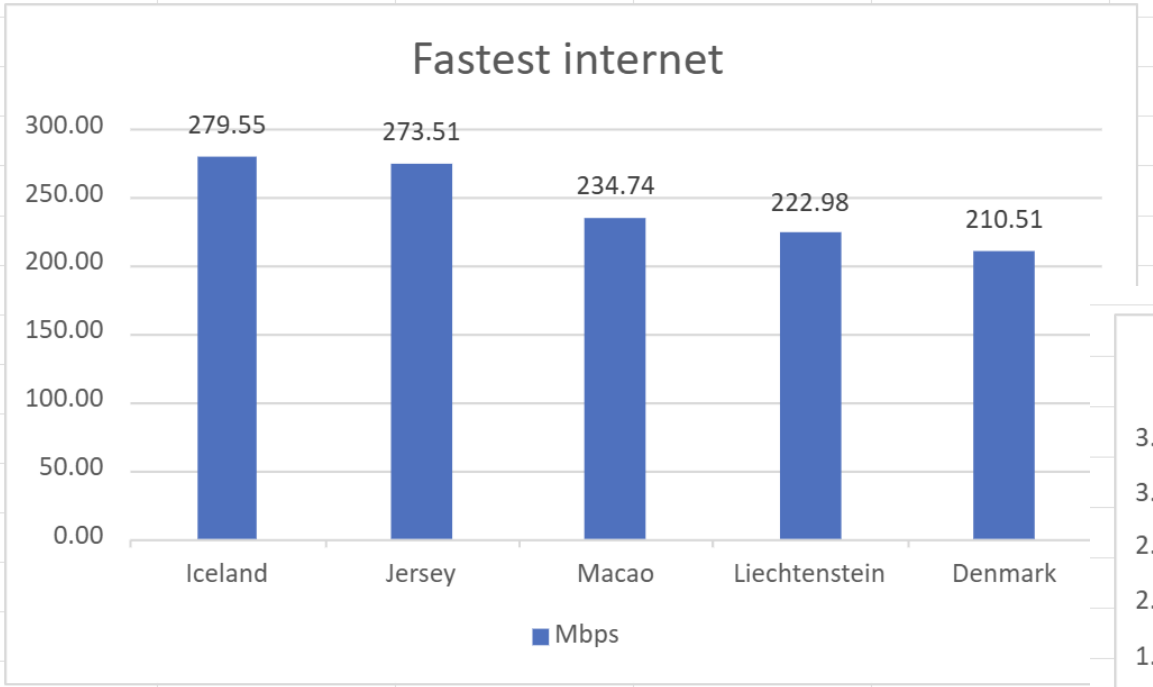
Lack of skills a barrier to internet use

- A major barrier to accessing information on the web is illiteracy
- Another important barrier in the effective use of the Internet is a lack of ICT skills
- In 40 out of 84 countries for which data are available, less than half the population possesses basic computer skills such as copying a file or sending an e-mail with an attachment
- For more complex activities (classified as “standard skills”), such as using basic arithmetic formulae in a spreadsheet or downloading and installing new software, the proportions are even lower

Growth in global internet speeds

- **Average global broadband download speed** measured from 9 May 2018 to 8 May 2019 was 11.03Mbps
- Average speed in 2020 was 24.83 Mbps (first pandemic year)
- Average speed in 2021 was 29.79 Mbps
- Average speed in 2022 was 35.98 Mbps
- Average speed in 2023 was 46.79 Mbps
- Latest average global broadband speed in 2024 is 55.38 Mbps
- **But** fixed and mobile broadband speeds vary wildly between nations!

Fig 6: The fastest and slowest countries for broadband speed, 2024



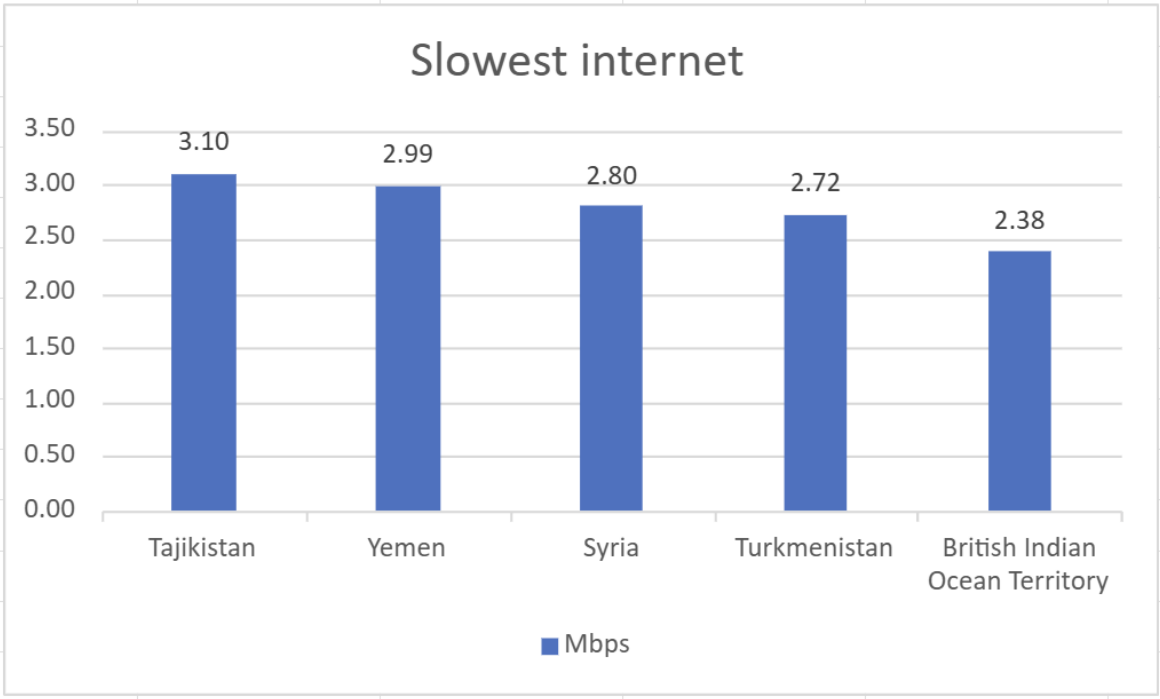


Fig 7: Countries with fastest internet speeds, 2024

- Interactive map of World broadband speeds 2023

#1. Iceland

In 2020, Iceland became the top country in Europe for Full Fibre penetration, and provides speeds of at least 100Mbps to 99.9% of its population. It moves into the top position from fourth place last year.

#2. Jersey

Jersey was the first jurisdiction in the world to make pure fibre (FTTP) available to every broadband user. Jersey Telecom now offers all of its population download speeds of up to 944Mbps.

#3. Macau

Macau has remained in third place this year, with little significant increase in its average network speeds, indicating take-up saturation of current infrastructure.

#4. Liechtenstein

99% of Liechtenstein's population are internet users, and, as a result of its small geographical area, the country enjoys excellent broadband infrastructure with high speeds for all.

Good Things Foundation

DIGITAL NATION UK 2024

FACTS & STATS TO FIX THE DIGITAL DIVIDE FOR GOOD

SCALE OF THE DIGITAL DIVIDE

3.7m FAMILIES ARE BELOW THE MINIMUM DIGITAL LIVING STANDARD

8.5m LACK BASIC DIGITAL SKILLS

2.4m HOUSEHOLDS CAN'T AFFORD THEIR MOBILE PHONE CONTRACT

7.5m WORKING AGE ADULTS LACK BASIC DIGITAL SKILLS FOR WORK

0.6m YOUNG PEOPLE LACK HOME INTERNET OR A SUITABLE DEVICE

1.5m DON'T HAVE A SMARTPHONE TABLET OR LAPTOP

5000 COMMUNITY ACCESS POINTS THE NATIONAL DIGITAL INCLUSION NETWORK

OUR CHANGING DIGITAL WORLD

Health

33% of those offline say its difficult to interact with NHS services

39% of UK adult population not registered on NHS App

50% higher food costs without internet access

Money

Banking takes **1.5 hrs** longer without an internet connection

4m+ older people are not managing their money online

Work

92% of UK businesses say there is a digital skills gap

40% of jobs will be affected by AI, worldwide

Internet

33% unaware of local access point for device access or internet connection

8% of eligible households signed up for social tariff

PEOPLE LEFT BEHIND lack basic digital skills

24% of those **not working**

25% of those with a **disability or health condition**

48% of those with **no formal qualifications**

37% of those **over 65**

WHAT THE PUBLIC THINK

64% believe there's **NOT ENOUGH SUPPORT** for people who **can't get online**

92% think most **ESSENTIAL SERVICES** require **internet access**

76% want **GOVT INVESTMENT** in **digital skills training**

21% feel **LEFT BEHIND** by **technology**

DEVICES

NATIONAL DEVICE BANK

CONNECTIVITY

NATIONAL DATABANK

CAPABILITY

CONFIDENCE

Learn My Way

NATIONAL DIGITAL INCLUSION NETWORK

TRUST

Good Things Foundation

#FixTheDigitalDivide

46k devices collected to date

CO_2 saved equivalent to **328k trees**

DIGITAL INCLUSION BENEFITS

as a result of support

£13.7 billion BENEFIT TO THE ECONOMY

I'm happier
76% say the internet helps them connect with family and friends

I'm more employable
68% saw a work or skills related benefit

I'm healthier
68% can use online tools to help them manage their health

I'm better off
People with high digital engagement save £900 more a year

Sources include: Lloyds Consumer Digital Index, Ofcom and Good Things Foundation data.
Full sources at: www.goodthingsfoundation.org/DigitalNation

Fig 9: UK Government Essential Digital Skills Framework

Table 1: Foundation Level Tasks Summary (Lloyds Bank, 2024)	No, I can't do this task	% cannot do
I can turn on the device and enter any account login	733,000	4%
I can use the available controls on my device (e.g. mouse, keyboard, touchscreen)	634,000	4%
I can use the different settings on my device to make it easier to use (e.g. adjust font size, volume, brightness)	977,000	7%
I can find and open different applications/programs/platforms	906,000	5%
I can set up a connection to a Wi-Fi network on my devices (e.g. when at home, work, out in public, visiting friends)	1,188,000	8%
I can open an Internet browser to find and use websites	693,000	4%
I can keep my login information and passwords for a device and any accounts secure	980,000	7%
I can update and change my password when prompted	864,000	6%

Foundation (most basic) digital skills

- In the UK today, 15% of adults aged 18+ are without the Foundation Level (i.e. they are either digitally disengaged or have Partial Foundation Level)
- Profiles of the digitally disengaged have demonstrated that those most likely to be in this group are:
  - Older individuals
  - Those living alone
  - People with lower levels of education
  - Those with impairments

Tables 2, 3: Demographics of foundation skills

	Social grade					
	AB	C1	C2	DE	ABC1	C2DE
Total	**26%**	**27%**	**20%**	**22%**	**53%**	**42%**
Has the Foundation Level (8 tasks)	28%	29%	20%	19%	57%	39%
On the cusp of Foundation Level (6-7 tasks)	21%	18%	22%	34%	39%	56%
Has partial Foundation (1-7 tasks)	18%	17%	21%	38%	35%	59%
Has no Foundation (0 tasks)	4%	17%	25%	46%	21%	72%

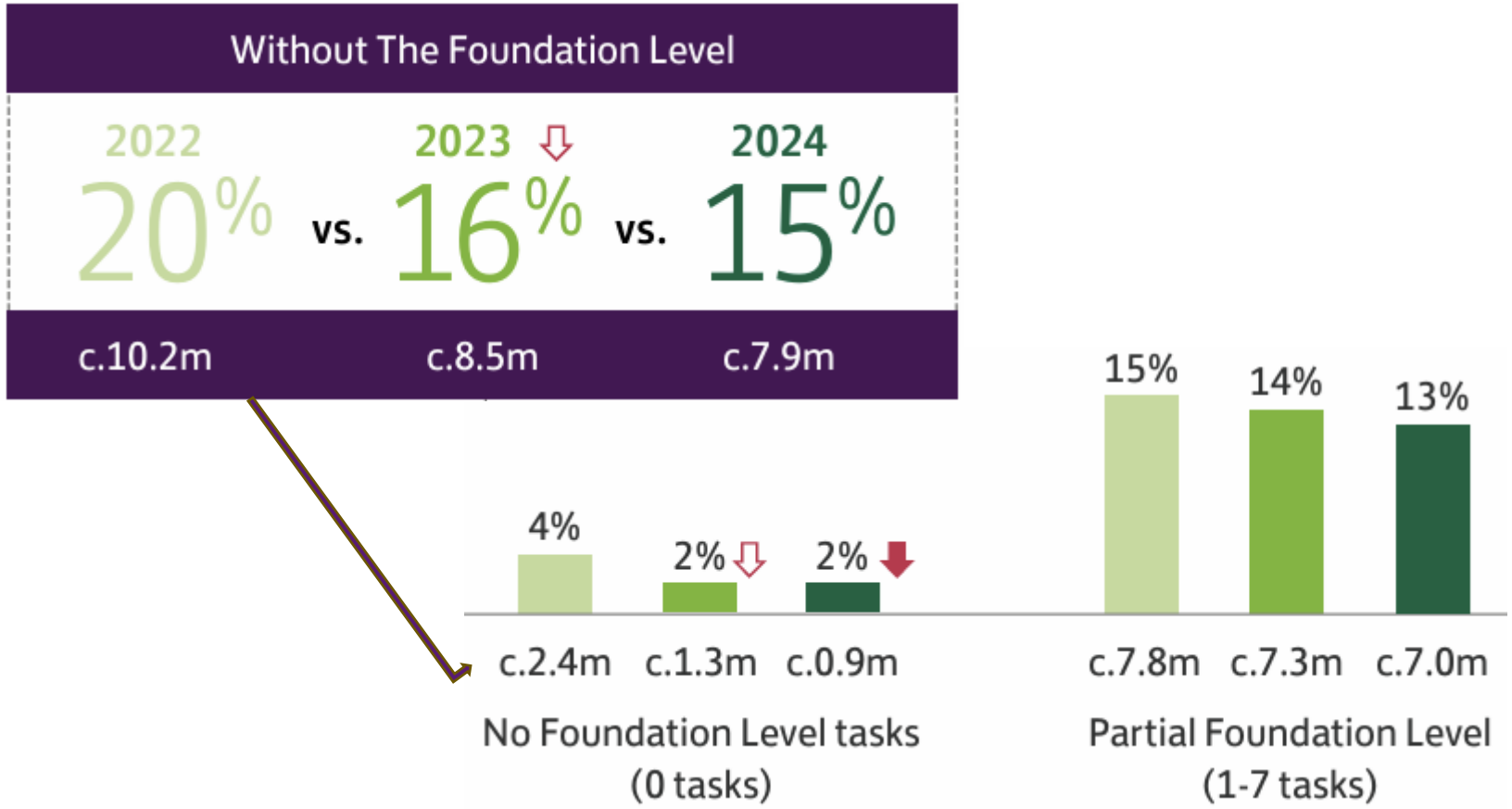
	Gender		Age						
	Male	Female	18-24	25-34	35-44	45-54	55-64	65-74	75+
Total	**48%**	**50%**	**11%**	**17%**	**16%**	**16%**	**16%**	**14%**	**9%**
Has the Foundation Level (8 tasks)	50%	49%	12%	19%	18%	17%	16%	12%	6%
On the cusp of Foundation Level (6-7 tasks)	41%	58%	6%	6%	11%	15%	17%	23%	23%
Has partial Foundation (1-7 tasks)	40%	58%	4%	5%	10%	13%	17%	24%	27%
Has no Foundation (0 tasks)	43%	55%	-	3%	1%	4%	15%	29%	48%

Table 4: Foundation skills and educational level

	Education			
	No formal qualification	GCSE/ O-Level/ CSE/NVQ12	A-Level or equivalent	Degree/ Master/PhD
Total	**6%**	**19%**	**20%**	**47%**
Has the Foundation Level (8 tasks)	4%	18%	21%	51%
On the cusp of Foundation Level (6-7 tasks)	14%	27%	18%	28%
Has partial Foundation (1-7 tasks)	17%	27%	17%	24%
Has no Foundation (0 tasks)	47%	21%	10%	10%

Fig 10: Improving figures for foundation digital skills

- Numbers without basic skills are improving, though this appears to be levelling off
- Figures for the 75+ age group are encouraging



Perceived benefits of digital skills

- A comprehensive recent survey (Lloyds Bank, 2024) indicated that, despite the fact that 99% of people have used the internet at least once in the past three months, 15% (6.8 million people) of the UK population are unable to do some of the most basic digital tasks. They are likely to struggle interacting with online services and are at risk of being left behind and left out of society
- Those with an impairment are less likely to be online and are:
  - 1.5 times more likely to struggle interacting with the NHS
  - 2.2 times more likely to have difficulty interacting with charities providing support
  - 2.5 times more likely to have difficulty interacting with housing associations

Fig 11: Essential digital skills for life and employment (Lloyds, 2024)

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Life EDS

Essential Digital Skills for Life are the tasks/skills required to be digitally proficient in day-to-day life. An individual must be able to do at least one task within each of the five Life skills to have Life EDS.

Communicating

1. You can set up accounts which help you communicate online (e.g. email, social media, forums)
2. You can communicate with others digitally using email or other messaging applications (e.g. WhatsApp or Messenger, direct messaging on social media such as Instagram, Facebook etc.)
3. You can use software to create, write or edit documents (e.g. Microsoft Word/ Google docs/Pages for a CV/letter)
4. You can share files or links with others by attaching to an email, uploading to a website or an application (e.g. proof of address/identity, sharing an image, or link via WhatsApp)
5. You can make and receive video calls (e.g. Facetime, Zoom, Facebook Portal or WhatsApp call)
6. You can post messages, photographs, videos or blogs on social media platforms (e.g. Facebook, Instagram, TikTok, Twitter or Snapchat)

Handling Information and Content

1. You can recognise what information or content online may, or may not, be trustworthy (e.g. fact checked information, 'fake news' or assess the trustworthiness of a company based on customer reviews)
2. You can use search engines to find information you're looking for (e.g. search for news, the weather, train times)
3. You can store and back up photos, messages, documents or other information (e.g. iCloud, Google Drive, Dropbox, OneDrive, desktop or storage drive)
4. You can use the cloud to access content from different devices (e.g. smartphone, tablet, laptop and desktop)
5. You can use the Internet to stream or download entertainment content (e.g. films, TV series, music, games or books through services like YouTube, Spotify, Netflix, BBC iPlayer)

Transacting

1. You can set up an account online that enables you to buy goods or services (e.g. Amazon, eBay, supermarkets or other retailers)
2. You can fill in forms online to access the services you need (e.g. Voting registration, ordering repeat prescriptions, booking doctor appointments, booking train tickets or beauty appointments)
3. You can buy goods/services online using online payments (e.g. Debit/credit card, PayPal, Apple Pay, Google Pay, Worldpay)
4. You can manage your money and transactions online (e.g. View balance or transfer funds via Internet or mobile banking app, manage spending through PayPal account, manage payments on finance plan)

Problem Solving

1. You can use the Internet to find information that helps you solve problems (e.g. by using search engines, web chat, FAQs and forums)
2. You can use the Internet to improve your skills and ability to do new things (e.g. using online tutorials, learning platforms and how-to guides)

Being Safe and Legal Online

1. You can act with caution online and understand that there are risks and threats involved in carrying out activities online (e.g. use anti-virus software, classify and share information securely or avoid certain types of websites such as piracy websites)
2. You can set privacy and marketing settings for websites and your accounts (e.g. managing social media privacy settings, managing cookie settings, updating contact preferences)
3. You can follow data protection guidelines online (e.g. following data storage and retention guidelines, not sharing or using other people's data or media such as movies or music without their consent)
4. You can respond to requests for authentication for online accounts (e.g. resetting your password when you've forgotten it, two factor authentication, using a remote access key or an authenticator app)
5. You can identify secure websites (e.g. by looking for the padlock and 'https' in the address bar)
6. You can recognise suspicious links and know that clicking on these links or downloading unfamiliar attachments is a risk (e.g. Spam/phishing emails, texts, pop ups)
7. You can update your device software/ operating systems when necessary to prevent viruses and other risks (e.g. enabling automatic updates, or installing when prompted to do so)
8. You can identify secure Wi-Fi networks to connect to (e.g. Wi-Fi networks where a unique password is required, trusted source or padlock next to Wi-Fi network)
9. You can be careful with what you share online as you know that online activity produces a permanent record that can be accessed by others (e.g. publicly shared photos, forums, personal information or opinions)

Work EDS

Essential Digital Skills for Work are the tasks/skills required to be digitally proficient in the workplace. An individual must be able to do at least one task within each of the five Work skills to have Work EDS.

Communicating

1. You can communicate in the workplace digitally using messaging applications (e.g. Email, Microsoft Teams, Zoom, Slack, internal Intranet, WhatsApp)
2. You can use workplace digital tools to create, share and collaborate with colleagues (e.g. Microsoft Teams, OneDrive, G-Suite, Office 365, WeTransfer, DropBox, WebEx, Slack)
3. You can set up and manage an account on a professional online network/ community/job site (e.g. LinkedIn, Total Jobs, Indeed)

Handling Information and Content

1. You can follow your organisation's IT policies when sharing information internally and externally (e.g. classifying emails/documents, encrypting sensitive information, sharing appropriate information on social media)
2. You can securely access, synchronise and share information at work across different devices (e.g. manage email, calendar or appointment system via different devices)

Transacting

1. You can complete digital records on behalf of, or within your organisation (e.g. absence management, holidays, timesheets, expenses, tax returns)
2. You can access salary and tax information digitally (e.g. password protected payslips, P60, P45)

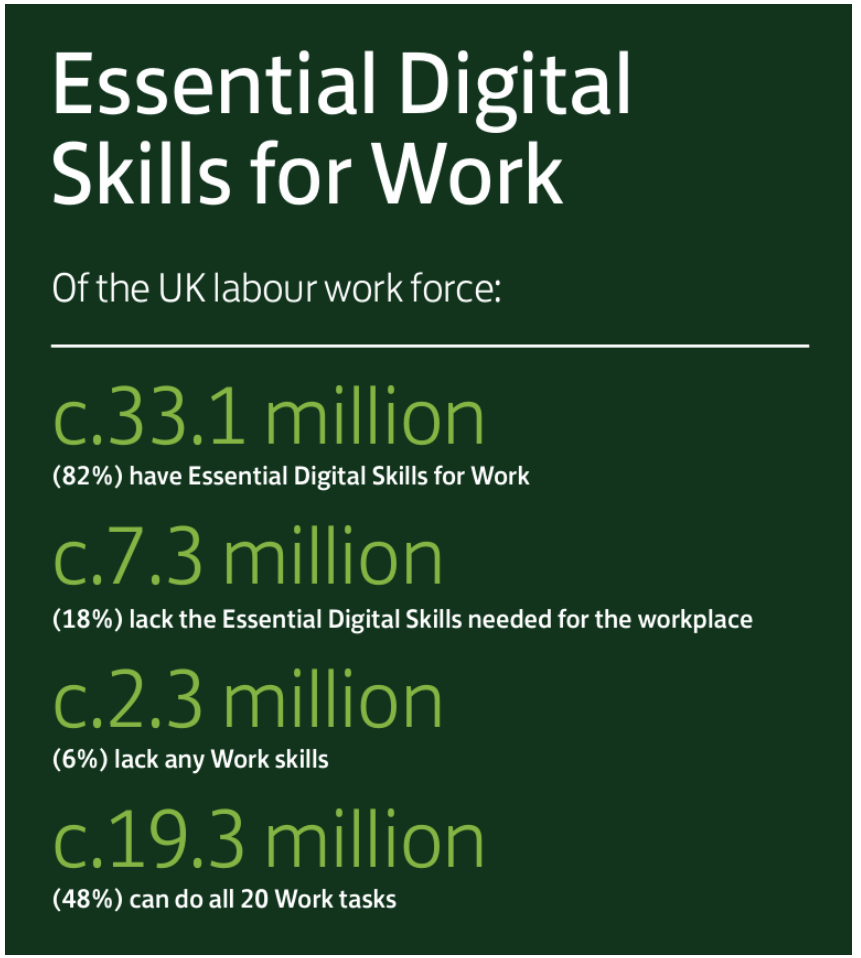
Problem Solving

1. You can find information online that helps you solve work related problems (e.g. Search Engines, IT helpdesk, software providers, peer networks)
2. You can use appropriate software that is required of your day-to-day job (e.g. spreadsheets, online booking systems, HR management, workflow or sales management)
3. You can improve your skills and ability to do new things at work using online tutorials, learning platforms and how-to guides (e.g. LinkedIn Learning, YouTube, iDEA, Skillsoft, internal learning platforms)
4. You can improve your own and/or the organisation's productivity using digital tools (e.g. Trello, Microsoft Projects and Planner, Slack)

Fig 12: UK digital capability segment characteristics, n=998,754 (Lloyds, 2024)

VERY LOW	LOW	HIGH	VERY HIGH
23% 12.1 million	**9%** 4.7 million	**40%** 21 million	**27%** 14.2 million
60% are confident using the Internet	**78%** are confident using the Internet	**89%** are confident using the Internet	**94%** are confident using the Internet
Almost three times less contribution to their savings (compared to High)	**35%** earn up to £20,000 per year	**Almost three times** more contribution to their savings (compared to Very Low)	**Almost three times** more contribution to their savings (compared to the Very Low)
41% earn up to £20,000 per year	**85%** feel confident protecting themselves from scams	**25%** earn up to £20,000 per year	**13%** earn up to £20,000 per year
75% feel confident protecting themselves from scams	**14%** upgraded to a higher financial segment	**84%** feel confident protecting themselves from scams	**87%** feel confident protecting themselves from scams
10% upgraded to a higher financial segment	**70%** shop around for cheaper deals online	**16%** upgraded to a higher financial segment	**17%** upgraded to a higher financial segment
60% shop around for cheaper deals online	**54%** feel like their digital skills have improved	**79%** shop around for cheaper deals online	**85%** shop around for cheaper deals online
50% feel like their digital skills have improved	**66%** remained in the same digital segment	**61%** feel like their digital skills have improved	**64%** feel like their digital skills have improved
96% remained in the same digital segment		**77%** remained in the same digital segment	**76%** remained in the same digital segment

Fig 13: Essential digital skills for Life and Work



What would you recommend as the best way to improve internet skills?

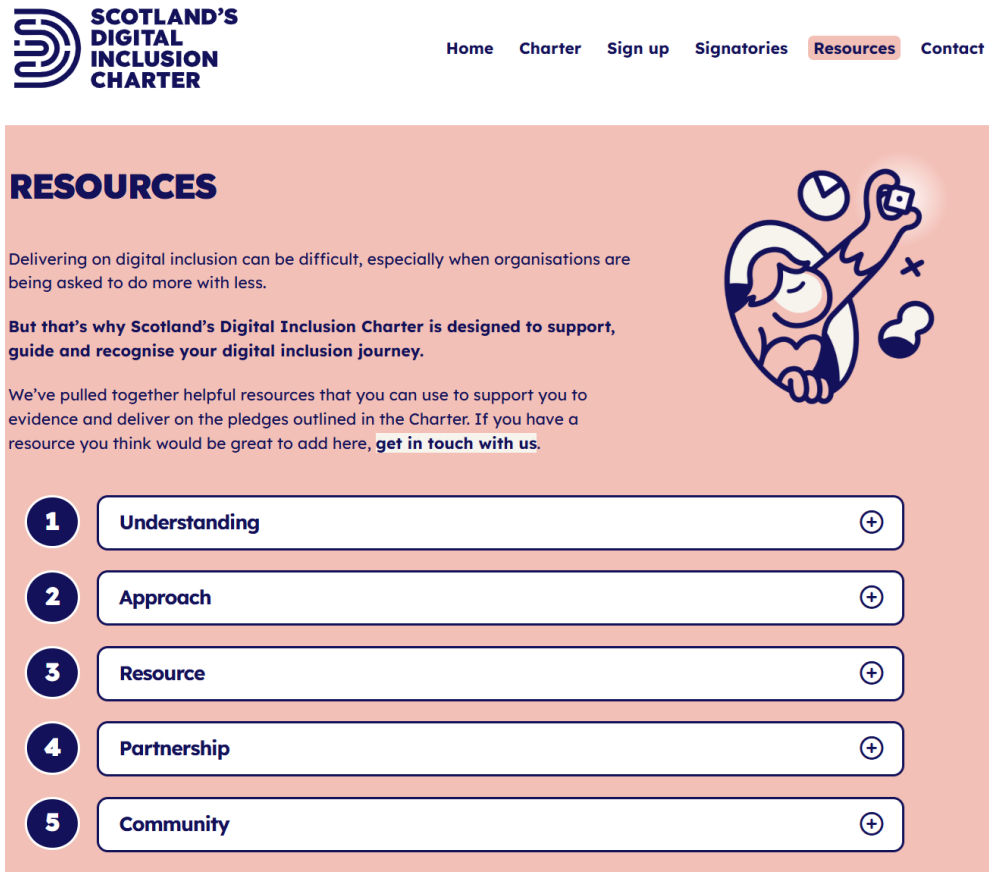
1. Amongst those in education?
2. In developed countries?
3. In the least developed countries?
4. What would you recommend for the older population?

UK digital skills example: Universal Credit

- Universal credit replaced six different welfare benefits and aims to make claiming easier
- You can make a claim for Universal Credit only online
- It is an example of a “digital by default” benefit
- Newspaper and social media stories cited hardship owing to digital exclusion and long waits
- Charities such as Good Things Foundation offer basic digital skills resources online

Scotland's Digital Inclusion Charter

- Aimed at organisations of all kinds (public, private or voluntary sector) to encourage them to sign up and recognise what they're doing to promote digital inclusion in Scotland
- They estimate around 700,000 people can't currently access the internet, thus excluding them from the benefits of being online



Accenture initiative, UK example

- In September 2024, Accenture announced a new initiative to help tackle the UK's digital inclusion gap called "Regenerative AI"
- Between 2024 and 2027, Accenture hopes Regenerative AI will bring community partners and organisations together with volunteers from Accenture to help over a million people build their AI skills
- The series of programmes aims to enable people in socioeconomically disadvantaged communities to access devices, data and AI literacy courses

Age and digital exclusion, UK example

- A study by Hu and Qian (2021) assessed social interactions across households and mental wellbeing during the pandemic
- They found that an older person who had only virtual contact during lockdown experienced greater loneliness and negative mental health impacts than an older person who had no contact with other people at all
- The problem was that older people unfamiliar with technology found it so stressful to learn how to use it, that it was more damaging to their mental health than simply coping with isolation and loneliness

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