

Digital Divide

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ABSTRACT

“Digital divide” is the unequal access to digital technology, including smartphones, tablets, laptops, and the internet. This leads to worsening inequality around access to information and resources in the present Information Age in which people with no access to the Internet and other technology are at a disadvantage, for being unable or less able to connect with others, find and apply for jobs, shop, and learn (on-line learning). The causes due to digital divide are many and include homelessness, people living in poverty, age, gender, educational disparities, rural-urban disparities, and class differentiation among others.

The paper delves into the causes, challenges, possible solutions to digital divide, and the future aspects of the impact on people.

KEYWORDS: *Digital divide, internet, digital technology, poverty, gender, rural-urban disparity, information age, digital literacy*

INTRODUCTION

The total or partial exclusion to access to digital technology such as smartphones, laptops, tablets, computers, and the internet is referred to as digital divide, which worsens the inequality around access to information and resources, making people unable to connect with others, as shown in Figures 1-4 [1, 2, 3].

Digital divide is the gap that exists between individuals who have access to modern information and communication technology and those who lack access. There are three key stages that influence digital inequality worldwide. This is evident between communities living in urban areas and those living in rural settlements; between socioeconomic groups; between less economically developed countries and more economically developed countries; between the educated and uneducated population. Individuals with access to a broadband connection can be digitally split via low-performance computers, limited broadband speeds and limited access to subscription-based content i. e. leading to widening the digital gap [4].

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HISTORY OF DIGITAL DIVIDE

The digital divide metaphor became popular in the mid-1990s, when the National Telecommunications and Information Administration (NTIA) of the U. S. Department of Commerce published “Falling Through the Net: A survey of the ‘Have Nots’ in Rural and Urban America” (1995), which was a research report on Internet Diffusion among Americans. The report revealed widespread inequalities in national ICT access, with migrant or ethnic minority groups and older, less-affluent people living in rural areas with low educational attainments being equally excluded from internet services. The pattern was confirmed by follow-up surveys by NTIA, which indicated also an initial gender gap in favour of men, as shown in Figure 5 [5].

The historical roots of the digital divide in America, as shown in Figure 6, refer to the increasing gap that occurred during the early modern period between those who could and who could not access the real time forms of calculation, decision-making, and visualization offered via written and printed media [6]. Within this context, ethical discussions regarding the relationship between education and the free

distribution of information were raised by thinkers such as Mary Wollstonecraft, Immanuel Kant and Jean Jacques Rousseau (1712-1778). In Great Britain during the Industrial Revolution, Rousseau's idea helped to justify poor laws that created a safety net for those who were harmed by new forms of production. Later when telegraph and postal systems evolved, many used Rousseau's ideas to argue for full access to those services, even if it meant subsidizing hard-to-serve citizens. Thus, "universal services" [7] referred to innovations in regulation and taxation that would allow phone services, such as AT&T in the United States to serve hard-to-serve rural users. In 1996, as telecommunications companies merged with internet companies, the Federal Communications Commission adopted Telecommunications Services Act of 1996 to consider regulatory strategies and taxation policies to close the digital divide. The term "digital divide" was coined among consumer groups that sought to tax and regulate information and communications technology (ICeT) companies to close the digital divide, the topic soon moved onto a global stage, as shown in Figure 7 [8].

The World Trade Organization (WTO) in order to assuage anti-globalization forces in 1999, hosted the "Financial Solutions to Digital Divide" in Seattle, US, co-organized by Craig Warren Smith of Digital Divide Institute and Bill Gates Sr, the chairman of the Bill and Melinda Gates Foundation – this catalyzed a full-scale global movement to close the digital divide, which quickly spread to all sectors of the global economy [9].

During the COVID-19 pandemic, governments worldwide, issued stay-at-home orders that brought about lockdowns, quarantines, restrictions, and closures. This brought about interruptions to schooling, public services, and business operations and drove nearly half of the world's population into seeking alternative methods to live while in isolation [10]. People resorted to telemedicine, virtual classrooms, online shopping, technology-based social interactions and working remotely, all of which require access to high-speed or broadband internet access and digital technologies, as shown in Figures 8 and 9. According to a Pew Research Center study, it was reported that 90% of Americans described the use of the internet as "essential" during the pandemic [11]. The pandemic exposed inequality causing discrepancies in learning as shown by more than 30% of K-12 students living below the poverty threshold among American Indian/Alaska Native, Black and Hispanic students [12-14].

The lack of "tech readiness", that is, confident and independent use of devices, was reported among the

US elderly population; with more than 50% reporting an inadequate knowledge of devices and more than one-third reporting lack of confidence [11, 15]. In various Asian countries, report by a UN research paper said that those above the age of 74 reported a lower and more confused usage of digital devices [16].

CAUSES OF DIGITAL DIVIDE

Some of the causes of digital divide are as follows [17, 18]:

1. Age-related issues: It is very rare for children, teens, and young adults below the age of thirty to avoid or not have access to the internet or technology. However, statistics for people over the age of sixty-five showed that 44 percent have no access or do not use it. This is due to poor education about its benefits and use and lifestyle situations that do not necessitate connectivity.
2. Socioeconomic factors: People with economic well withal or have more money, have more access to technology and the internet. So also are people that have achieved higher educational levels who have more knowledge about its uses and benefits. The digital divide mimics the divisions caused by income, education, and social standing all over the world – serving to even widen the more the socioeconomic gaps and inequalities across the board.
3. Geographical causes: As omnipresent as the internet appears to be, there are many locations in the US and in the world with no or limited high-speed access. Full coverage and access are available in urban areas and most suburbs, but the residents in rural areas are much less likely to have and enjoy digital services. Geographic, accessibility, and financial issues must be found to able to solve this particular problem.
4. Racial, cultural and language issues: Most of the problems to the access to the internet and technology are said to occur along racial, cultural and language lines. This matches most discrepancies like the wage gap, access to high-level education and healthcare, cum other health-related environmental factors. As an example, those primarily speaking Spanish or another non-English language would be less likely to use online resources, since this is not accessible in the format they can understand. There are some other people who are not just interested in connecting to the internet, maybe due to not knowing the benefits or they prefer a different type of lifestyle – this is the only reason that does not need a definitive solution.

5. **Faster development in technology:** The faster development of computers and cellphones are not the only kinds of technology developing at exponential rates. With the rollout of 5G, the digital divide is becoming wider as technology advances and becomes crucial for many different elements of daily life. COVID-19 pandemic has made many aspects of life that previously took place in person have now moved online, such as education, medicine and healthcare, virtual meetings and conferences, etc.
 6. **Infrastructure:** This is another cause in digital divide, since accessing a website requires a computer and an internet connection i.e. broadband or fiber-optic connectivity, or the user of a smartphone with data,
 7. **Digital literacy:** The digital divide is not just an issue of who has access to digital tools but also who can use them safely and effectively. It means what information is safe to share online, how to spot disinformation on the internet, and the use of digital skills to improve one's life. This information should be taught, which is why closing the digital gap isn't only a matter of building infrastructure, but closing the knowledge gap by educating people on digital literacy, as shown in Figure 10.
 8. **Institutions:** The lack of support from institutions such as the national, state, or local governments contributes to the digital divide. Hence, governments should fund or subsidize access to broadband internet, educate individuals about technology, use, and safety. In countries where this is not the case, people are likely to be on the wrong side of the digital divide.
- **Social economic impact:** Individual economic loss on a massive scale – caused by technology divide – negatively impacts entire economies. The reports by the World Bank states that increasing broadband penetration by 10 percent increases gross domestic product (GDP) by 1.21% in developed nations and 1.38% in developing countries [18], as shown in Figure 11.
 - **Increased racial inequalities:** Digital divide worsens pre-existing inequalities. According to Bhaskar Chakravorti, in the US, nearly half of Americans without at-home internet access were in Hispanic or Black households. Up to 40% of students from Black, Latino, and indigenous communities struggle with insufficient digital literacy. As more jobs require digital skills, without proper intervention, a majority of Black and Hispanic workers could be locked out of 86% of jobs by 2045 [18].
 - **Gender digital divide:** Women are said to face some of the harshest results of the digital divide. According to UNESCO, 2 billion women globally are not connected to the internet – resulting to gender divide. Before the COVID-19 pandemic hit, 130 million girls were denied education. Now, because of COVID-19 disruptions in education and the switch to digital learning, UNESCO has estimated that an additional 11 million girls are at the risk of not returning to the classroom [18], as shown in Figure 12.
 - **Income divide:** In a study 191 countries, showed that higher income and educational attainment are positively linked with access to technology. Higher GDP per capita correlates with higher information and communication technology (ICT) dispersion, which is true for developing economies and rural areas within developed nations [18].

It should be noted too that it is our responsibility to use technology in a way that doesn't harm others and to be aware of the impact that technology has on our health, environment, and the society at large. Digital responsibility refers to using technology in an appropriate, constructive way for oneself and others.

IMPACT OF THE DIGITAL DIVIDE

The digital divide apart from causing economic disadvantages, it can also stunt the economic growth of an entire society/nation. Worst still, the technology divide is deepening pre-existing inequalities around the world. Some of the impacts include:

- **Personal economic impact:** The lack of connectivity means that individuals may miss out on education and healthcare, since higher educational attainment is linked with higher earning potential, and losing healthcare because

of technology could mean a lower life expectancy and inequality of life.

- **Social economic impact:** Individual economic loss on a massive scale – caused by technology divide – negatively impacts entire economies. The reports by the World Bank states that increasing broadband penetration by 10 percent increases gross domestic product (GDP) by 1.21% in developed nations and 1.38% in developing countries [18], as shown in Figure 11.
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BRIDGING THE DIGITAL DIVIDE

Many countries, institutions, and industries are working assiduously to bridge the digital divide, some of which are the European Union, the Republic of Korea, and Estonia that are building infrastructure, prioritizing digital education, and promoting public-private partnerships [18]. The digital divide can be closed by implementing digital inclusive policies, programs and tools that incorporate the following [19, 20]:

- Affordable, reliable broadband internet service/increased connectivity

- Internet-enabled devices that meet the needs of the user
- Access to digital literacy training/investment in digital education
- Quality technical support
- Applications and online content designed to enable and encourage self-sufficiency, participation and collaboration
- Devise locally appropriate, public-private participation

Providing universal access where everyone will have access to digital technologies such as the internet, computers, and mobile devices, regardless of their location or socioeconomic status [21].

Reforming the economic, educational and telecommunications systems can be achieved by addressing income inequality, disparities in education, and inadequate communications infrastructure [21].

Building up IT infrastructure by massive investments in network infrastructure, cybersecurity measures, and expanding connectivity to underserved areas that will enable more people to have access and benefit from digital technologies [21].

CONCLUSION

The digital divide issue if not to be exacerbated further, then there is need for urgent actions to be taken for it not to be more worsened in future years. There are greater demands for digital skills in the workforce now than ever before, more and more jobs require applicants with a baseline understanding of digital applications and the internet. If the access to the internet continues to be inequitable, the marginalized groups/individuals would be unable to unlock these opportunities which will exacerbate socioeconomic inequalities.

The governments, institutions, and businesses must prioritize digital equity, invest massively and proffer solutions to solve this problem, which will enable more people to take advantage of these opportunities and participate in their economies. Governments must need to prioritize funding and provide the enabling environment for the full involvement cum participation in the online sphere. Moreover, stronger infrastructure and digital education are necessary to close the gap. Those on the wrong side of the global digital divide will not only have less power and quality of life in these areas, but will see the gap continue to increase as computing/technology continues its rapid advance of human capabilities.

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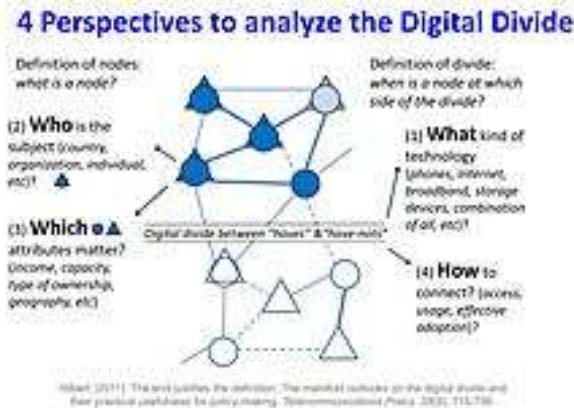


Figure 1. Digital divide

Source:https://www.google.com/search?scas_esv=c744cb070de47b7e&sxsrf=ADLYWIIhC2WKbr44fOa_BespebNK8zgLKg:1732539151796&q=images+on+digital+divide+by+wikipedia&udm=2&fbs=AEQNm0Aa4sjWe7Rqy32pFwRj0UkWd8nbOJfsBGGB5IQQO6L3JyJclJuzBPI12qJyPx7ESJehObpS5jg6J88CCM-RK72qUv4GOvBp3LxAsC35pUAVd1mVJlZ_kJEI7OpW0Y42rOM96fEVibRmxJCzmEqh53sBnJMLdHFyYMnh1J8SLKdTBIS0c&sa=X&ved=2ahUKewix5M6lw_eJAXVAPUQIHxN2FP4QtKgLegQIExAB&biw=1034&bih=539&dpr=1#vhid=V14eNWie6xnL7M&vssid=mosaic

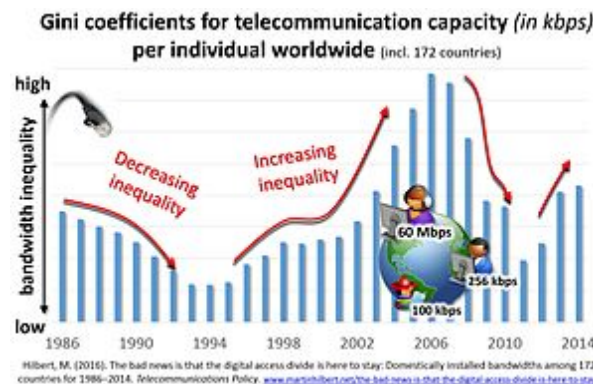


Figure 2. Digital divide

Source:https://www.google.com/search?scas_esv=c744cb070de47b7e&sxsrf=ADLYWIIhC2WKbr44fOa_BespebNK8zgLKg:1732539151796&q=images+on+digital+divide+by+wikipedia&udm=2&fbs=AEQNm0Aa4sjWe7Rqy32pFwRj0UkWd8nbOJfsBGGB5IQQO6L3JyJclJuzBPI12qJyPx7ESJehObpS5jg6J88CCM-RK72qUv4GOvBp3LxAsC35pUAVd1mVJlZ_kJEI7OpW0Y42rOM96fEVibRmxJCzmEqh53sBnJMLdHFyYMnh1J8SLKdTBIS0c&sa=X&ved=2ahUKewix5M6lw_eJAXVAPUQIHxN2FP4QtKgLegQIExAB&biw=1034&bih=539&dpr=1#vhid=TaILwVwtc29oIM&vssid=mosaic

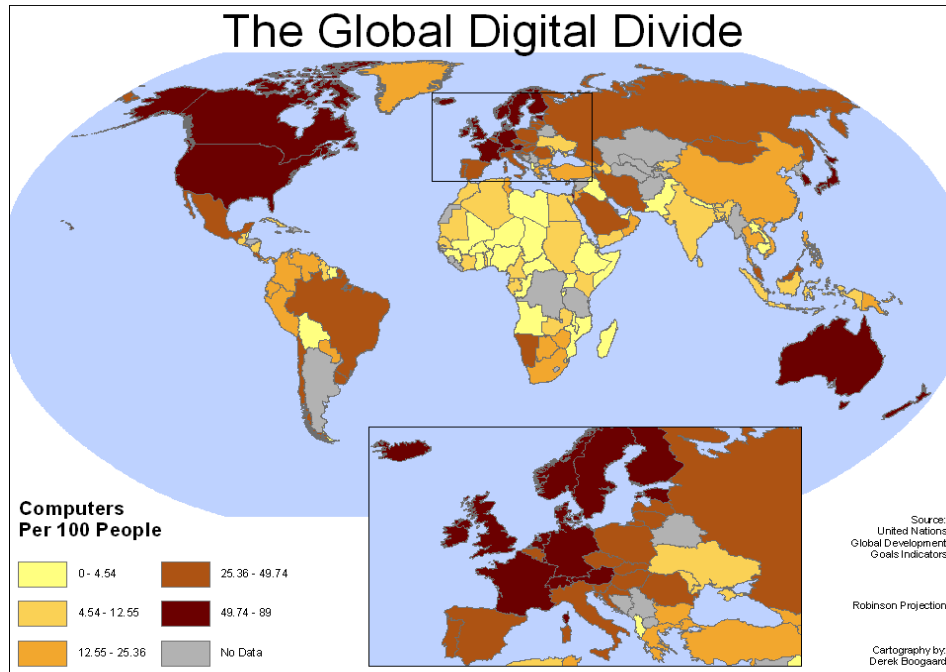
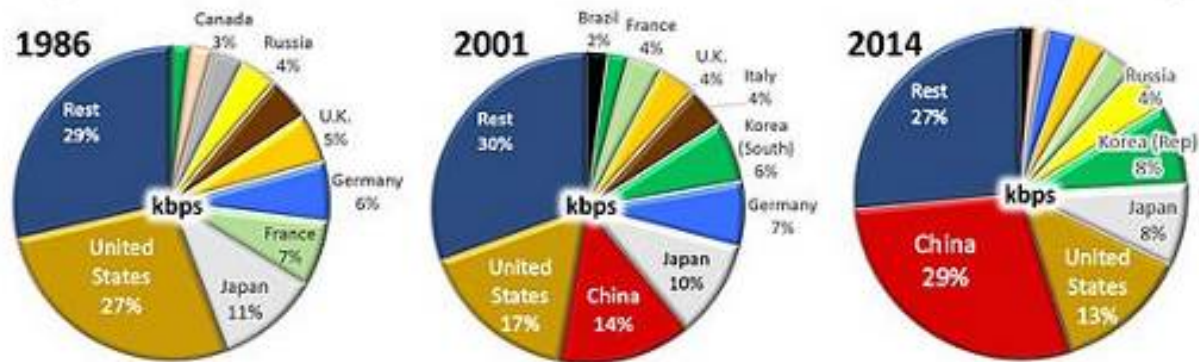


Figure 3. Global digital divide

Source:https://www.google.com/search?sca_esv=c744cb070de47b7e&sxsrf=ADLYWIIhC2WKbr44fOa_BespebNK8zgLKg:1732539151796&q=images+on+digital+divide+by+wikipedia&udm=2&fbs=AEQNm0Aa4sjWe7Rqy32pFwRj0UkWd8nbOJfsBGGB5IQQO6L3JyJJclJuzBP112qJyPx7ESJehObpS5jg6J88CCM-RK72qUv4GOvBp3LxAsC35pUAVd1mVJIz_kJEI7OpW0Y42rOM96fEVibRmxJCzmEqh53sBnJMLdHFyYMnh1J8SLKdTBIS0c&sa=X&ved=2ahUKEwix5M6lw_eJAxVAPUQIHXN2FP4QtKgLegQIExAB&biw=1034&bih=539&dpr=1#vhid=oG-rLzt8smKDXM&vssid=mosaic

Top 10 countries with most installed bandwidth (in kbps)



Hilbert, M. (2016). The bad news is that the digital access divide is here to stay: Domestically installed bandwidths among 172 countries for 1986–2014. *Telecommunications Policy*. www.martinhilbert.net/the-bad-news-is-that-the-digital-access-divide-is-here-to-stay/

Figure 4. Global digital divide

Source:https://www.google.com/search?sca_esv=c744cb070de47b7e&sxsrf=ADLYWIIhC2WKbr44fOa_BespebNK8zgLKg:1732539151796&q=images+on+digital+divide+by+wikipedia&udm=2&fbs=AEQNm0Aa4sjWe7Rqy32pFwRj0UkWd8nbOJfsBGGB5IQQO6L3JyJJclJuzBP112qJyPx7ESJehObpS5jg6J88CCM-RK72qUv4GOvBp3LxAsC35pUAVd1mVJIz_kJEI7OpW0Y42rOM96fEVibRmxJCzmEqh53sBnJMLdHFyYMnh1J8SLKdTBIS0c&sa=X&ved=2ahUKEwix5M6lw_eJAxVAPUQIHXN2FP4QtKgLegQIExAB&biw=1034&bih=539&dpr=1#vhid=bQRB6Ir3lyUwPM&vssid=mosaic



Figure 5. Gender disparity in computing

Source:https://www.google.com/search?q=images+on+women+digital+divide+by+wikipedia&sca_esv=c744cb070de47b7e&udm=2&biw=1034&bih=539&sxsrf=ADLYWILJDQU4076zDf47V59EJtBjIIsXIQ%3A1732541817472&ei=eX1EZ8jJHOirur8PwsW2Ao&ved=0ahUKEwiI6tqczeJAxXole4BHcKiDa8Q4dUDCB A&oq=images+on+women+digital+divide+by+wikipedia&gs_lp=EgNpbWciK2ltYWdscyBvbiB3b211biBkaWdpdGFsIGRpdmlkZSBieSB3aWtpcGVkaWFIj05QwwZYuChwAXgAkAEEmAHoFaAB71-qAQ8zLTMuMS4wLjEuMS4yLjK4AQzIAQD4AQQYAgCgAgCYAwCIBgGSBwCgB68F&scient=img#vhid=ohsB9IYDxsHiLM&vssid=mosaic

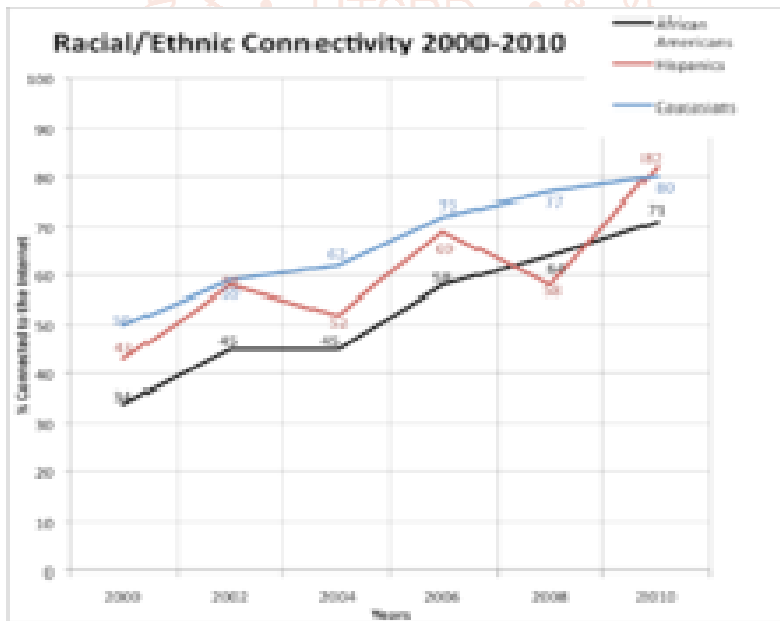


Figure 6. Digital divide in the United States

Source:https://www.google.com/search?sca_esv=c744cb070de47b7e&sxsrf=ADLYWIIhC2WKbr44fOa_BespebNK8zgLKg:1732539151796&q=images+on+digital+divide+by+wikipedia&udm=2&fbs=AEQNm0Aa4sjWe7Rqy32pFwRj0UkWd8nbOJfsBGGB5IQQO6L3JyJJclJuzBP112qJyPx7ESJehObpS5jg6J88CCM-RK72qUv4GOvBp3LxAsC35pUAVd1mVJIz_kJEI7OpW0Y42rOM96fEVibRmxJCzmEqh53sBnJMLdHFyYMnh1J8SLKdTBIS0c&sa=X&ved=2ahUKEwix5M6lw_eJAxVAPUQIHxN2FP4QtKgLegQIExAB&biw=1034&bih=539&dpr=1#vhid=rgov8vF9yVO41M&vssid=mosaic



Figure 9. Information age

Source:https://www.google.com/search?sca_esv=c744cb070de47b7e&sxsrf=ADLYWIIhC2WKbr44fOa_BespebNK8zgLKg:1732539151796&q=images+on+digital+divide+by+wikipedia&udm=2&fbs=AEQNm0Aa4sjWe7Rqy32pFwRj0UkWd8nbOJfsBGGB5IQQO6L3JyJJclJuzBPl12qJyPx7ESJehObpS5jg6J88CCM-RK72qUv4GOvBp3LxAsC35pUAVd1mVJlZ_kJEI7OpW0Y42rOM96fEVibRmxJCzmEqh53sBnJMLdHFyYMnh1J8SLKdTBIS0c&sa=X&ved=2ahUKEwix5M6lw_eJAxVAPUQIHxN2FP4QtKgLegQIExAB&biw=1034&bih=539&dpr=1#vhid=_Y-MqCtjSIsTzM&vssid=mosaic



Figure 10. Digital literacy

Source:https://www.google.com/search?sca_esv=c744cb070de47b7e&sxsrf=ADLYWIIhC2WKbr44fOa_BespebNK8zgLKg:1732539151796&q=images+on+digital+divide+by+wikipedia&udm=2&fbs=AEQNm0Aa4sjWe7Rqy32pFwRj0UkWd8nbOJfsBGGB5IQQO6L3JyJJclJuzBPl12qJyPx7ESJehObpS5jg6J88CCM-RK72qUv4GOvBp3LxAsC35pUAVd1mVJlZ_kJEI7OpW0Y42rOM96fEVibRmxJCzmEqh53sBnJMLdHFyYMnh1J8SLKdTBIS0c&sa=X&ved=2ahUKEwix5M6lw_eJAxVAPUQIHxN2FP4QtKgLegQIExAB&biw=1034&bih=539&dpr=1#vhid=Lq2UXB1PTdHrbM&vssid=mosaic

