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## Impact of the Digital Divide on Digital Learning: A Review Paper

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### ABSTRACT

Today, we live in a digital world, so the internet has become an essential part of life. ICTs and the internet have become vital in education; individuals need to have knowledge of digital access and use. The digital divide is a gap between people with internet access and those without—this gap is a problem in online learning. The digital access problem is the most significant issue, as students do not have internet and device access. Hence, this paper reviews the impact of online learning on students in India. Society has changed from traditional to modern, affecting the learning pattern. This paper focuses on learning patterns from traditional to contemporary education systems. The main objective of this paper is to explore the effects of the digital divide on learning and how socioeconomic factors are responsible for digital inequalities, as well as to identify the impact of these digital inequalities on learning outcomes. This review paper is based on secondary data sources. Secondary data sources include books, journals, newspapers, reports, and government data.

**Introduction:**

In this contemporary world, ICTs have brought revolutionary change to every individual's life. ICTs have become vital to daily human activities (Prathapagiri,2020). Digital inequality is a type of social stratification because of the unequal distribution of digital resources (Warschauer,2004). The term digital divide originated in the 1990s and was first used in an official publication by the US Department of Commerce's National Telecommunications and Information Administration (Van Dijk & J.A.,2006). It refers to the gap between those with internet access and those without (Van Dijk,2020). It includes internet access (speed of the internet) and physical access to digital devices (desktops, mobile phones, laptops), which are a significant part of digital or online learning (Van Dijk,2020). Education is an integral part of an individual's socialization. In this modern society, the internet plays a significant role in every sphere of life, including education, entertainment, business, online banking, travel, etc. (Agarwal & Day,1998). Therefore, the increasing integration of the internet in education has led to a gap in digital access among students of higher education (Sarker et al.,2019). However, with the rise of information and communication technology, digital facilities have made individuals' lives easier. On the other hand, digital inequality also exists in every society. Many factors are responsible for these inequalities, such as gender, socio-economic status, cultural, geographical location, status, and class (Antonio et al.,2014; Lindblom & Rasanen,2017; Cooper,2006). The digital divide is not only an issue of technological and physical access to internet resources (Anderson, 2019; DiMaggio et al., 2001) but also a complex social phenomenon affecting social stratification and inequality (Heeks,2022). Social stratification is everywhere in society, including in educational resources. The Internet has become very important for education (Anderson, 2019). Many people confuse online learning with distance learning, which has been most prevalent in recent years (Amrane-Cooper et al., 2023). Digital learning is based on digital learning methods, or online use of ICTs, and distance learning is a method of learning where teachers and students are physically separated and rely on printed study material and books; online methods are also used (Amrane-Cooper et al., 2023). On the other hand, online learning is a broad term that includes digital classrooms, pre-recorded lectures, live virtual classes, and Online learning platforms that are entirely Internet-based (Feruza & Gulnoza, 2024). In this digital world, ICTs, based on online learning, are essential to education. Online learning provides equal access to learning for everyone; there is no barrier to age, race, geographical location, gender, class, or status (Picciano, 2006). ICTs indeed make education more accessible. Digital or online learning reduces the geographical problem for students in remote areas where mobility is an issue for quality education (Abrol & Jain, 2022). Online learning is more beneficial



for people with disabilities (Scholz,2017). In this modern world, the internet is essential to every individual's daily life. However, the Internet signifies a transformative socio-technical infrastructure that has reshaped modern human interaction, social organization, and power dynamics (Castells, 2021). Therefore, it functions as a complex digital system where social relationships, cultural patterns, economic transactions, and political discourse are gradually interceded through information and communication technologies (DiMaggio et al., 2020). Social relationships are gradually influenced by the internet and digital platforms, where social capital is shaped and maintained through the Internet and online networks (Bourdieu, 1986). Digital literacy, as conceptualized by Gilster (1997), represents more than just technical ability with digital devices and digital tools. He defined it as "the skill to understand and use information and communication technology in several formats from a wide range of digital resources when they exist via digital devices" (Pool, 1997). Institutions must now invest in digital infrastructure, including high-capacity servers and digital learning environments. However, not all institutions have equal resources to do so. Some educational institutions can offer high-quality online learning programs. At the same time, few have sufficient funding, and institutions may struggle to provide reliable digital platforms or technical support, affecting the quality of education they can offer (Dillenbourg,2016). Using digital devices in higher education is very common, but the changing nature of technology plays a crucial role in the digital divide in higher education (Mathrani et al.,2022). The unequal distribution of digital resources leads to a digital divide. Researchers defined different levels of the digital divide, such as lack of skill, quality of access, language, and use (Hillier,2020). The digital divide is between individuals with digital access and those without (Van Dijk, 2006). Online learning is entirely computer-based or internet-based learning. The Indian government took the initiative with the NEP 2020 to provide fully online courses where learners can earn their degree without visiting schools, colleges, and universities. Students can enroll in online classes even in regular-based courses (Indian Report on Digital Education, 2021, and National Education Policy,2020). The primary issue was access to devices and the internet in the early stages of the digital divide. Students without internet access and devices were entirely excluded from online learning opportunities. However, the current impact of ICTs on education is that the shift to high-speed internet, advanced devices, and digital literacy creates new gaps between students (Van Dijk &J, 2017). Students with poor internet connections and low-quality devices face difficulties participating in online classes, virtual labs, video-based learning, and online or digital learning platforms. These issues create a barrier to learning outcomes, as students without adequate digital resources may fall behind due to limited engagement with ICT-based learning platforms. However, the global nature of the current digital divide means that students from developing countries



regularly lack access to online higher education programs. Although many educational institutions now offer MOOCs (Massive Open Online Courses) and global virtual programs, students from regions with limited internet infrastructure cannot participate fully, further extending global educational inequalities (Lee et al., 2018; Grace et al., 2019). The digital divide is not just about the internet and physical access but also about the skills and knowledge required to use technology efficiently. The students who lack the necessary skills and expertise face more struggles in the learning environment, especially during the COVID-19 pandemic, which is increasing (Norman et al., 2022; Gandolfi et al., 2021). As such, the digital divide leads to the issue of digital literacy, which can significantly impact students' academic performance.

### **Advantages and disadvantages of online learning:**

The essential advantage of online learning is that it provides an accessible and flexible platform where students can study from anywhere, according to their schedule, with Internet access. This flexibility and accessibility in learning are beneficial for learners who are working. Another benefit is that digital study materials reduce book costs. Online courses provide study materials like e-books, recorded video lectures, and articles, which reduce the need for physical textbooks. However, in the traditional education system, a limited selection of courses is available for students, but online learning changes the whole scenario. Various online education courses are available, so students can take any course not provided by local education institutions (Yuhanna et al., 2020). Learners have access to online study material libraries, multimedia, and learning tools in online learning (Alexander et al., 2012; Ozerbas & Erdogan, 2024; Hall, 2024). With the rise of multimedia, students can benefit from available online learning tools such as podcasts, quizzes, and video lectures. Digital content makes education more affordable, especially for students from low-income backgrounds. With the advantages of online learning, there are disadvantages also. One of the most significant disadvantages is that Online learning is not beneficial for learners who face the digital divide problem. While internet access is widespread worldwide, there are still gaps in internet accessibility and affordability. The barriers to online learning are a lack of digital knowledge and skill, language, high fee structure, poor internet connectivity, low-quality devices, time management, and face-to-face interaction. Sometimes, maintaining discipline is difficult in online learning (Zaki, 2022). In addition to digital inequality, the lack of digital literacy creates a barrier to online learning. Therefore, learners who have not grown up with the rise of the internet may struggle with navigating online digital devices and learning platforms. Language is another challenge for online learning. Many online courses are offered in English, which can limit access to



non-English speaking students. However, some online learning platforms provide subtitles, but the quality of translation is not good. Therefore, language creates problems for students whose first language is not English. Language affects teacher and student communication, reducing the overall learning experience. Online learning reduces the cost of study materials, but some online courses charge high fees, which makes it difficult for students from poor backgrounds. However, to participate in online learning, students must invest in quality devices and internet access, which adds to their financial burden. Another difficulty is time management; sometimes, learners face problems balancing their online learning and other responsibilities. Furthermore, face-to-face interaction is not possible in online learning. In a traditional classroom setting, socializing with peers, receiving feedback, and engaging in learning activities are helpful for students. Therefore, maintaining discipline in an online learning environment is challenging.

### **Methodology:**

This review paper focuses on the impact of the digital divide on digital learning. In 1990, the digital divide was popularized by Larry Irving, the assistant secretary of commerce for communications and information in the Clinton administration (Srinuan et al., 2011). The digital divide and digital learning are less explored in sociology. In sociology, the social capital theory is relevant to studying the digital divide in online learning. In this modern world, social networks and connection can affect their access to digital resources. Relationships (formal and informal) within an institution can impact a learning environment. Through social connection, social capital converts into other forms of capital, such as accessing better internet access and devices (computer, mobile, laptop) and a better chance of gaining ICT knowledge (Bourdieu, 1986). The postmodern perspective emerges with the critique of meta-theory, and it believes in multiple truths. An interdisciplinary approach will be used to understand digital inequalities and online education because the multidisciplinary approach allows multiple approaches from other disciplines like education, mass media, communication, psychology, anthropology, economics, political science, and computer science. Secondary data sources are books, articles, journals, government reports, and online data, and all data sources include a review of different disciplines like sociology, social work, anthropology, psychology, economics, media, and communication. This review is based on secondary sources of data, data taken from published books, articles, reports, newspapers, and online data sources.



## Theoretical framework

This review paper focuses on the impact of the digital divide on online learning. To explore this concept, the Denial Bell (1975) theory of the post-industrial society provides a valuable framework for this paper to understand the digital divide and online learning. His theory focuses on society's shift from an industrial to a service economy. In this post-industrial era, information and knowledge, education, finance, healthcare, and entertainment are at the center, but in industrial society, they focus on physical work and production. However, knowledge became a central pillar of development in Bell's post-industrial society. According to post-industrial theory, digital access and literacy have changed the learning environment. Therefore, the digital divide is not just a matter of access; it also affects the economy and opportunities for individuals. Therefore, online learning and information technology are significant in participating in this new economy. The digital divide creates difficulties for equal participation in the information society, where access to digital devices and the internet, with digital literacy and skills, is necessary. However, in Bell's post-industrial society, knowledge became a central development pillar.

## Discussion:

Most studies focus on the digital divide as an issue of technological access. Researchers discuss the levels of the digital divide. The very first level of the digital divide is access to the internet. The second level is digital skills, knowledge, and language, because most websites are in English. The third level is a huge gap between classes, and the fourth level is getting the benefits of ICTs for daily life activities like e-commerce, eGovernment services, eHealth, and public services (Ragneddal & Kreitem, 2018). Some researchers argue that the digital divide is based on socioeconomic factors (Van & Dijk & Jan 2006; Jung et al.,2008; Sai et al.,2020; Wang et al.,2023). According to them, the digital divide is having the skill to use ICTs rather than access them (Attewell,2001) because, with knowledge, digital access is beneficial for individuals. Unlike other disciplines, sociology has a long history of studying social stratification. The digital divide is a part of social stratification (Hargittai,2024). Four significant factors responsible for digital inequality are motivational access, skill access, material access, and use access (Van Dijk,2006). The problem of digital inequality is not limited to internet and digital divide access; it takes new dimensions like the quality of physical access and internet access (Dijk & Deursen, 2019; Robinson et al.,2020).The primary issue was access to devices and the internet in the early stages of the digital divide. Students without internet access and devices were entirely excluded from online



learning opportunities. However, the Current Impact of ICTs on education is that the shift to high-speed internet, advanced devices, and digital literacy creates new gaps between students (Van Dijk & J, 2017). Because of the patriarchal structure of society, gender discrimination exists in every culture and society. In a patriarchal society, women have been deprived of work and education since ancient times. Several reasons are responsible for women having less access to ICTs than men (Mamporeze & Prieler, 2017). Female employees are deficient in the IT sector compared to men (Chen & Wellman, 2004; Sianou & Tsiplakides, 2012). The digital divide in online learning is complicated for disabled people who are not able to operate digital devices. Most individuals excluded from the digital divide, like females, older adults, illiterate people, disabled people, and people who live in peripheral areas (Cullen, 2001; Saha et al., 2017). The social cognitive theory defines access to digital resources, skills to use ICTs, and quality use of technology for education (Van Dijk & Deursen, 2019). Observation of learning is essential because people have limited exposure to the internet in their social environment or geographical location. Secondly, self-efficacy plays a vital role because of their beliefs about their ability to learn and use technology for learning and their engagement with online learning resources. The third is outcome expectation, which can be their online learning experience. Fourth is the goal setting of learners that can build the ability to learn online and be influenced by socioeconomic factors and their past experiences with the technology (Gruzdeva, 2022; Feruza, 2024). Digital access to devices (desktops, laptops, mobile phones), internet, skills, and knowledge affect academic performance in higher education. The students who are digitally literate and have access to the internet and good-quality devices tend to perform better academically because they can easily access online courses, virtual classes, study material, digital libraries, submit assignments, and participate in online discussions (Wang et al., 2023; Mwim & Kritzinger, 2016; Mumporeze & Prieler, 2017). The Digital Divide and Its Impact on Academic Performance. Students with digital access are more confident about participating in digital learning, enhancing their academic performance (Ben et al., 2022). Students who lack digital resources may struggle to participate in digital learning. They are facing challenges in enrolling in online courses and completing assignments. Students who do not have digital access and skills often experience exclusion, which affects their academic performance (Bates et al., 2017). Skill disparities in digital access and use make it challenging for students to navigate online learning platforms and software. Therefore, with less knowledge, skills, and digital access, time management makes it difficult to find alternative ways to access information that affects the academic performance of students in higher education (Gulzar et al., 2024; Faloye & Ajayi, 2022; Al et al., 2020; Radovanović, 2015). As we all know, modern technological infrastructure has positive impacts on society, but it also has negative consequences.



Therefore, people who cannot afford digital access face more challenges in the digital era. Several factors contribute to digital inequalities (Jung et al.,2022). Socioeconomic factors play an essential role in the digital divide. Students from wealthier backgrounds have access to quality digital devices and high-speed internet, but students from low-income families may not have the resources and knowledge to help their children take part in digital literacy (Liu et al.,2021; Wong et al.,2015; Van Dijk,2020; Gu,2021). Geographic location is also a cause for the digital divide for students from rural areas. They lack good internet connections, affecting their learning outcomes (Mahmoud et al.,2022). Educational institutions may lead to the digital divide by lacking digital resources, skills, and knowledge among the students and faculty (Selwyn,2021). The patriarchal structure creates a gender-based digital inequality between males and females in higher education. In some regions, cultural values and norms limit females' access to digital resources. Gender stereotypes also affect confidence and digital learning because women receive less encouragement and digital resources (Mathrani et al.,2020; Samudra,2022).

Here is a content analysis of the discussion provided in a tabular form:

**Table 1.1**

<b>Theme</b>	<b>Description</b>	<b>Authors</b>
<b>Levels of digital divide</b>	Categorizes the levels at which digital inequality is experienced: access to the internet, digital skills, knowledge, and benefits of ICTs.	Ragneddal & Kreitem (2018), Van & Dijk & Jan (2006), Attewell (2001), Van Dijk (2006)
<b>Socioeconomic factors</b>	The digital divide is created by socioeconomic status and class, where wealthier students have better access to resources (devices, internet, digital literacy, and skills).	Jung et al. (2022). Liu et al. (2021), Van Dijk (2020), Gu (2021), Bates et al. (2017)
<b>Digital skills and knowledge</b>	A focus on the importance of digital skills and knowledge, not just access to the internet and devices. Digital skills make access to ICTs beneficial.	Attewell (2001), Hargittai (2024)
<b>Gender-based inequalities</b>	Gender-based digital divide, with women having less access to ICTs due to cultural	Mamporeze & Prieler (2017), Chen & Wellman (2004),



	and societal norms, impacts their digital learning participation.	Sianou & Tsiplakides (2012), Mathrani et al. (2020)
<b>Geographic location and digital divide</b>	The digital divide is particularly significant for rural areas, where limited internet access is a barrier to learning outcomes.	Mahmoud et al. (2022). Van Dijk & J. (2017)
<b>Educational institutions and the digital divide</b>	Educational institutions may contribute to the digital divide by lacking digital resources and training, impacting students' learning opportunities.	Selwyn (2021), Dijk & Deursen (2019), Robinson et al. (2020)
<b>Social Cognitive Theory</b>	Theory applied to understand the role of access to resources, digital skills and knowledge, and self-efficacy in engaging with digital learning platforms.	Gruzdeva (2022), Feruza (2024), Van Dijk & Deursen (2019)
<b>Impact on academic performance</b>	Digital access is associated with better academic performance, where students with digital access can participate more effectively in online learning activities.	Wang et al. (2023). Mwim & Kritzinger (2016). Mumporeze & Prieler (2017). Ben et al. (2022)
<b>Exclusion in digital learning</b>	Students without digital access face exclusion in online learning, affecting their academic performance.	Bates et al. (2017). Gulzar et al. (2024), Faloye & Ajayi (2022)
<b>Technology and social inequality</b>	The digital divide is part of broader social stratification, where individuals' socioeconomic background, gender, class, caste, and geography influence their access to ICTs.	Hargittai (2024), Van Dijk (2006), Cullen (2001), Saha et al. (2017)
<b>Good Quality of internet Access</b>	Emphasis on the quality of access to digital resources such as high-speed internet, reliable devices, and the level of digital literacy.	Dijk & Deursen (2019). Robinson et al. (2020)
<b>Access to Devices</b>	Lack of access to digital devices such as desktops, laptops, and mobile phones was a	Van Dijk & J. (2017), Ragneddal & Kreitem (2018)



	major early issue in the digital divide.	
<b>Technological Infrastructure</b>	Modern technological infrastructure has a positive impact, but also creates new inequalities. Those who cannot afford digital access face more challenges.	Jung et al. (2022), Liu et al. (2021), Wong et al. (2015)
<b>Digital learning</b>	Self-efficacy, or the belief in one's ability to engage with digital learning, is vital in determining engagement and performance.	Gruzdeva (2022), Feruza (2024)

### Conclusion:

Nowadays, life is based on ICTs, and the internet plays an essential role in every sphere of life, like health, education, economy, travel, business, entertainment, etc. Patterns of lifestyles have changed from traditional to modern society, but social stratification is always present in every society. When we talk about an ICT-based society, the problem of digital inequality exists in every culture. However, the internet has positive and negative effects on everyday life. With the rise of the internet, the problem of the digital divide increased everywhere in society. Education plays a vital role in human life; with the rise of ICT, education relies on the Internet, but digital inequalities affect the education system. As we already discussed, the factors responsible for digital inequality are class, gender, status, geographical location, age, income, and lack of knowledge. In conclusion, using ICTs and the Internet has changed the educational environment. The use of ICTs has both positive and negative consequences on higher education. Government and educational institutions should invest in providing quality internet connectivity and digital devices for students and faculty. Institutions should also implement comprehensive digital literacy programs to help teachers and students become affordable. As we all know, most teachers belonged to that generation when the internet was not much of a privilege; they needed special training to create an inclusive digital learning environment. However, in changing times, people have come to depend on online learning because they have less time for education due to their busy schedules. Online learning benefits people because there is no barrier to geographical location, age, gender, time, class, or status. Learners who have quality internet access and physical access can enroll in online learning platforms. The barriers that affect online learning are a lack of interaction, language, and digital skills, the high price of paid platforms, poor internet services, and the availability of digital



devices (computers, laptops, phones). People with high incomes get the best quality internet and devices, unlike poor people. Due to this class stratification, discrimination exists in online learning.

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