Digital Divide in Higher Education System in Odisha

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Synopsis

The “perceived difference between those who have access to the newest information technology and those who do not” is referred to as the digital divide (Compaine, 2001b, p. xi). The digital divide is commonly measured by means of computer ownership and internet access (Kastsinas and Moeck, 2002; Parker, 2003). The two groups of people on opposite sides of the split are referred to as "haves," or "information rich," or "have-nots," or "information poor," respectively, in literature. In the "knowledge economy," the former has the most powerful computers and has the finest internet access to strong streams of continuous information, whereas the latter does not (Cullen, 2003, p. 247). In today's society, information is a "development resource," and "the lack of trustworthy information is the heart of underdevelopment" (Kargbo, 2002, p. 97). In today's society, information is a "development resource," and "the lack of reliable information is the essence of underdevelopment" (Kargbo, 2002, p. 97). Information is essential for societal advancements in education, culture, science, and technology, as well as individual personal and professional development.

Apart from greater internet access, there has been an upsurge in web-based educational programmes, which have received mixed reviews (Kahn, 1997). The rise of digital libraries merely adds to the problem (also called electronic or virtual libraries). According to Jonassen et al. (1999), web-based education is linked to constructivist learning environments, which are technology-driven environments in which students can contribute something meaningful and useful. Technologies provide students with the ability to explore, experiment, construct, and reflect on their work so that they can learn from it. The use of information resources is important in this method, as it is in many other models, including collaborative learning models. The effective use of information and resources has become increasingly important in academic life, in addition to the workplace and daily life. All of these are susceptible to the digital divide.

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Chapter 1
Introduction

The digital divide is the difference between people who don't have access to information technologies and those who have. The Internet and computers are the most common examples (Dijk, 2017). The digital gap is a barrier to the information society because it indicates a disparity in access and use of information and communication technology (ICT). ICT use is primarily driven by habit, skills, and compassion (Goncalves, 2018). A transition from an emphasis on binary internet access (first-level digital divide) and internet skills and use (second-level digital divide) to a third-level digital divide in which actual benefits of the internet users are considered is needed, according to several scholars (Scheerder, A., 2017 et al.). Rapid technical change usually occurs in waves.

New information and communication technologies (ICTs) are being adopted at breakneck speed, but distribution patterns are less obvious and changing swiftly (Campbell, 2001). To develop an information-centric society, technological change is a major step. A robust IT infrastructure leads to a digital divide, which has an impact on society's growth and development by propelling some people who have access to knowledge and denying others who do not (Malhan, I. V., 2003, et.al). A digital gap is the unequal distribution of ICTs (access to, use of, or influence of ICT) among various groups. These groupings can be classified based on social, geographical, or geopolitical factors (NTIA, 1995).

According to Hargittai (2002), the digital divide study should not be limited to a binary ICT access classification. To comprehend the digital divide, a spectrum of inequalities across population segments should be considered, based on differences in the various dimensions of ICT access (Srinuan, 2012). Norris (2001) and the OECD (2001) also pointed out that there may be a digital divide within and among nations. The digital division on three levels was explained by Norris (2001). The digital divide, or the so-called global divide, has become starkly visible between advanced and emerging economies. The imbalance in access to and use of information and communication technology (ICT) among different sections of a country's society is referred to as the community divide. The varying degrees of ICT access for groups with various socioeconomic characteristics can be noticed in a country.

The democratic gap refers to the inequality in community life between those who use and those who do not use information and communication technologies in the third phase (Srinuan, 2012). The word was loosely used to convey the inequalities

between persons using technology-enabled devices or, more specifically, the differences in their Internet admittance at the commencement of study into the digital divide. According to DiMaggio (2001) and Hargittai (2002), the inequality gap study should not be restricted to a unilateral way hence a connection should be there with ICTs. To comprehend the digital divide, it's also necessary to evaluate a spectrum of inequality among population groups, based on variations in several dimensions of ICT access and use (Chakraborty& Bosman, 2002).

Per capita income differentials and human behavior parameters are important in describing digital divisions in Asia and the Pacific region. On the other hand, it is also important to describe regulatory efficiency, in the form of ICT facilities and institutional conditions. In the past decade, several nations have been continually developing ICT infrastructure and services, which have led to the region becoming a world leader in ICTs, despite its low penetration rates (Chakraborty & Bosman 2002). Furthermore, due to the slow pace of reform, competition in domestic fixed-line and internet services sectors has emerged in some countries.

The progress of ICT-enabled services may vary in comparison with European countries as the growth path and government interventions are different. The shift from monopoly to competition is both hard and time-consuming, with various administrative issues and delays. Delays in executing this shift restrict business investment and growth, as well as deter new entrants from investing in infrastructure. As a result, telecom service providers are reluctant to offer new products and technologies, resulting in considerable social losses (Prieger, 2007).

1.1 Evolution of Digital Divide

Information and communication technology (ICT) is one of the key engines powering modern civilization. ICT has swiftly expanded and spread (Nandi, 2002) in all domains of human activity around the world, and this trend continues, particularly in the economic and social realm. ICT allows for interactive communication regardless of distance, volume, medium, or time, while lowering coordination costs (Fletcher et al., 2000). ICT has transformed the way people do business (S. Singh, 2007). The Internet and its low-cost technology, such as e-commerce, have given firms new opportunities and transformed the whole corporate world to be global. The new economy and networked society are rooted in virtual reality. The economic and social absence of the information or knowledge revolution is needed to be connected. This idea of the social polarization between individuals, groups, and regions as long as the observers noted the socio-economic significance of technical transformations, was emphasized because they are separating themselves from instruments and the content of the information revolution (Graham, 2011). Progress in ICT is one of the technological changes defined at the end of the 20th century (Castells, 2001). The focus was on personal computers (PCs), video games, television (TV), and telephones. Even before the invention and coining of electronic computers, there was a widely held belief that communication technology would lead to positive economic and social

development on a global scale (Marvin, 1988).

The impacts of one or several of these technologies are the focus of current debates in the social sciences. With the latest developments, the internet became widespread in the 90s to connect multiple forms of ICT. Singer (1970) stressed worldwide dualist technology between rich and poor countries, while UNESCO used the phrase "New World Information Order" (Mowlana, 1997). Similarly, Castells (1998) argues that the digital revolution will increase socio-spatial segregation by resulting in "dual cities" of people with radically distinct knowledge domains. With the expanding number of users on the market, Castells (2001) maintained the growing interest in the worldwide web. He asserted that there were over 800 million computer communications network users in the world in early 2010 and that at the end of 2001 there was a massive increase of over 300 million users. The numbers are projected to continue to grow shortly with reliable projections predicting the billionth regular internet user is expected to arrive in 2020. Despite these forecasts, internet usage is not universal (Srinuan, 2012).

In the US, the 1990s were not just a time of great enthusiasm, as the Eastern Bloc collapsed, but also a time of great expectations, given the rapid expansion of the Internet. Since 1994 (Network Wizards, 1999), this Internet application known as World Wide Web has grown at an exponential rate, coinciding with NCSA's graphical Mosaic interface to "navigate the world-wide website" (Hoffman, Novak, & Chatterjee, 1995). In the early years of digital division research (1999–2002), the focus of research on the notion was on a narrow definition of access. This was physical access: the acquisition of digital media hardware and software and Internet connectivity. The overall demographical access such as income, education, age, gender, and the race was correlated to physical access. Digital Divide Research is an activity that began around the year 2000 with a particular focus on the sciences of communication, sociology, psychology, economics, and education. The science of communication focused on digital media access and use. Sociology emphasized social inequalities as regards resources, capital of all kinds, and social participation. Psychology analyses phenomena such as anxiety and technophobia in computers, as well as attitudes and motives for using digital media (Hoffman et al., 2000).

The rise of ubiquitous computing and peer information production (Graham, 2011) will almost certainly make increasing use of the digital divide for integration with the numerous ubiquitous networking technologies already in use (Greenfield, 2006). The main goal was to equate the 'digital dividend' with internet access, as the internet remains the focal point of most current talks about the ‘digital divide’. Nevertheless, the term can be considered significant, keeping track of concurrent technological changes, rather than having any fixed meaning. The nature of digital divide research was nevertheless extremely descriptive until around 2005 (Van Dijk, 2006). The theory was missing. income, education, age, gender, and ethnicity demographics were stressed in conjunction with physical access. This brief history of the digital divide reveals the symbolic, practical, and opportunistic explanations for the perplexing possibilities of ubiquitous computer and internet use. The inclusion of

computers and the internet in numerous worldwide economic declarations emphasize the implicit promises of these technologies and explains why several individuals, organizations, policymakers, and organizations have bought into the dictum that computer use equals economic growth and better social conditions (Stover, 2014).

In practice, the digital divide has established national, state, and local programs, to provide a broad range of institutions with more equipment and connections. The importance of greater computer literacy to employment development through access to equipment and training was a substantial reason for these endeavors. However, there has been a continuous lack of focus on equipment and acceptance of the ostensible need for computer training. Over 10 years from 2008 to 2018, OECD revenues in the telecommunications industry averaged about 2.8% of gross domestic product (GDP). The total growth of sector revenues in the OECD region was slightly negative between 2016 and 2018 as a percentage of GDP. There has also been a downward tendency since 2008, with sector revenues falling from 3.2 percent to 2.4 percent of GDP at the end of 2018. Investment as a percentage of GDP, on the other hand, remained relatively steady over the same period, declining from 0.5 percent to 0.38 percent[1].

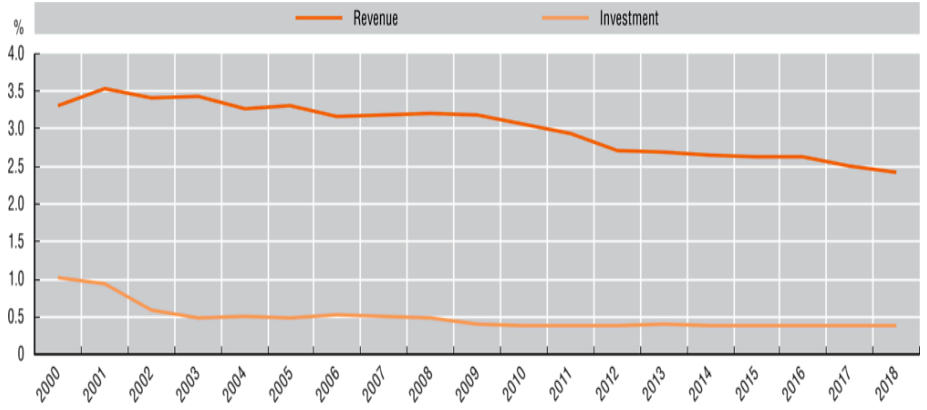

Figure 1.1: Telecommunication sector revenue and investment as a percentage of GDP in the OECD area (2000-2018)

Source: OECD (2020[6]), OECD Telecommunication and Internet Statistics (database), http://dx.doi.org/10.1787/tel_int-data-en (accessed on 18 May 2021).

Canada, the Netherlands, Denmark, France, Sweden, Switzerland, and the United States are among the OECD's historic leaders in fixed broadband coverage. Korea was far ahead of the rest of the OECD in the early 2000s. It has a fixed broadband penetration rate of more than 20 subscriptions per 100 people in 2001. Korea has achieved this rate when other OECD countries were still in the early stages

[1] OECD (2020[6]), OECD Telecommunication and Internet Statistics (database), http://dx.doi.org/10.1787/tel_int-data-en (accessed on 18 May 2021).

of developing residential broadband. However, in the previous two decades, the difference between. OECD countries has narrowed. In June 2019, Switzerland, Denmark, France, and the Netherlands led to fixed broadband penetration2. The following figure shows the fixed broad band penetration by OECD countries from the year 2000 to 2019.

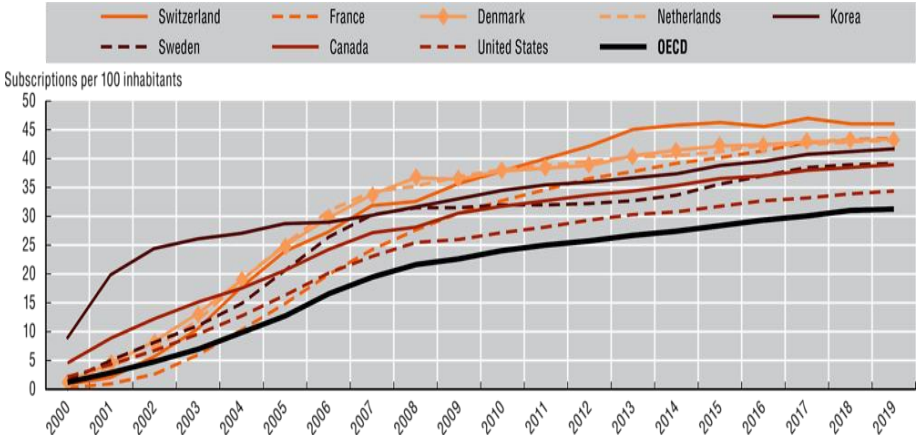

Figure 1.2: Fixed broadband penetration, historical leading OECD countries, 2000-2019:

Source: OECD (2020[8]), Broadband Portal (database), www.oecd.org/sti/broadband/oecdbroadbandportal.htm (accessed on 19 March 2021).

From 2000 to 2019, the number of mobile broadband connections has also increased. Broadband is a crucial driver of economic growth because it increases corporate efficiency, builds human capital through online education and digital civic involvement, creates knowledge-based opportunities, and makes vital services like telemedicine and phone banking more accessible (Prieger, 2012). According to empirical estimates, rural areas in the United States had fewer fixed high speed and mobile providers than metropolitan areas, but mobile providers are slower than fixed providers. Rural locations have less access to mobile broadband than urban areas, although it helps to fill up gaps in rural fixed internet connectivity. The following figure shows the mobile broadband evolution between OECD area, world, and world excluding OECD.

The presence of PCs and the extent of internet access in homes is a significant determinant of domestic or individual income. The distribution of income is

[2]OECD (2020[8]), Broadband Portal (database), www.oecd.org/sti/broadband/oecdbroadbandportal.htm (accessed on 19 March 2021).

particularly crucial early in the adoption of new technologies, as early and prematurely higher income groups purchase ICTs (OECD, 2001). Learnings and incomes are strongly linked and explain a large amount of the difference in consumption. In addition, those who have better education will have higher access rates at the same level of income. In the OECD countries, mobile network usage increased by 49 percent per year between 1995 and 1999, compared to four percent for fixed networks. In addition, digital services offer more advanced Internet-based services in an increasing number of OECD countries (OECD, 2001). But, as a result of slow access and ongoing price models of providers, mobile Internet access is still relatively expensive. Internet access will get a boost if the price decreases significantly, in particular regarding fixed access prices (OECD, 2001).

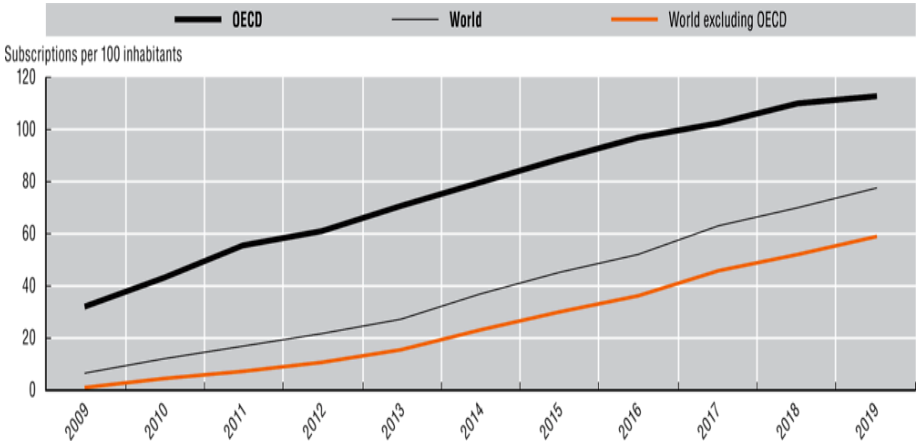

Figure 1.3: Mobile broadband evolution, OECD area, and World, 2000-2019

Source: OECD (2020[8]), Broadband Portal (database), www.oecd.org/sti/broadband/oecdbroadbandportal.htm (accessed on 19 March 2021.

1.2 Indian Scenario

India is the second-largest nation behind China in the Asian region. The country has advanced significantly in science and technology, and it is now one of the world's most powerful economies. As a result of knowledge diffusion, ICTs have had a tremendous influence on the formation of Indian society. Today's technology is similar to what machines were during the industrial revolution. They are the most instrumental factors for the overall progress of the countries like India. In today's scenario, without the application of knowledge-based digital divide techniques, it won't be possible to survive in the long run. It is important to understand that the world had seen many developments and growth of industries in the different segments but IT-enabled services are the ones that changed the dynamics of the business environment. This change in infrastructure-enabled growth was first observed in developed countries and the same subsequently trickle down to the lowest part of other

emerging countries as well. Hence, post-liberalization period India also witnessed the growth of IT-enabled services, and a clear road ap was also developed during this same time frame. With the growth of this new industry, it also came to the notice that IT services started creating disparities as the cost of availing services was not the same for all the segments of the society (N. Singh, 2007).

The key to the information society's growth and development is regarded to include e-learning, e-library, e-health, e-government, and other information society pillars. UN Secretary-General Kofi Annan held a world conference in Geneva in 2003 to address this issue. The summit aims to create a shared vision and understanding of the information society, as well as a comprehensive strategy to fulfill that vision within the context of adaptation efforts. There has always been a separation between people who can efficiently utilize IT and those who can't, resulting in a digital divide that is critical to the governments of developing countries (N. Singh, 2007).

IT and computerization started in India in 1978. The Indian government resolved in 1985 to enhance district IT usage. As a central governmental institution, a nationwide program called "DISSNIC," the information system for the National Information Center (NIC), for computerizing all district offices was chosen. It was a huge accomplishment to commission nearly 500 computer centers and connect them to a national network (Dutta, S, 2003). As the IT industry progressed rapidly, remarkable social changes have taken place in India in some places. But this growth has its negative sides as well. People had a fair that it will lead to job loss. People's attitudes have shifted dramatically in recent years. Many state governments are promoting the IT industry. "Cyber City" refers to cities like Hyderabad, Pune, and Bangalore (N. Singh, 2007). The digital divide in India is not only limited to less developed states with traditionally weak infrastructures (Bihar, Uttar Pradesh, Rajasthan, and Orissa) but also in developed states (Karnataka, Tamil Nadu, and Andhra Pradesh) (Rao, 2005).

In India, the development of telecommunications has gained momentum over the last decade. Attempt to improve telecommunications infrastructure has been made both by government and non-governmental entities. The idea is that the modern technologies of telecommunications should serve and cover all sections of India's diverse culture to convert it into a technologically sound country. Different studies such as DiMaggio et al., 2001 have shown that in developing countries such as India, the problem of the digital divide is greater. Although the largest cities are in developed states, states like Bihar and Orissa are less developed than many others. The problem needs to be further examined in three sections - the division of teledensity, the division of mobile phones, and the division of the internet between rural and urban India (Singh, 2007).

Providing universal and cost-efficient access IT enabled facilities for narrowing the digital divide in which the priorities are the development of telecommunications and IT infrastructure. In 2003, India's government marked the 150th anniversary of Indian telecommunication. In the improvement of its telecoms sector, the country has gone a long way. Only 80,000 telephone subscribers were there

at the time of independence, mostly in government organizations[3]. Professionals in software contribute more than a quarter of the overall export income of the country. Rapid technical advancements have also resulted in a vast division of information in the country. Unfair information linkage has placed the government in a difficult position, forcing it to take action to close the gap. The government and non-governmental organizations discussed some of their initiatives to close the country's digital gap (S. Dutta, 2003). Digital consumption is being driven by both the public and private sectors. Over 1.2 billion Indians have been enrolled in the government's biometric digital identification program, Aadhaar, and over 10 million businesses have been put onto a shared digital platform via a Goods and Services Tax code. The problem is that ICT adoption varies greatly not only across nations but also inside a country with a digital divide (Kaur & Singh, 2016). There is a significant urban-rural digital divide in India, as evidenced by telecommunications, mobile users, and internet users' indices. The infrastructural telecommunications gap, which results in an information gap in rural and urban areas, is one of the major reasons for the country's continued digital divide between rural and urban areas (Kaur & Singh, 2016).

Telecommunications services constitute the backbone for these applications, as well as several other important service sectors in the economy, such as banking, health care, education, and so on. Mobile telephones have become much more available than a communication device because of increased access to smartphones at much cheaper rates, and various services becoming increasingly connected through mobile phones, the Internet, and other digital delivery modes,4G services are growing and have given an incentive to the data revolution that took advantage of these services. The future of the telecommunications landscape is hopeful with the advent of 5G technologies, and the evolution of 5G would highlight various new applications/techniques such as artificial intelligence, quantum computing, virtual reality, etc. 5G produces data with an unprecedented speed and a huge volume (TRAI Annual Report, 2019-2020).

In India, predicting the future of the digital divide is extremely difficult. However, the current situation in India is not frightening. The digital divide is indeed closing (Singh, 2010). Government measures and public-private partnerships are expected to help close the digital divide (Singh, 2010). However, because gender, age, culture, language, sex, and other characteristics are all key components of daily activities and experiences, including the virtual world, the digital divide in India cannot be bridged.

1.3 Indian Scenario

The amount of interaction between people and computers has expanded dramatically in the twenty-first century. If we are to completely immerse ourselves in the economic, political, and social aspects of the world, computers and the internet are becoming increasingly crucial. "Digital Divide" refers to the widening difference between rich, urbanites who have an internet connection and poor, rural, and

[3]Gosh, Shyamal. (2004) "Indian Telecom Scenario." Yojna. 48, no. 1: 20.

disadvantaged persons in society. Many aspects of life and society around the world have been radically impacted by the rapid development and distribution of ICTs. The Internet, in particular, has had a huge impact on how we live, communicate, work, learn, and socialize. ICTs have become an indispensable aspect of modern life (Acilar, 2011). Many factors affect internet access. Some of the major digital inequality gaps include:

a) Income inequality: The existence of a personal computer and internet at home is mostly determined by the household or individual income. Not surprisingly, the levels of household incomes play an important part in the widening gap, in the direct connection with education. Because of lower levels of income, poor neighbourhoods lack infrastructure which is found in affluent communities. The telecommunications facilities for wealthier communities are easier to access. Poverty in less developed neighbourhoods, therefore, makes it less attractive for external investment, and that further exacerbates the divide. In the spread of new technology, the distribution of income is important because higher income groups take an early lead in acquiring ICTs (OECD Report, 2018).

b) Gender and age divide: The Internet gender gap in developing countries, in particular, is striking according to a 2018 report by OECD. Although mobile access is very well extended, it is not equally widespread. Women are still trailing behind their male counterparts. 1.2 billion women in poor and middle-income nations do not have internet access, even if they do have cell phones. During and after school, women use computers and the internet less frequently than men (Hakkarainen et al., 2000). Women are less likely than men to know about using a phone, accessing the internet, and using social media to safeguard data in the digital world (functions underlying life, work, and people of all ages). There is a distinction between the lowest level of competence such as mobile applications and the most sophisticated computer coding tools for analyzing massive data sets (West et al., 2019).

For older people, penetration of computers and internet access is usually lower than for younger people. In younger age groups, usage has tended to grow faster. The 35–45-year age group seems to be the highest users. The patterns of age between countries are more or less similar (OECD Report, 2001). Many older adults are physically or mentally disabled and financially insecure. They can't afford an internet connection or don't have transportation, which puts their health at risk, as well as their sadness and desire to use computers in public places. Rich older people who live alone may find it beneficial to use the Internet to obtain health information, shop, bank online, and communicate with friends and family via email or social media. They would also benefit from the Internet (Cotton et al., 2013).

c) Social divide: Internet access brings people together who share common interests and social circles. The social stratification of internet use has been impacted more than ever before in communities that are and are not connected to the Internet. Unconnected groups are separated because they cannot have the advantages of connected groups over the internet. This is evidenced by cultural differences in access to and effective use of technological resources between and within countries. Once connected, the internet and ICTs can assist people in developing their future social and cultural capital (Acilar, 2011). Another technique to accomplish recurrent contact is

through the use of the internet (Mossberger et al., 2006). Repeated connections, chat rooms, and game sites are all possible with Internet networking and social network access. When someone has access to ICT connectivity, he/she has the facilities to communicate, understand and use the knowledge that ICTs provide and he/she becomes a "digital citizen" (Mossberger et al., 2006).

d) Disability divide: Persons with physical disabilities often find access to the Internet disadvantaged. Skills may be needed, but they would be unable to use the hardware and software that they have. Some areas of the world are isolated from the World Wide Web, despite its vast potential due to the lack of digital learning; low educational levels, and limited broadband facilities. In the case of persons with disabilities, about non-disabled people, there are inequities in access to information systems. According to Fox, S. (2013), 54 percent of disabled people have Internet access at home, compared to 81 percent of families with Internet access but no disabled person. A person with a quadriplegic disability, for example, can prohibit himself from engaging with a computer screen or smartphone. For people with cognitive and auditory impairments, access to technology and home internet is still limited. There is fear that increased IT technology use would either improve accessibility by creating possibilities for persons with disabilities or aggravate existing inequity and push people with disabilities further behind in society (Lazer et al., 2017).

1.4 Inferences of Digital Divide

The digital divide established a new paradigm for differences in culture that has had a significant impact on people's lives all over the world. In today's environment, having access to the Internet causes full inequality and alienation (Steele, 2018). The study of ICT use across countries reveals immense changes in other life facets, given the internet's central position in our daily lives. Although income and literacy levels are the key causes of the digital gap, they only account for a part of ethnic and racial disparities in access to homes and workplaces. Education, job prospects, connectivity, politics, customer happiness, health information, community participation, governance, and emergency information are all impacted by the digital divide (Steele, 2018). Because technology is so crucial to a country's progress, industrialized countries must discover ways to bridge the digital divide. Some efforts to fill this hole, such as scholarships and awareness camps, have shown to be good, while others, such as supporting public technology experience, have proven to be unproductive and, at times, detrimental (Mossberger et al., 2006).

1.4.1. Economy and Digital Divide

Telecommunications services stimulate economic growth. A country's economic efficiency is enhanced by broad internet use. People may shop online and avoid traffic jams. Unprocessed purchases are a straightforward approach to gaining economic power. Especially developing countries, with insufficient ITC integration, are widening their economic gap. The provision of telecommunications services is critical to economic development, and the two are inextricably linked. Surprisingly, one of the primary causes and implications of the digital gap is social standing.

Citizens can easily participate in economically beneficial actions such as trading thanks to the widespread use of the internet. They can shop and compare prices online, participate in online auctions, and conduct healthy, stable, and economically empowered transactions online. Trade is becoming hectic for the group which lacks technology access and returns are being reduced, thus maintaining an extensive economic gap between developing and underdeveloped nations. Since rich countries can compete, emerging markets cannot continue to rely on grants and donations. ICT integration affects a company's performance and, as a result, the flow of capital among people.

1.4.2. Society and Digital Divide

The digital divide has worsened demographic stratification due to their literacy levels, resulting in a class of people who have Internet access and a class of people who do not. The digital divide in society is exacerbated by factors such as age, race, and ethnicity. Because of the digital gap, people are being judged based on their ability to access internet resources and the benefits that come with it. The technology generates new alignments between people who have and those who do not have internet access. Those who have limited access continue to postpone their creation and growth. Integrating ICT programs has been important in developing people's social experiences. Social media platforms such as Facebook and Instagram aided in collaboration and the maintaining of intimate connections with friends and family. Technology has a significant impact on social connections and as we incorporate ICT into our connections, new social possibilities emerge. People can now keep in touch with old friends or make new ones in packed chat rooms. Furthermore, the Internet provides a wealth of knowledge on people's cultures and religions, all of which are critical to social ties. Individuals with internet connectivity have access to a broad range of resources, resulting in a socioeconomic divide between the wealthy and the poor. In societies where rich people have computers and internet access but poor people do not, such segregation has the potential to spark societal upheaval. On a personal level, attempts to bridge the gap caused by inappropriate acts such as robbery have resulted in the breakdown of societal peace.

1.4.3. Society and Digital Divide

Technology influences different cultures, both positively and negatively. Connections, communications, and art have all benefited immensely from technological advances. However, it appears that certain rituals and cultural practices have not been forgotten. The developed world undergoes significant cultural changes as a result of adopting new Internet-acquired cultures, while the developing countries with restricted internet access maintain their culture. The development of developed countries is critical to closing the global ICT divide (Acilar, 2011). In the case of underdeveloped countries, increasing technological expertise is a quick approach to boost economic growth. The effect on the downside is sobering and straightforward to lessen, if not remove, because the digital gap is vital to the defence of specific communities.

1.4.4. Education and Digital Divide

The internet is a vast repository of knowledge. We can now learn specialized skills on several educational channels more than ever before. Academic achievement and excellent scientific research have been related to ICT access. It gives the mind the ability to educate itself. This dynamic sector is crucial if an individual and society are to achieve remarkable success (Albert et al. 2019). The Internet provides a wide array of knowledge and information. Computers are well organized and transmitted over the Internet and are a common activity within the developed world. Computers are the right to use computers. Since users may relate to it easily, access to and availability of ICT has been related to academic performance and solid study. Education is a very complex field, and it is important to keep up with the latest findings. Our research capabilities will be revolutionized and updated as a result of the availability of Internet access. The insufficiencies of ICT devices in developing countries have rendered the already weak education system even ineffective (Billon et al, 2009). Government efforts are now being made to make use of schools' ICT services to improve standards of education. Every student was successful, including installing computing laboratories and providing laptops, among other strategies.

The integration of IT in education has transformed society drastically, especially for those who can access the services. In contrast, the people who cannot access these services remain in the dark, which leads to a new stratification of society, whereby the has-not remain conservative to the old ideologies while the has-not become more vibrant with new ideas. The huge discrepancies in access to IT can be geographic or socio-economic and this rift adversely affects the education sector. The effects of the digital divide are perceived at all levels of life, and how the digital divide concerns education should be questioned. Access to ICT is a broad topic in this era of technology which involves access to equipment, software, accessories, and networks, and unlimited access to reliable information, in particular in the formal education setting. Because they do not have access to the internet, low-income families have restricted access to information, which is crucial for their education and new ideas. As a result, the majority of students in low-income areas enroll in theoretical programs that do not require considerable study. Because of the scarcity of information available to such students, they frequently avoid enrolling in classes or, if they do, perform poorly.

Many universities around the world are currently employing technology, and the vast majority are online activities, including tasks and the display of learning material. This makes superior students more competitive against their less privileged counterparts. The poor will be left without critical information on the internet, and they will always be lagging, and this can be synthesized by poor performance. If the gradation system is made online, people in the lower divisions are unable to monitor and strategize their progress and thus are often not motivated to continue. Education needs to be liberating and often regarded as a living factor that standardizes. By gaining knowledge, students can face life situations and offer solutions to promote a country's development. The vast digital gap in education is a key impediment to the developing world's progress because it prevents it from inventing new technologies and doing research to improve people's living conditions.

This research is based on the effect of the digital divide on the education sector in Odisha, India. The next sections will concentrate on the education sector of India and the influences of the digital divide on this sector. The study will help identify and sensitize the digital divide in the higher education system, which will enable governments to modify policies in the future so that the digital divide gets narrowed. This research will help students and other stakeholders indirectly access digital consumption and benefit from it.

1.5. Education Sector in India

Education is essential for achieving human potential, building an equitable society, and advancing national progress. India's continued rise and global leadership in economic development, social fairness and equity, scientific innovation, national integration, and cultural preservation are critical for ensuring equitable access to high-quality education. In the next decade, India will have the world's greatest youthful population, and we will shape their destiny by providing a high education.

The education sector in India is a developing sector, though it is a huge field because of its low literacy rates, high urban concentration, and increasing per capita income. Higher education is becoming increasingly important for developing countries, particularly those with service-led growth like it is in India. Higher education's objective is to develop information while also encouraging socially useful skills and critical thinking (A. Singh, 2016). There will be four guiding principles in the development of higher education in India in the twenty-first century: access, equity, accountability, and quality.

In India, education is imparted through the public and private sectors, with three levels of supervision and funding: central, state, and local. In India, from at least the 5th century BC Takshila was the earliest recorded higher education school, and it is arguable whether it might be considered a university. Nalanda University was recognized as the world's earliest university education system in the modern sense. In Indian society, the British Raj laid the groundwork for western education (Patel, 2013). The Indian Constitution recognizes education as a fundamental right in several areas. The majority of Indian institutions are run by the Union or state governments. India has made significant progress in increasing primary school enrolment and literacy to nearly two-thirds of the population. The enhanced education system in India is generally cited as a key component in the country's economic progress.

After India gained independence in 1947, the first Prime Minister, Jawaharlal Nehru, is credited with fostering public education. Maulana Azad, India's first education minister, envisioned a unified education system with strong central government control over education across the country (Patel, 2013). It could also formulate national education development strategies and control certain sectors of Indian education. The National Education Policy was developed by the Indian government in 1968 and 1986. (NEP).

Over the years, India's social, economic, and worldwide development has changed. Following the 2011 census, India 2011 has a literacy rate of 74.04%. The

Right to Education Act was introduced in India in 2010. This Act's main aim was to provide all children aged between 6 and 14 with free education. The Indian government committed itself to improve the quality of education provision within the 12th Five Year Plan for 2012-2017. The figures below demonstrate the level of literacy between 2001 and 2011.

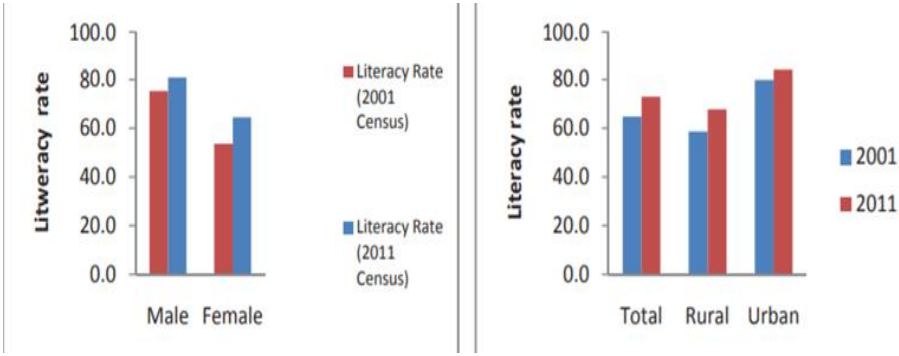

Figure 1.4: Literacy Rate in India (2001 and 2011)

Source:http://mospi.nic.in/sites/default/files/publication_reports/SelectedSocioEconomicStatisticsIndia2017_27oct17.pdf

The Government has struggled to improve its citizens' education. It is predicted that 104.62 million new workers will enter the labour market by 2022. As a result, India would need to produce 8.1 million jobs per year[4]. The present system of education in India consists of primary, secondary, senior secondary, and higher education. The creation of skilled workers is an important area of technological and vocational education. It increases productivity in the industry and improves the quality of life. Technical training is generally referred to as post-secondary training and offers practical training to work as technicians or supervisors in general. Vocational training refers to lower-level training and education for skilled and semi-qualified individuals in a variety of occupations that do not lead to a higher educational degree. The Annual Status Report on Education (ASRE) reports shows that, while students graduate each year in higher education, very few perform at their desired level (S. Menon, 2020). The pandemic has led to an increase in online training, and these trends are likely to continue. The ASRE 2020 report showed that this year 5.3% of rural children in the six to ten years of age bracket did not enroll at school, compared to 1.8% in 2018.

The climate is evolving rapidly in the information landscape. Many unqualified workplaces around the world can be filled by computers, while the demand for skilled people, including mathematics, computer science, data science, as well as multidiscipline skills in science, social science, humanities, and technology, is especially large. With climate change, increased emissions, and dwindling natural resources, the world's electricity, water, food, and sanitation requirements will shift dramatically, necessitating the need for new skilled labour, especially in the biological, chemical, physical, and agricultural, climatic, and social sciences sectors. As India

[4]Indian Economy Survey, 2017, OECD

develops as one of the world's three major economies, demand for humanities and art will rise. The National Education Policy 2020 (NEP 2020), which spells out a vision for the country's new education system, was ratified by India's Union on July 29, 2020. The Indian government produced the New Education Policy of 2020 to succeed the 34-year-old National Policy on Education, which was drafted in 1986. The Union Cabinet has approved a new education strategy that includes comprehensive academic and educational reforms, including instruction. The goal of this new policy is to instill in students a deep sense of pride in themselves as Indians, as well as to create knowledge, skills, values, and provisions which encourage responsible involvement with human rights, environmental sustainability, global welfare, expressing a truly international citizen (NEP, 2020).

The New Education Policy extends the age of compulsory education from 6-14 years to 3-18 years. The NEP has so far opened the school curriculum to children aged 3-6 years for three years. The new system would consist of 12 years of formal education and three years of Anganwadi work (pre-school education). The Higher Education Commission of India (HECI) would be established as an overarching framework for higher education, except medical and legal education, under the new strategy. The same regulatory, accreditation, and academic criteria will apply to both undergraduate and post-graduate institutions. Under NEP 2020, the division between science and arts, between curricular and extracurricular activities, and between professional and university streams will not be rigid. Students can choose topics across the streams as per their choice. In sixth grade at schools, vocational training starts and includes internships. Taking the current situation into account, the policy aims to encourage online learning by offering the correct digital infrastructure and bridging the digital gap that exists.

India’s education industry has seen a huge growth in the number of universities and colleges since independence. Indian education management is beset by over-centralization, red tape, and a lack of accountability, transparency, and professionalism. The administrative burden on universities has expanded considerably as a result of the expansion of linked colleges and students, and the primary concentration on academics and research has deteriorated. By 2020, India will have over 1000 universities, with 54 Central Universities, 416 State Universities, 125 Deemed Universities, 361 Private Universities, 7 State Legislative Institutes, and 159 National Institutes, including IMI, AIIMS, IITs, IIITs, IISERs, and NITs (Press Information Bureau, Govt. of India, 2020). According to the MHRD in 2020, other institutions include 52,627 universities, including public universities, private colleges, independent institutes, and universities that work inside the MHRD. Universities are divided into three categories: traditional universities, deemed universities, and nationally significant institutions. Deemed Universities are established by central authorities during the formation of Conventional Universities by the Act of Parliament or State legislatures. Parliament has designated National Institutes of Importance (Ravi, 2015). The regulatory framework of the Indian higher education sector is depicted in the figure.1.5.

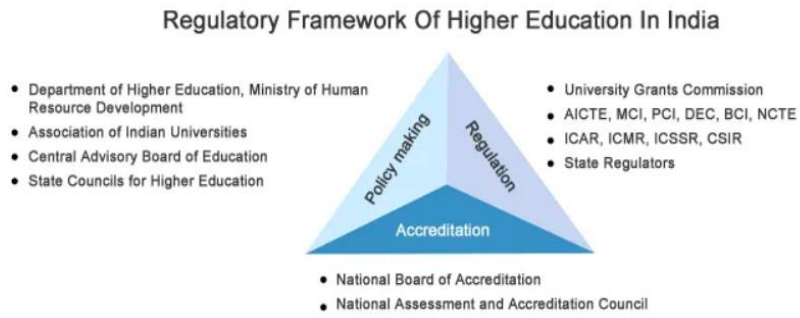

Figure 1.5. Regulatory Framework of Higher Education

Source: https://www.drishtiias.com/to-the-points/Paper2/higher-education-in-india-1, accessed on 25.03.2021

India's presence on the global map is visible, but the country is in the transit state to fulfil everybody's objectives and expectations. The recent initiatives of the government are welcomed but must be speeded up in their implementation. Global reforms in higher education have been significant and consistent. India will depend substantially on its human capital to be a globally competitive country. The presence of huge challenges calls for choosing the successful strategies carefully that lead to real and lasting results. Studying in Indian higher education needs, challenges and opportunities would help take the necessary steps to confront the challenges.

1.6. ICT and changing role of higher education in India

"The university is a machinery whereby education facilities are provided to all those who are intellectually capable of using those facilities to their best advantages but who cannot avail themselves of those facilities for want of funds or other handicaps in life," said Dr. Babasaheb Ambedkar (Bombay, Debate to the Legislative Council, 27th July 1927). With the help of information and communication technology, the purpose of education has extended to nearly every aspect of life. The use of ICT in education has changed dramatically during the previous 20 years. The importance of ICT education and acceptance as a social necessity has increased in today's environment-conscious world. Social acceptance is essential for the improvement of mobility in society and the existence of a level playing field for equity and social justice. Qualitative education is not restricted to the structure of the classroom. Both students and institutions are highly interested in the contemporary tools of ICT like eLearning and online learning and information-raising. (R. Nayak, 2011). The Higher Education ICT Policy aims to prepare young people for creative participation in building, sustaining, and growing a knowledge society that will lead to a whole country's socioeconomic development and global competitiveness. Introducing ICT in higher education will have profound effects on the entire process of education, from investment to the application of technology in key areas like equity, management, effectiveness, pedagogy, and quality issues (Munoz-Repiso et al., 2006).

ICT in India is seen to be a medium to be globalized. Indian technology entrepreneurs in the United States have successfully excelled in Indian services software and the IT-enabled industry has grown rapidly, particularly in its export segment (Chandrasekhar, 2000). The government invests heavily in ICT. The NEP stresses the importance of ICT in raising higher education enrolment rates in the sphere of higher education. In India, there is a high dropout rate in school, and it is necessary to figure out how to minimize this number. In the same way, we need to boost the number of students in higher education. As a result, by making education more participatory through the use of ICT, we may radically transform the way our educational system operates. We should also address the difficulties of costs and the availability of trained teachers when delivering education using ICT.

The ICT system has far reached influenced the higher education system in every country in our times. One of these countries is India. India is transforming into a knowledge-based economy that cannot function without the use of information and communication technologies (Chakraborty et al., 2018). The gap between the demand for higher education and the actions governments and institutions are taking to deploy ICT must be bridged. Collaboration between the public and private sectors is required to close the gap. The Educational ICT Policy should seek ways to use ICT to improve higher education institutions' capacities. According to a recent study, innovations such as delivering messages via WhatsApp are quite efficient in spreading education. Similarly, YouTube will contribute significantly to the dissemination of education through video sharing. Higher education in India has grown in importance over the last 10 years as the government recognizes that education is India's greatest strength.

Higher education programs in India consist of diplomas, Graduation, Postgraduate Degree, Doctorate, Post-Doctoral Degree, and Fellowship – all of these offer the applicants a program that aims to enhance their knowledge for practical application in colleges, institutions, universities, and research centres (Chakraborty et al., 2018). In India, a large number of government or private institutions have been set up. The main purpose of education is to make the best use of their input resources including teachers, classrooms, libraries, and laboratories to provide knowledge. Each program has specific results, but the most common result is to install knowledge into incumbents for further study or professional skills. Integrating computer-mediated communication with supporting tasks for teachers, presents a great challenge. A powerful teaching environment through a computer-mediated network can also be created for teachers in which high standard content can be presented and the incumbents can be given authentic tasks irrespective of time and place (Chakraborty et al., 2018).

Enhancing and improving educational quality is a key concern, particularly when education is spread and developed. ICTs can improve education quality in a variety of ways, including enhancing student involvement and passion, making basic skill acquisition easier, and improving teacher training. ICTs can also be utilized to enable and modify a correctly utilized environment to encourage a move to a learner-centered setting (Sarkar, S., 2012). ICTs can be employed in the form of video, television, and computer multi-media software that mixes sound, transcripts, and multi-coloured movements to deliver entertaining, thinking-inductive, and dependable

content that keeps students involved in the learning process. To entice students to listen to its interactive programs, the radio uses songs, sound effects, adoptions, satirical comedies, and extra performance collections (Sarkar, S., 2012).

Several initiatives in recent years have emphasized the importance of ICT in higher education. Various projects have resulted in decreased costs and increased openness. India has taken significant steps in terms of content distribution and increased IT-based training. Gyan Darshan for example was introduced to school children, university students, and adults in 2000 as part of broadcast educational programs. In the same way, the broadcasts by institutions such as IGNOU and IITs were another major step for Gyan Vani (Pegu, 2014). Under the sensible initiative of the UGC, education programs are broadcasted on national channels such as Door-Darshan and Gyan-Darshan daily. E-Gyankosh was launched by IGNOU in 2005 as a knowledge repository to preserve digital learning resources. Nearly, 95% of the printed materials of IGNOU have been digitized via a repository upload. A further joint IITS and IISC initiative, technological education, was initiated in 2001 by the National Program on Technology Enhanced Learning (NPTEL) (Pegu, 2014). In 2009, the Government approved the landmark 'ICT Education Mission.' The National Education through ICT Mission is a core program, presented by the HRD Ministry and approved by the Economic Affairs Committee of the Cabinet (CCEA). The mission has planned to develop and standardize digital content for the Indian higher education sector in a wide variety of initiatives. The Mission aims to meet the educational needs of 500 million individuals in the country (Pegu, 2014).

The Ministry of Human Resources and Development (MHRD) has established several efforts to help students, scholars, teachers, and lifelong learners overcome distance learning obstacles. From elementary school students to post-graduates, these programs cater to a wide spectrum of educational needs. DIKSHA is a national educational portal for grades 1 to 12 that was established in September 2017 for all states and the federal government. DIKSHA is available as a website and as a mobile application. DIKSHA offers access through various uses and alternatives such as QR-coded Energized Textbooks (ETP), teachers' courses, quizzes, etc. to a wide range of curricular-linked e-content. Vidya Daan, a statewide content contribution program that employs the Diksha platform and technology to enable educational institutions, private organizations, and individual experts to submit or donate e-learning resources for classroom usage, was launched in April 2020. (India Report-Digital Education, 2020).

Swayam Prabha DTH channels support and reach people without internet access. The MHRD devotes 32 channels to television programs of the highest level. School and higher education channels are allocated separately. It provides live interactive sessions with experts from home to Skype on these channels. Online NIOS MOOC courses are available through the SWAYAM site; approximately 92 courses have been commenced, with 1.5 crore students enrolled. SWAYAM makes all courses available to students and teachers, including text, videos, and evaluation questions. The Ministry also has a 'One-Stop Education Portal' called 'SAKSHAT.' SAKSHAT is responsible for uploading the high-quality e-content in all disciplines and subjects once developed. Many projects are completed, and the way teaching and learning are

done in India is expected to change.

Making the most of the potential generated by the spread of ICTs in higher education is a serious problem. Nonetheless, because it can alleviate some of the country's higher education system's challenges, it has become an important support system for higher education. The employment of diverse ICT instruments and technology boosted not only the flexibility with which education was delivered, but also expanded community involvement, teaching experience, administration, and research in other areas of educational institutions. This research paper explores the various challenges and opportunities to use ICT as tools to improve the educational quality in Private as well as Government Universities.

1.7. India's Covid-19 Pandemic and Education Scenario

During lockdown for the unique corona viral disease 2019, the whole elementary and higher education system in India, as well as around the world, failed (COVID-19). Educational systems all across the world have been vulnerable as a result of the Corona virus. Given our uncertain futures, society clearly demands adaptable and stable educational systems (Ali, 2020). Governments and university institutions around the world are launching several programs to increase virus education in response to the COVID-19 epidemic. However, there is disagreement and confusion over what to do, how to teach, teacher and student workloads, and the implications for educational equity (Zhang, Wang, Yang, & Wang, 2020). There is no doubt that institutions that do not have such measures of preparation and planning now need to implement them to prevent the exaggerated demands and tensions arising from rapid adoption. In this crisis, there is a clear need for online learning after secondary education expertise, and the idea that institutions need to develop this skill should be recalled.

According to UNESCO, around 264 million children and adolescents were out of school in 2017, and the epidemic has aggravated this issue. As the COVID-19 pandemic spread, online education became the only alternative, and schools, colleges, and institutions should not be closed indefinitely (Martinez, 2020). Therefore, this was the time for serious rethinking, revamping, and redesigning the education system in a very demanding context. Informal and non-formal training also had a huge impact. But it was a well-conceived belief that the high position of formal education cannot be replaced by a pedagogical approach because of the direct interaction between teachers. Following the COVID 19 crisis, e-learning evolved into a pedagogical shift away from traditional approaches, moving from the classroom to the zoom, personal to virtual, and from seminars to webinars (Mishra et al., 2020). According to Lederman (2020), the COVID-19 problem has compelled both students and teachers to accept the interactive academic experience as the overall benefit of online learning. Teachers were able and provide for children's digital abilities that are on the border of cyber risk and educational accomplishment using digital intelligence (DQ Institute 2019), which is especially important in future pandemics where children rely entirely on online schooling. Furthermore, during a COVID-19 period, online learning provides a sense of psychological security to the community.

Tam and El-Azar (2020) argued that resilience must be built into our educational structures, and they described three developments that could occur in future transitions increased educational creativity, a strengthened educational connection between the public and private sectors, and the digital divide gap. Without the rigorous use of online resources, the post-COVID-19 outbreak educational situation will be difficult to handle. After witnessing the dreadful corona virus, students will face a slew of challenges, including quality education, practical training, laboratory work, library services, peer tutoring, remedial instruction, science, and creativity. Furthermore, students' experience will be quite valuable. Therefore, the attempted solution for education tangles after COVID-19 is to keep the balance of online and offline teaching (Mishra et al., 2020). Digital technology has accelerated lock-down. It has provided an opportunity for new and better professional skills and knowledge to be developed more efficiently and effectively through online learning (Jena, 2020).

The Indian government has taken several precautions to prevent COVID-19 pandemics from spreading. On March 16, 2020, the union government proclaimed all educational institutions in the country to be closed. The UGC, India's apex regulatory agency for higher education, has taken the present learning situation seriously and has taken proactive measures to address the current half-year course and examination deadlock by releasing an academic calendar circular in responding to recommendations from a UGC committee. It was also determined that all Indian universities must provide 25% of their curriculum through online education and 75% face-to-face engagement (UGC, 2020). The government's digital India goal has emerged as a vital tool for fixing the current crisis, thanks to Covid-19. Education-based on technology is more transparent. With colleges and schools refusing to participate in this challenge, the Indian government, state governments, and private institutions have taken the appropriate steps. For pupils to continue learning, the MHRD has set up online portals and teaching channels, as well as direct-to-home television and radios. Students used popular social media apps like WhatsApp, Zoom, Google Meeting, Telegram, YouTube Live, and Facebook for online study throughout the lockdown. E-Broucher, a single platform that collects all digital content on the internet for education, was the MHRD's ICT endeavour (https://mhrd.gov.in/ict-initiatives).

Many institutions have carried out online faculty development programs to enhance faculty's ability to deliver. There is no great difference in the feeling that faculty can use PPT, play videos, and board and marker as regular classroom sessions in both online and offline sessions (Shenoy et al., 2020). During this period of lock-out, post-graduate students can access eBooks, online classes, and study materials. The importance of this platform was that these amenities could be accessed throughout the day without the need for the Internet. Many colleges have taken free online classes for pupils during the lockdown. Students were given access to the E-Library and E-Books. Aside from regular virtual class attendance, various measures have been launched to engage students (Shenoy et al., 2020). In the social, health, political, education, and employment fields, the COVID-19 pandemic has had devastating effects on society. In the field of education, a paradigm shift goes beyond methodological parameters. The fact that the education systems have to transfer from

face-to-face to online learning, at a fast pace, leads different educational authorities to make ICT one more methodological resource and necessary means to avoid the collapse of the education system so that the process is not interrupted (Espanio-Diaz et al., 2020).

1.8. Digital Divide, Higher Education and COVID 19

The first and most obvious concern about switching to online learning is the access problem. In a country in which the majority of students do not have access to digital devices like smartphones or laptops, internet connectivity, or the same level of education, they can't have access to online education. Of course, higher education institutions have a bearing on lock-down measures. Most of the students and staff in the universities had to leave the campus and go home. Teaching/learning face to face has been stopped and we have seen several universities focusing on what is referred to as online teaching/learning (Preez and Granze, 2020). There are two concerns about online learning. Firstly, there's distributive justice – there's unequal access to technologies used in online learning and unfair access to data and connectivity in an unequal country such as India. The second issue is epistemological access, and it should be remembered that not all students will have access to technology. Regular talks on the materiality of smartphone ownership as a new mantra in India to bridge the digital divide have failed to take into account the geographical and infrastructural aspects of the digital gap in times of crisis (Mishra, S.V., 2020).

The digital divides inside India and its rapid progress into the rural-urban divide have a long history, seeming to have been largely overlooked by the third generation (3G), and the fourth generation (4G) (Nedungadi et al., 2018). During the new normal time, people in India rely heavily on the fast internet, computers, and mobile phones to return to work. Because the crisis has no end in sight, students are encouraged to choose e-learning alternatives. The current epidemic impacts rural students more than urban students when the country invests in online education (Divya Jain, 2020). E-learning, on the other hand, is revolutionizing the sector even in remote rural locations. Rural communities often have to cope with power outages and outdated technological equipment, which can make it difficult to maintain continuous connectivity (Divya Jain, 2020). While indigenous families did not purchase other assets such as televisions or automobiles between 2018 and 2020, smartphone ownership climbed significantly. For example, in homes where children enroll at government schools, smartphone ownership has grown up to 74.2 percent in 2020 and is 24 percentage points higher than in 2018, from 29.6 percent in 2018 to 56.2 percent in 2020, and in households where children attend private schools (ASER Report, 2020).

Students in rural India, unfortunately, do not have access to the same cutting-edge technologies and levels of internet material as students in urban areas. In comparison to their peers in cities, fewer students in villages have access to desktop or laptop computers. Students' health may be jeopardized if small screens are used to display the most information for long periods. Furthermore, for families with limited financial resources, purchasing learning data plans can require a significant financial

outlay. Teachers' and students' levels of participation in live classes may also be influenced. Our country has been concerned about digital literacy and the digital gap for more than a decade. Many rural teachers and students lack the educational and technical abilities that students in cities possess.

Many private educational institutions moved quickly from traditional to online education. Except for a few of the most well-known institutions, such as IITs, NITs, IIMs, and some large universities, most government educational institutions are having difficulty adapting. A lack of digital materials, teaching practice in the use of online teaching and technologies, and little or no technical development are all difficulties that these institutes face. Digital infrastructure and connectivity vary by state and between urban and rural locations, as well as by socioeconomic and geographical factors. Many teachers (urban and rural) judged their preparedness to be "non-technically sound" and "have very little knowledge of digital technology."

When students move from off-line to online learning, they encounter blocks that may be a cause for discontent in rural communities. Civil society groups, legislators, and the government must collaborate to create a user-friendly digital interface that allows teachers and students to continue their education. Teachers will be able to make a smooth transition if they are provided the assistance they require. Local and national governments must work together with the IT and education companies to accelerate the implementation of innovative and low-cost online learning tools in rural India. The National Internet Mission, which aims to provide internet service to all Indian villages by 2022, is a good start, but content access necessitates last-mile connectivity and digital device ownership.

1.9. Online Education and Marginality

We define marginality as an involuntary position and condition of an individual or group on the outskirts of social, economic, and ecological systems, preventing access to resources, assets, and services, limiting freedom of choice, and impeding capability development (Gatzweiler et al. 2011). Groups excluded because of race, gender identity, sexual orientation, age, physical ability, language, and/or immigration status are examples of marginalised populations. Marginalization occurs as a result of unequal power dynamics between social groups (Baah et al., 2019).

Furthermore, the pandemic and the resulting shutdown of many systems, including community-based clinics, resources, and support services, is exacerbating many communities' marginalisation (Operario et al. 2020). The COVID-19 pandemic has highlighted the importance of closing the digital divide, as those without reliable internet, appropriate devices, and digital literacy skills were severely disadvantaged when most essential activities moved online (Matt et al. 2021).

Because of the impact of an increasing number of online courses on the demographic composition of classes, the concepts of diversity, multiculturalism, and globalisation are now important aspects of curriculum planning. With the internationalisation and globalisation of education, and in response to the increasing demand for a more educated and adequately trained workforce, universities are

offering more flexible programmes, aided by new educational and communication technologies (Germain et al., 2008). Enrollment in distance education courses in higher education has been increasing, with a recent surge in response to a global pandemic. While implementing this method of instruction, instructors used to conventional face-to-face methods face new challenges, such as students failing to turn on their cameras during sequential class meetings held via videoconferencing (Castelli et al., 2021). Upon identification of the problems faced by the students as well as instructors some initiatives may be implemented so as to provide better learning environment under new system.

Several lecturers and institutions have voiced alarm that students may turn off their video cameras in order to avoid being seen as absent minded or doing other things. Indeed, due to the reasons mentioned our students gave for not desiring to be seen not paying much attention, walking away from the computer, and doing other things on their computer, this appears to be possible. Students may be bored or succumb to the dangers of multitasking. The emphasis is on developing a laboratory framework that can use obtainable online classes and adapt them for students with special educational needs. Most of the initiatives are in nascent stage.

1.10. Study Area

We live in the era of the Technological Revolution era. Digital devices and the internet are used more and more every day. The Covid-19 pandemic spreads its move very rapidly towards the next level. The digital divide is emerging side by side and it is clearly showing. The world demonstrates the division or segregation of digital devices and ICT in various spheres. Our education, in general, and higher education, in particular, are not exempt from this rule. In this direction, the proposed research works to identify and suggest improvements to the system and the situation of the digital gap in the higher education sectors of Odisha.

Odisha is an architectural, artistic, and cultural land. It has a rich maritime business history. It has a history of education that speaks of its pursuit of excellence. The ruins of Puspagiri University, which are believed to be larger than Nalanda, with its campus in Lalitgiri, Udayagiri, and Ratnagiri are evidence of this. The splendid temples of Bhubaneswar, Puri, Konark, and various parts of Odisha speak of great civil, technical, art, architectural, and sculptural centers. Taking into account the contribution of higher education in general and technical and vocational training in particular to the overall development of educational recipients, the debate on quantitative and qualitative aspects of higher education in Odisha was undertaken with particular reference to the digital divide (Das, 2018).

After independence, the government has made intensive efforts to improve access to higher education. By establishing universities and colleges, the government-supported higher education. It is also responsible for the management of private sector established institutions. The number of universities and colleges has increased significantly. There were 12 universities respectively in general colleges and universities in 1947–48. By 2017-2018, these figures raised significantly to 741 and 21, with an annual compound increase in general educational institutions of 5.98%

and universities of 4.38% (Das, 2018). The following two tables Table 1.1 and Table 1.2. show the number of universities and colleges in the state of Odisha.

Table 1.1: Category wise number of universities

Type of Technical/Professional Universities	**Number as of 2018-2019**
Central University	1
Institute of National Importance	5
State Public University	15
State Open University	1
State Private University	4
Deemed University-Private	2
Total	**28**

Source: AISHE-Report, 2018-2019, MHRD, Page no.60

Table 1.2: Number of Government & Private Colleges

Type	**Number as of 2018-2019**
Private Un-aided	279
Private aided	426
Total Private	705
Government	347
Total	**1052**

Source: AISHE-Report, 2018-2019, MHRD, Page no.69

Several institutions have recently appeared. It is, therefore, necessary to maintain the pace of academic growth by expanding education at all levels in the State to create growth opportunities in the global, competitive environment. Odisha offers huge potential for the growth of higher quality education. For example, Bhubaneswar is a favourite educational and industrial hub for the state Capital. Overall higher education registration in 2017/18 was estimated at 1.02 million. Out of them, 54.10% were boys and 45.90% were girls. In higher education in Odisha, the Gross Enrolment Ratio (GER) was 22.0%, estimated for the 18-23 age groups. GER was 23.8% for the male students and 20.1% for the female students. It was 18.8% for Scheduled Castes and 12.5% for Scheduled Tribes, compared to 25.8% in the national GER. Distance and student enrolment represent approximately 5.53 percent of total higher education enrolment (Page, I., 2020). Approximately 78.12 percent of the enrolment population is undergraduate. There are 2982 Ph.D. Scholars, while 73,233 were post-graduate

courses. Interestingly, students from 166 countries from abroad have been enrolled in different HEIs in Odisha. The total number of foreign university students is 200, of which 14 are doctoral students, 46 PG students, and 140 UG students (Page, I., 2020).

On many fronts of development activities in the country, Odisha was a well-known pioneer. Odisha's commitment to growth is driven by a continuous political will to develop educational performance, policies, and actions (Government of Odisha, 2018). The state had established one higher education task force in 2010 whose main mandate was to recommend reform measures to strengthen higher education in its attempt to implement higher education reforms. This initiative's brain child is the Odisha Higher education program (OHEP). The state has negotiated a World Bank loan of USD 119 million, after its continued efforts for higher education upgrades. The loan for the entire transformation of the management of higher education is part of a unique project known as the Odisha Higher Education Programme for Excellence and Equity (OHEPEE) (World Bank, 2017). OHEPEE is a performance finance model based on the achievement of defined equity and excellence indicators over five years (World Bank, 2017). There are a total of 76 higher education institutions in the first stage, and Odisha's performance in its first year was satisfactory (Larsen, 2018).

During the pandemic, online education in Odisha has become a major challenge for State authorities. Under the Covid 19 guidelines, both the State Departments of Higher Education and Mass Education instructed schools and colleges to take virtual lessons. Both students and teachers have therefore been active in online schools where they are faced with a vast number of problems. The Government of Odisha launched a lock-down program called 'Odisha Shiksha Sanjog'. Educational institutions have to set up WhatsApp groups to keep up with and engage students in the learning process. The Covid 19 pandemic has led the Odisha Government to integrate the digital learning System into its state schools in IT major Tata Consultancy Services (TCS). The pandemic has changed educational paradigms from classroom teaching to online. All of the textbooks have been converted and uploaded to the DIKSHA portal and OSEPA webpage in powered textbooks providing QR codes for each chapter. The digital content which was created was linked to the QR code in the DIKSHA portal. DIKSHA has grown in popularity among kids, parents, and educators. The DIKSHA e-content was also used by Odisha Shiksha Sanjog. DIETs and Odisha Adarsha Vidyalaya use Zoom and Google to complete various e-learning tasks.

During the post-reform period, the state's universities, technical and professional institutes, and colleges grew rapidly. The purpose of this research paper is to investigate the digital divide in this state's higher education system. The study will help identify and raise awareness of the digital divide within the Higher Education System that will make it possible for policymakers to modify policies to minimize the digital divide in the future. This investigation indirectly helps students and other stakeholders to access digital consumption and take advantage of it.

1.11. Scope of the study

The digital divide is a problem that the stakeholders in the Higher Education System face. The sort of digital divide has yet to be examined in India's higher education system. The study was carried out among the stakeholders of Higher Education in Odisha. The stakeholders to be considered are students, faculties, and administrative staff of Higher Educational Institutes. The study was restricted to the Bhubaneswar and adjoining areas.

1.12. Research questions

a) What are the factors responsible for digital divide among the students in higher education sector?

b) What are the impacts of digital divide among students studying in higher education institutes?

Based on the research questions three research objectives are developed that are mentioned in section 1.13.

1.13. Objective of the study

The objective of the study is as follows:

i. To find out the factor responsible for the digital divide among the student in higher education.

ii. To understand the impact of the digital divide among the students in higher education.

iii. To make a comparative study on government and private educational institutions.

1.14. The rationality of the study

The study will help to identify and make awareness of the digital divide in the Higher Education System, which may enable the policy makers to amend policy in the future to minimize the gap, occurring due to the digital divide. This research will indirectly help the students as well as the other stakeholders to access and get benefits from the use of digitalization. The findings should assist public policymakers in developing strategies to address issues of the digital divide and e-government development by encouraging holistic and integrative analysis. Addressing the digital divide alone is unlikely to be enough to spur an increase in e-government adoption. Along with technology, social media tools and techniques also becoming relevant. Social media tools have been observed to play an important role in the transformation of traditional teaching and learning practises all over the world. Though designed primarily for online social communication, social media platforms often include tools that can be used for instructional purposes in order to promote active learning among students. Furthermore, social publishing features that support User Generated Content

(UGC) are powerful motivators in transforming social media sites into informal, networked, and constructive virtual learning environments. Various studies provide an analysis of the processes, issues, and impacts associated with the rapid transition to digitisation in HEIs shortly after the onset of the COVID-19 pandemic in 2020. It raises issues concerning online learning inclusivity, pedagogy, unintended consequences of digitalisation, and privacy when transitioning to online teaching that are relevant both during the pandemic and in the long run.

1.15. Summary

The digital divide is a disparity in ICT instrument ownership and access. The researcher wanted to see how differences in consciousness, digital literacy, and competence of higher educational institutions in using digital and online services, as well as ownership and access to ICT instruments, were measured in this study. Almost everyone today has electronic gadgets, but it doesn't mean that there is no gap in the deliverance of services. Because it is obvious that while someone may have access to ICT tools, he/she may not know about services and if he or she knows about services, he/she may have no skills to use them. The investigator has decided to check the gap between the conscious and the unknown, qualified and unqualified, and the frequency with which higher education students use online services. The study investigates the digital divide in higher education and provides a strategy for closing it. The digital divide has arisen as a major issue in higher education, and proactive steps must be done to guarantee that it does not lead to social friction and a new form of exclusion. In addition to the challenge of access to ICTs, the study may also explore the connection of factors responsible for social exclusion in the light of digital advances, such as socioeconomic background, gender, language, etc.

Chapter 2
Review of Literature

2. Introduction

The literature review provides insight and answers to certain research issues and provides helps to lay the groundwork for the study's theoretical structure. The literature review provides insight and answers to certain research issues and provides helps to lay the groundwork for the study's theoretical structure. The experience and familiarity in the process of the previous study not only strengthen the researcher's comprehension but also make a major contribution to the research direction and triangles the results of the researchers (Kumar, 2011). The analysis of literature helps to narrow the broad research ideas and identify a suitable research context and methodology, with increased comprehension. During this process, a thorough literary survey was carried out and the researchers examined scholarly magazines, books, journals, previous studies, government reports, and international organizations as well as policy documents to gain an understanding of the research issue. The comprehensive literature survey contributed to the theory being developed and the differences and challenges identified in this research.

The researcher identified the theme of the digital divide and examined the literature available. The core topic of the research study is the digital divide; a thorough understanding of the critical concept of the study is therefore crucial. The main aim of the thesis is to find out the effect of the digital divide in higher education in the private and government universities in the state of Odisha, India. To fulfill the purpose, the researcher has divided this chapter into three segments which are mentioned below to identify suitable variables related to the theme.

With the rapid advancement of new technology, the digital divide has become the focal point of exclusionary language. The "distance in access to and activities on the Internet for individuals, households, or companies of different social and economic backgrounds and geographies," as defined by the OECD (2001), is the "distance in access to and activities on the Internet for individuals, households, or companies of different social and economic backgrounds and geographies".[1] The definition of the phrase "digital divide" was broad at the outset of the report, and it was freely used to convey the differential in access to ICTs between people, or, more precisely, access to the Internet. As of the end of the 1990s, the digital divide can also be accurately reflected. Different international literature (van Dijk, 2002; OECD, 2001) has

[1]A Study of The Digital Divide Evaluation Model For ... (n.d.). Retrieved from http:// aisel.aisnet.org/cgi/viewcontent.cgi?article=1143&context=amcis2009

highlighted the importance of defining divisions of ICT access and use. Furthermore, according to Norris (2001) and the OECD (2001), the digital divide can exist both inside and between countries. Albert D. Ritzhaupt and Tina N. Hohlfeld (2019) establish approximately seven dividing factors. These factors include socio-economic, gender, ethnicity, education, linguistic, geographical, and age groups. They explained these various socio-economic factors and groups that have resulted in disparities in the access, use of ICTs, and literacy, which constitute the backdrop to the digital divide.

2.1 Digital Divide and Economy

Dasgupta et al (2001) decided to look at the factors that create diversity in terms of technology. Surprisingly, the intensity of the internet has not been broken (Internet subscriptions per telephone mainline). In terms of tracking other sources, developing countries have intensities comparable to developed countries. Although there was no representation of the human resource gap in this context, their results suggested that there are substantial political differences. They concluded that there is no truly new digital divide, but rather a long gap in the availability of mainline telecommunications services per capita. They researched the determinants of cell phone diffusion over the last decade after recognizing mobile phones as a potentially new medium for Internet access. Their findings demonstrated the importance of income disparities, but they also highlighted the crucial position of progressive policies.

Jill Rubery and Damian Grimshaw (2001) examined the positive and negative effects of information and communication technology (ICT) on three areas of job quality: connections, job stability, and self-employment. Pessimists argue, for example, that ICT use weakens internal career ladders by dissolving hierarchical management structures and creating flexible employment links, diminishing workplace rights and prospects for freedom of association. Optimists, on the other hand, claim that the use of ICT creates new, flexible, and infinite employment. Pessimists, on the other hand, warn that work takes over the life of ICT users, who are often isolated and stressed (due to the need to work everywhere) (working at different times and places). Optimists answer by stating that ICTs enable the integration and subordination of work in daily life (work tailored to family needs) and that they interconnect and stimulate individual ICT users.

Nikam et al (2004) goal were to address and emphasize certain areas in which masses have been achieved by using ICT. It was discussed how technology has changed contemporary India. Several rural development projects have previously shown the impact and success of ICT on rural development. The aim was to provide people with information because rural people had been without it for many years. The IT-Tasking Force, founded by the Indian government in 1998, uses information technology as a forum for personal and national development and works effectively to articulate and spread this vision to provide the requisite ethos for the newly emerging global civilize-driven awareness. The IT Task Force is a national task force that focuses on software development and information technology. To lift the country to

the rank of global economic strength, the task group also pushed for wider use of information technology in all sectors of the national economy. The paper highlighted the library resources. The highest decision-making bodies like UGC also taking initiatives to implement the projects to link the universities so that they can adopt e – education system with the help of dedicated internet LAN connection. Moreover, the linking of all published research journals under one roof is also another ambitious project that the higher education department is implementing in a phased manner.

In the twenty-first century, **Buam (2005)** addressed the need of bridging the digital divide in India for overall socio-economic development. To assist the IT industry, the Indian government has created an information technology Working Group. Although not every domain of activity or person in India is affected by information technology, India has made significant contributions in this area and has emerged as a global leader. Informatics has evolved into a modern and competitive economic field that produces significant employment and income. As a consequence, the results of the superhighway should be shared by the disadvantaged, and not only a few are transported through the digital information age and left behind, especially the vulnerable and oppressed. We should be able to find a successful way to get IT to the common man in India with this plan and collaborative effort. Countries like India, where arranging a day's meal is difficult for a section of population, arranging digital education with the help of digital device is a distance dream. So, it is important to reduce the income inequality before thinking about reducing digital divide.

Gamage and Halpin (2007) studied the effect of the Telecentre Development Program of e-Sri Lanka on connecting the digital gap. A survey instrument was utilized to gather qualitative and quantitative information from real and latent TV audiences in the study's target communities. The survey conducted among target population and it was observed that around 30% of the respondents are not aware of the telecom centers situated at the various parts of Sri Lanka and their effective usage. Language is the key element for use. According to the majority of respondents, they have no facilities like the internet and e-mail because they understand only their native languages. In this respect, the content of the evidence offered through Telecentres plays an important role. The majority do not know the English language of 70 percent of the rural population. If rural areas are not properly recognized and explanations for sustainability are not found immediately, it will be a waste of money to invest significant sums of money to address digital divisions.

Mutula (2007) investigated the relationship between the digital divide and development in Sub-Saharan Africa, as well as strategies to bridge the gap at the continental, local, and national levels. To determine the status of the digital divide in Sub-Saharan Africa, an analytical and comparative approach of global e- readiness, digital opportunity, and information society indices is used. A top-level view and comparing strategy to global e-readiness, digital opportunities, and records society indicators were utilized to determine the popularity of the virtual divide in Sub-Saharan Africa. According to the study, there is a link between the final virtual divide and economic advancement. The question of whether the virtual divide in developing countries, particularly Sub-Saharan Africa, is reducing or widening remains a subject of contention. However, Sub-Saharan African countries are closing the digital divide,

particularly in terms of infrastructure and mobile phone access.

Ameen and Gorman (2008) investigated the level of information and digital literacy (IDL) in developing nations, as well as how it impedes individual and national growth. Pakistan is an excellent example of how bad information and digital literacy may be eliminated. Pakistan will be given as an example. To achieve the goals of this research, a review of the literature and the results of surveys conducted in Pakistan are used to suggest the state of IDL among university students and faculty in one country, while incorporating these observations with discourse. It also strives to solve the disadvantages of effective IDLs in Asian emerging countries in general. Because IDL training and practice are not seen as operational priorities in Pakistani libraries or schools, they have been discovered. The current status of knowledge illiteracy is due t o a low level of IDL amongst some of the educated classes. It also emphasizes the significance of knowledge's "critical users" for national and individual empowerment. The study used Pakistan as an example to examine the overall state of IDL in developing countries. It was proposed that a local study on contextually appropriate literacy and IDL be done. The article expressed gratitude for incorporating IDL into all stages of educational programs.

Fong (2009) studied the effect of ICT on GNI per capita in underdeveloped nations in 2005, including the Internet, telephone, pager, personal computer, and telephone. The regression method was used in this paper to examine the relationship between Gross National Income per capita (in PPP international dollars) and each type of ICT access (as represented by the respective ICT penetration index) in 91 lower-middle-income and low-income developing countries in 2005. A positive significant coefficient from the regression model indicates a narrowing of the income gap between developing countries and richer developed countries through income growth. The study discovered a close association between GNP per capita in global dollar PPP and ICT adoption (mobile telephone, personal computer, and telephone). It also recognizes the considerations that developing countries should take into account when adopting and using ICTs for economic development. It also stated that poor countries face challenges in utilizing ICT capabilities for economic development. Many countries have promised that wireless technology would be a quicker and less expensive way to develop telecommunications networks to keep up with more developed countries in terms of economic development than the typically fixed-line approach.

Islam and Tsuji (2010) try to identify the linkage between the digitalization of various activities through community-based information technology centres. As a case study, this research looked at a telephone-based data collection system (outbound call center). Additional sources included study reports, internal Grameen phone reports, and articles, as well as web visits and personal visits (as a project participant). The current initiatives that bridge the divide to build Bangladesh digitally are highlighted in this paper, as well as how CIC bridges the divide. It is only reasonable that the government prioritizes the rural masses, given the current government's goal of a Digital Bangladesh by 2020. CICs would be a pioneer in rural regions in this regard. This research will undoubtedly contribute to another method of bridging the digital divide, and Bangladesh will be able to reshape digital progress in the future.

Srinuan and Bohlin (2011) offered a review of the research literature as well as a classification method on the digital divide. The digital divide has been recognized as a major public policy issue with social, economic, and political implications. Because of the many features of the variables, the findings suggest that the digital divide is a multidimensional phenomenon. The digital gap has also been described using social, institutional, and physiological variables in recent studies. They demonstrate, among other things, that the emergence of the digital divide does not necessitate a sufficient amount of technological determinism. Furthermore, a variety of technologies were investigated, both empirically and conceptually.

Even though ICTs are crucial to communal and financial development in today's developing digital society, the digital gap perseveres, according to **Walterova and Tevit (2012).** The paper explained the rationale for DLA in five European countries and addresses its introduction on pilot sites to assist civil servants in small municipalities in building and using their measurements to use ICTs and meeting the citizens most at risk of e-exclusion. To close the gap, the EU has introduced e-inclusive steps. However, there is a common assumption that the issue must be solved locally. The purpose of this report is to update the Digital Local Agenda (DLA). Its goal is to show how DLA has grown across Europe and to show how it can be implemented through a European initiative. According to preliminary findings, the DLA should be taken into account when seeking solutions to Europe's ongoing digital exclusion challenge. The DLA would improve public service delivery while also bridging the digital divide that the disallowed classes suffer.

Choudhury (2012) tried to propose a model that illustrates how different aspects of digital data service sustainability are responsible and contribute. It also aims to take into account certain domains of data processing and their interconnections in the long-term viability of digital information systems. For a variety of academic and policy articles, as well as environmental scans, this study focused on important studies in several domains of information system and facility sustainability. Recent historical academic studies, as well as applicable government policies and efforts, have critically studied the various factors that contribute to information services' economic, social, and environmental sustainability. In general information science studies, the durability of information has not been investigated. Several earlier research projects, on the other hand, have produced insights and models for achieving specific aspects of information sustainability. It should also be mentioned that several aspects of sustainable development are intertwined and that the development and management of sustainable digital knowledge resources necessitates a well-thought-out research plan as well as a collaborative research endeavor.

According to **Islam and Mamun (2013),** in this information age, the digital divide is a major source of concern for long-term development and even national growth. In this study an exploration technique is used to understand implications of digital divide among SAARC countries. Because of this problem, this paper investigated the digital divide status among SAARC countries. According to an analysis of the digital divide across SAARC member countries, there is a considerable difference in growth and development between SAARC member countries, according to static and dynamic regression models. The Maldives had the smallest digital divide

among SAARC countries, meaning that it has the strongest ICT infrastructure and, as a result, the highest capita GDP. In contrast, the Maldives and Bangladesh have the lowest per capita GDP income among countries with ICT infrastructure.

The aim of the paper by **Edoho (2013)** is to address the issues and opportunities associated with ICT implementation in Africa. It identifies potential areas in the region where ICTs may be most effectively targeted and implemented, as well as an integrated framework for the coordination of various components and the institutionalization of ICTs in the Region's economy. The paper looked at the African theory of ICTs. A systematic framework was built to provide a consistent emphasis on the application of ICTs in a complete way, synthesizing the literature on African perspectives on ICTs. Fundamental ICT leveraging processes in Africa are fragmented and uncoordinated for development, according to the findings. To successfully adopt ICTs, critical physical capital and human capability are not working in unison. Where the core infrastructure is located, different components do not work together to achieve optimal efficiency.

According to **Guillen and Suarez (2013)**, the global digital divide is caused by economic, regulatory, and socio-political reasons, as evidenced by cross-national differences in internet use and their growth through time. They believed that the use of the Internet will increase with the status of the world economy in the telecommunications market, democracy, and cosmopolitanism. Disparities in Internet use are the result of a multitude of interests wielding varying degrees of influence over governments and multilateral organizations. Governments can undoubtedly adopt novel policies to increase the population's use of the medium, such as privatizing and liberalizing telecommunications and increasing competition. Government policies can affect other major variables, such as procurement regulation, the state of the world economy, democratic freedoms, and cosmopolitanism because they are part of larger, more complex policies that affect industries other than telecommunications and the Internet. Their research revealed that the variables (GDP per capita, democratic freedoms, cosmopolitanism) with the greatest magnitude effect, at least for internet usage, are also the ones that are more difficult for any single government to form.

Taghavi et al. (2014) performed this research to analyze the current state of the Iranian ICT industry. The study was a review of literatures usage statistics of ICT services used by different organizations. It proposes a systemically applicable political strategy and appropriate strategic planning strategies to help developing countries achieve their information society objectives. To gather coherent and modern knowledge about existing ICT-services difficulties in Iran's public and private sectors, global technology breakthroughs and findings are mostly centered on established literature and the use of statistics in IT services. This study looked at and proposed policies for all of Iran's ICT services industry's difficulties, elements, and best practices.

Levine (2018) emphasized the importance of high-speed Internet connectivity for full and meaningful participation in the modern civic, economic, and education systems in his study. In 2018, the digital divide between marginalized populations is expanding, making it impossible for rural, low-income, and disabled individuals to fully participate in education and economic processes. Furthermore, a

dichotomy between the economy and education has been claimed and inspired by the Digital Divide. As per the data, the digital divide not only exists but also causes serious problems that the government can and should address.

According to the **Digital Economy Report (2019),** the digital revolution has transformed lives and culture at an unparalleled rate and scale, creating both enormous opportunities and difficult challenges. New technologies can make substantial contributions to achieving sustainable development goals, but they cannot be counted on to deliver positive outcomes. If the full social and economic potential of new technology is to be realized while unintended effects are avoided, international cooperation must be strengthened urgently. In recent years, digital technologies have generated tremendous wealth, but only a small number of individuals, companies, and countries have concentrated on this wealth. This trend is expected to continue under current policies and regulations, resulting in even more disparities. It has been suggested that the digital divide, which currently affects more than half of the world's population, must be bridged. Inclusion requires the development of a digital economy that benefits everyone.

Henry (2019) summarized some of the most difficult aspects of digital divisions as they relate to closing the poverty gap between towns and rural areas. It explained the problem on a global scale and identifies obstacles to the use of ICTs in developing countries to reduce poverty. According to the author, there are several aspects of the digital divide that policymakers must address: (1) how to increase ordinary citizens' access to technology, and (2) how to develop skills and training needed to use devices. (3) how to promote a creative culture, especially in the production of local content; and (4) how to address gender and other biases that exist in many developing countries.

In comparison to Internet use results based on Bourdieu's theory, **Gomez (2020)** focused on the digital third-tier division. The mechanisms for converting three major forms of capital i.e. economic, cultural, and social into digital capital (DC) and back into three major forms of capital were explored using 30 in-depth qualitative interviews with young people in Madrid. According to him, the most fundamental type of digital inequality is economic capital, which imposes material constraints on access. Techno-socialization transforms cultural capital into DC, whereas social activities and social support transform social capital into DC.

The goal of **Inegbedian's research (2020)** is to evaluate if the digital divide between the world's major regions will lessen by investigating the nature of inequalities in internet use and the rate of increase in internet use. From 2009 to 2019, the approach was a research study of internet usage and the rate of growth in various parts of the world. The quantitative analysis method was applied in this investigation. The data were analyzed using simple percentages and F-tests. Asia and Europe have the highest Internet usage rates on the planet. The research also revealed that some digitally disadvantaged places had faster internet growth rates, as well as no disadvantages in terms of mobile and emerging 5G technologies, meaning that as smartphone subscriptions rise, internet access will become unavoidable.

Femenias et al. (2020) study looked into how new generations of digital

natives may modify teaching and learning approaches to support their commitment to long-term progress. The proposed hypothesis was evaluated by a study of 532 students of digital indigenous higher education using a structural equation model. The findings revealed a link between digital natives' skills, individual dynamic capacities, and better situation management regarding key stakeholders, supporting creativity and commitment to the social and environmental challenges that society requires.

Mubarak et al. (2020) conducted a study in 191 countries to explore statistical links between income, education, and ICT, taking into account 9 indicators best expressed by socioeconomic values. In 191 countries, multivariate regression analysis was utilized as the major way of analyzing revenue and education connections with ICT diffusion. The findings back with the idea that affluence and education help spread ICT. According to the statistics, poverty is the global leader in the digital break. Academics, policymakers, and realists have pledged to work together to close the digital divide. Furthermore, the current findings suggest that while the digital divide may never be crossed, multi-partner projects can be better coordinated.

The summary of the reviews suggest that digital divide is a pertaining problem that leads to create wide disparity among different stakeholders. A higher order of digital divide certainly going to affect the growth of the country as it will further create disparity among different stakeholders. So, it is important to address the following questions:

- How far digital divide affect the growth of the economy?
- What are the policy initiatives that needs to be implemented to reduce the digital divide?

2.2 Digital Divide and Social Aspect

Cultivating digital inclusion can aid in the reduction of certain inequalities. Although implementing digital inclusion is not just an appropriate way to change the problem of discrimination in practice. The digital world cannot be isolated from the social world. While enforcing digital inclusion is not the only way to resolve the issue of discrimination in practice. In the real world, they are well-positioned and affluent, however, poor groups are less likely to obtain access to and use digital services than marginalized ones.

In **Sassi's (2005)** study, the term "digital gap" and its societal implications were utilized to analyze some of the discrepancies in today's technological world. It examined the history of communications technology in the 1970s when much was made of the new information and communication order and the phenomenal growth of mass media. The "digital divide" is examined from four angles: technological, social structural, information structure and exclusion, and modernization and capitalism. The essential points are discussed and analyzed in these speeches. The function of information technology in contemporary cultures is briefly studied in the context of a technologically advanced Nordic country, and a preliminary judgment on the subject of cultural differences toward social segregation is reached. Finally, certain

recommendations are made for internet uptake and use in a specific area.

According to **Rahaman and Naz (2006),** several studies have shown the importance and potential of information and communication technologies (ICTs) in economic development around the world. ICT has the potential to help ease these restraints by empowering the poor in the Pacific, notably in Fiji, where growth is impeded by dispersed people, small sizes, and enormous ocean distances. Efforts are being made to show that, despite a range of government programs and policies, poverty in Fiji remains crippling and has worsened by about 33% in the previous ten years. As a result, it is prudent to review Fiji's government policies and e-governance initiatives to determine why there are no outcomes in the society. According to the findings of a rapid evaluation of numerous stakeholders, the e-governance project cannot be made considerably successful at this time due to a lack of involvement processes in e-governance and ICT procedures. It employs digital technology, new technologies, and media to make government agencies more responsive to stakeholders, addressing the difficulty of community participation in public policy and practicing dialogue and decision-making. It also calls for bridging information gaps and gaps that contribute to insufficient training and decision-making, as well as the isolation of government departments and planning agencies from sharp scientific statistical data. It promotes horizontal and vertical mutual visions for e-government planning and management objectives.

To address and investigate the presence of the digital divide in Nigeria, **Ani et al. (2007)** chose the University of Calabar in the Calabar Metropolis as a case study. Validated questionnaires were delivered to internet users in Calabar, Nigeria, at the University of Calabar's licensed cyber cafe. Several digital types of breakdowns, such as sex, marital status, stage, and education, are common in Nigeria, according to the survey data. Nigeria's federal and state governments, as well as university administrations, must devise plans to bridge the country's numerous digital divisions. To achieve worldwide inclusion in the digital economy, the report recommended that Nigeria address the issue of the digital divide in whichever form it may take.

The study by **Davies and Hill (2007)** focuses on the fact that available resources are important to utilize wisely so as to bring necessary changes in the technological sector. The emerging pattern of digital transformation affects the nature of work in private as well as government education sectors, hence increasing the gap to a larger extent. The study uses a digital dividend index adapted from earlier research to investigate the nature and scope of this phenomenon in Wales, the United Kingdom. Based on Housing and Selhofer's prior work, the document addressed the construction of a "digital divide index". DDIX divides people into four groups depending on various demographic factors when it comes to internet access and use. There are no substantial digital gender or income disparities in Wales. However, there are considerable digital disparities between people of different ages and levels of education. Their usage of DDIX has helped illustrate the phenomenon's varied geographic characteristics.

Middleton and Chambers (2009) conducted an exploratory analysis to look into the links between demographic and situational characteristics and small owners'' willingness to embrace and access free internet. In contrast to the previous study, the

decision to adopt wireless technology has nothing to do with gender, age, education, or experience. Ethnicity had something to do with motive, but the connection was tenuous. Wi-Fi use has been associated with ethnicity and age. Education, gender, and experience were not substantial predictors of usage, contrary to earlier research. According to the findings, high-speed Wi-Fi connectivity can narrow and/or close the digital divide. Variations in the digital transformation mismatches are predicted to have a substantial influence on SMEs' quality and performance.

The article by **Ganesh and Barber (2009)** is a critical investigation into the rise of the "Third World" as a bursary on digital divides. Previous digital divide research has three flaws, according to this article: a simplified discourse of "haves" and "have-nots" (the normative split), and an awkward depiction of local community concerns. The report identifies three faulty assumptions. The essay used a case study of an NGO that wanted to develop ICT over ten years. The research focuses on a long-term investigation of a specific NGO. The three stages of ICT development are the first stage, expansion phase, and consolidation phase. The history of ICT is employed in non-governmental organizations to question the three theories of digital literature, emphasizing its importance in the formation of digital zones. The consequences of comprehending the digital divide as well as development difficulties are investigated.

Halford and Savage (2010) presented methodological approaches in their research article that could allow for a comprehensive sociological analysis of the connection between information and communication technologies and social inequalities. They discussed the well-known idea of the "digital divide" to emphasize digital social inequalities. Several scholars, however, have used a gender perspective to understand the complexities of technology, as well as the democratic availability and usage that is needed.

Swalehin (2010) sought to concentrate on unequal access to resources in general, correctly explaining the digital transition, and how society as a whole is entering the information age. According to the report, the divide in digital media reflects broader socio-economic inequalities such as insufficient infrastructure, high access costs, bad or poor policy regimes, incompetence in the provision of telecommunications networks and services, a shortage of local content, and unequal capacity to draw from economic and social issues.

Some assumptions hold that women are relatively technophobic, that men are more technologically educated, and that women happily consume digital media. In his article, **Hilbert (2011)** discovered some prejudice against women and the United States; however, he did not include an empirical test for this topic in his paper. Furthermore, the test findings were transparent and illuminating. Fewer women have access to and use ICT as a result of their disadvantages in terms of labor, education, and income. He also noted that women are more likely than men to use digital instruments for work, schooling, and income. Long-standing gender disparities in underdeveloped nations, such as access to jobs, money, education, and health care, can be discussed using ICT. It is a tool for raising living standards, and it has the potential to turn the ostensibly divided digital gender into an opportunity.

Miller and Shrum (2011) collected the panel data of African countries to

establish the link between the digital transformation. The results demonstrated gender inequality through bivariate and multivariate studies in the increasingly technologically saturated world. Broder's perspective of technology adoption has expanded substantially over time, yet gender discrimination can be visible as many women members do not have sufficient exposure to digital transformation processes. If considered the recommendations mentioned by the authors can be seen as a new avenue to reduce any kind of disparities.

According to **DiMaggio and Garip (2012),** digital inequalities can amplify and even exacerbate existing social inequalities by translating existing human capital differences into online settings. The study of the possible consequences of digital inequality has also focused on the two key perspectives: race and ethnicity, as well as stratified theories, which claim that ICT adoption and use processes regenerate existing social disparities by recreating offline social media network frameworks and human capital through digitally mediated networks.

Agnew and Ripper (2012) wrote to highlight new strategies to improve digital inclusion, particularly the usage of the Internet as part of daily life for a growing number of seniors. It aims to identify and evaluate the impact of a novel engagement strategy known as "embedded outreach" on digital exclusion. The survey data are collected to analyze the intentions of the participants toward accepting the digital divide that may be happening as a result of diversification. The factors that may influence inclusion decisions will surely be going to impact positively to reduce any kind of disparity.

Drori and Jang (2014) examined the comparative as well as global dimensions of the digital divide by examining various types of processes that shape the distinguishing characteristics and mapping their transition patterns. The authors analyzed the various national characteristics that contribute to the degree of IT connectivity and 'map' the digital global divide using several measures to find patterns of gaps between countries worldwide and between blocs of States. The authors contrasted the effect of these various social influences on the generality of IT. Their preliminary findings revealed that the determinants of IT contact are not political or economic domestic characteristics, but rather cultural characteristics. Thus, the global digital divide was more a product of global society's networking than of local economic ability.

According to **Cheang, Lim Swee, and Lei. Guo (2015),** digital inclusion is an effort to create a socially, economically, and politically harmonious society, rather than a goal in and of itself. As a result, it is critical to enforce digital inclusion by going outside the digital space to achieve the end goal of providing tangible benefits to individuals who are in disadvantaged positions in society. The result is more significant than a skewed perception of digital inclusion".

Hilbert (2015) commented on the social dimension of the digital divide and said that the digital divide is not only a technical problem, but a social one and the main issue of how the digital divide is tackled depends in context on the anticipated social gain that ICT can achieve. Given the diversity of possible ICT implementations, solutions to address these complex issues must be diverse. Therefore, the topic of

social inclusion is increasingly an e-inclusion issue.

Centered on a systematic literature review, **Sachdeva et al (2015)** intend to establish a philosophical structure to examine the divide between digital disabilities and pursue solutions for them. There is a distinction between disabled and unimpaired people in terms of digital disabilities. The digital disability barrier, on the other hand, is about more than simply access; it's also about usability. Previous literature did not address the repercussions of people's financial positions; instead, it focused on persons with limited or no earning capacity. Motivation also demonstrates that a compelling example can be found in the digital impairment division subset.

Khalid & Pedersen, (2016) said that the digital divide and digital exclusion are threats or obstacles of multifaceted dimensions, which in the perspective of higher education are not confined to a dichotomy of "have" or "have-not". They discovered that the reasons for digital exclusion varied widely from person to person; it could be a lack of understanding, expertise, or excitement for utilizing ICT resources. Socioeconomic concerns disproportionately affect society's most disadvantaged individuals; a lack of education leads to lower salaries, which in turn leads to reduced ICT affordability and usage, as well as a lack of familiarity with the technology.

Even though governments have invested in broadband networks, studies show that infrastructure alone does not ensure internet access. **Thomas and Finn (2017)** looked into the effectiveness of a government program aimed at increasing family acceptance and use of the Internet. Rural consumers valued overall e-services higher than urban households when access prices were equalized by a publicly sponsored new broadband network, according to Survey 2, reflecting the dual function of admittance to e-services and their apparent advantages. These findings add to the body of knowledge about digital divisions by demonstrating the applicability of the global village urban management scheme to home e-service assessment.

Shashi Bala and Puja (2018) conducted a study with 591 respondents from six districts in Uttar Pradesh State and discovered that approximately 55% of the female population lacks basic internet skills, making them vulnerable when using modern internet technologies. Furthermore, women continue to battle inequalities in the use of these information technologies, despite any attempts made by the Government of Indian territory to break up digital technology. The researchers were in favor of "Gender Centric Policies" that could include easy access, affordability, and time for ICT access and use. The statistical findings showed that the majority of the 12 sub-districts were first and second orders of DGD, with the prevalence of exclusion from fundamental technical skills, societal norms, and financial restrictions contributing to this gender gap in an increasingly digital society. The findings have repercussions for the Uttar Pradesh government in general, legislators who support digitalization programs in particular, and advocates for gender equality, such as researchers and fellows.

The research paper by **Rai & Sharma (2018)** addressed the gender gap at an international conference. They said that technology could narrow the gender gap, but it doesn't look promising. Digitally educated women must be combined with cell phone providers, website operators, banks, and public authorities. On the ground, the

picture is troubling, and politicians, development organizations, and other groups are taking notice. Through a gender-sensitive strategy for the government and other parties, mobile operators can also bring about the requisite change in mobile ownership and mobile internet use to close the gender gap.

Digital media, according to **Miheljet et al. (2019),** is seen as a critical platform for increasing engagement and diversity in the arts and culture. This paper investigates if two previously distinct research bodies, cultural participation research, and digital divide research, share the same viewpoint. The research looked at data from the Taking Part Survey on Digital Media and Cultural Interaction in the United Kingdom, which was conducted between 2005/2006 and 2015/2016 and focused on museums and galleries. While the findings reveal that digital media is an important tool for reaching new audiences, they also demonstrate that online and offline engagement with museums and galleries is still fundamentally incongruent. Worryingly, online, the differences between havens and nods are far more obvious than in person. Online access, rather than helping to enhance viewers' diversity, tends to reproduce, if not widen, existing divides. The report also emphasized the importance of place as a crucial factor of cultural engagement, especially in the digital age, and urged that future media and cultural participation studies include room or area on the list of essential social and demographic variables.

According to **Whitlock (2020)**, the purpose of the study is to demonstrate the need for socially based self-regulation in light of the significant increase in digital fraud and crime, which has resulted in a variety of afflictions for millions of users as a result of horizontal interactive and transitive Internet exchanges. It contends that this is possible and can be achieved by broad-based, systemic DEC programs. The study's approach is made up of four types of elements: analytical, exploratory, constructive, and propositional. The concept of a combined original research tool: triangular connection pattern (TRP) is the building factor. Scientists can use TRPs to create and investigate the types of connections between three individuals involved: distress, the perpetrator, and the survivor. Other researchers can use the TRPs developed, applied, and proposed here to detect, track, and analyze different types of cybercrime and victimhood, as well as their consequences around the world and in the digital human condition, for educational purposes, and to promote societal harmony.

The summary of the review shows that the impact of digital divide has a social obligation and it is important to address these obligations. Over a period of time as the usage of ICT tools and techniques are on the higher side, the social disparities keep on increasing as all the members of the society do not have equal access to resources that are necessary to reduce the social disparity.

Hence, following questions are important to address:

- What is the impact of digital divide on social disparity?
- What are the policy initiatives that are important to address to reduce the social injustice arising out of digital divide?

2.3 Digital Literacy, Higher Education, and Digital Divide

The improvement of quality and inclusivity in higher education has been aided by the development and deployment of digital technology. However, a sizable section of the population was either institutionalized or digitally replaced. Because they lack such basic digital skills, higher education students find it challenging to attend specific information literacy classes.

According to **Selwyn et al. (2001)**, the use of information technology in education has become a political orthodoxy, with many politicians and educators seeing it as a realistic method to engage with social groups who have been historically excluded from education. However, addressing the use of technology in education and lifelong learning to combat social exclusion has never been unbiased, with many academics publicly excited or cautious. In this context, the paper critically assessed current trends in educational and technological exclusion, as well as the extent of continuing technology and education policies and activities in the United States. This increased knowledge of education technology has also coincided with the renewed value of the need for countries to promote healthy learning habits in their lives and, ultimately, to decrease social exclusion in education and lifelong education practices.

Ching, Basham, and Jang (2005) examined the use of technology and digital exposure among college students. They collected data from 130 students at two mid-western universities' education colleges. In the study, they divided students' use of technology into three understandable categories: entertainment, communication, and construction. Every detail must be considered, and the high levels of usage across categories imply a diverse set of technical abilities. Male pupils who had access to computers at home at greater family levels before the age of ten had significantly higher impressions of full-spectrum technology than other demographic participants, according to the study's multiple regression results.

The article by **Fourie and Bothma (2005)** aims to help students transition from ICT access to information sharing. An analysis of information seeking research, as well as experience teaching a course in advanced information retrieval at the Department of Information Science, University of Pretoria, South Africa, inspired a theoretical model for addressing different layers of the digital divide. Hence, conceptual model is developed by the authors to address the issues related to the digital divide. The gap between digital technology and information is more than just a matter of ICT access. Knowledge literacy projects, information recovery efforts, collaborative learning, and community-based technology should all be supported by the paradigm. The proposed paradigm encourages greater knowledge sharing, which could help society bridge the digital gap.

Huang and Russell's (2006) paper explored the students' degrees in computer and Internet access, as well as the connection between exposure to technology and academic achievement. Researchers collected data on technology usability as well as academic achievements. The findings showed that the digital divide persists and that connections between technical accessibility and academic achievement can be formed, even though complicating factors such as learning subjects, technology uses, and socioeconomic conditions can be very complicated.

This study's findings may aid legislators, school administrators, and teachers in better understanding digital divides as well as the effects of technology use in classrooms and beyond. The proposed paradigm encourages greater knowledge sharing, which could help society bridge the digital gap.

The aim of **Bhattacharya and Sharma's (2007)** paper is to advocate for significant investment in ICTs to develop high-quality human capital for India's economic development. An attempt has been made to investigate online learning and e-learning in a developing country like India to build quality human resources in higher education. For various e-learning experiments, applications, e-learning systems, or institutional efforts, a comprehensive environmental scan was performed. The article also intends to showcase the many e-learning deployments and implementation alternatives available to traditional institutions. The study outlines the current situation of education in India, with a focus on e-learning, and draws on both published and unpublished secondary sources.

The paper of **Obeidat and Genoni (2010)** attempted to determine the extent of the Digital Divide as it applies to a developing Arab world. The findings demonstrated that there is a digital divide, but that digital content has aided in bridging a substantial gap among researchers. Though attempting to repair the effects of digital fractures, research in developing Arab countries had ramifications for academic libraries. The paper employed a ground-breaking automated dividing calculation method, marking the first attempt in a developing Arab country to compute the effects of the digital divide.

This is the introductory essay in **Ismael Peña-López's (2010)** monograph "The Redesign of the Digital Divide". Centered on the study of Marc Raboy and Mark Warschauer, the study developed a systematic analysis of occurring literature to throw some light on the fact that physical facilities should not be the only factor that is going to add a dimension. Internet-based technology adoption is also necessary to bring necessary and desired changes.

Susana Juniu's (2011) essay illustrates how the existing digital divide in higher education affects technology integration in the classroom. She recognizes educators' often contradictory attitudes toward technology, as well as a lack of communication between IT departments and faculty. It's a matter of employing a circular communication model to provide feedback and a more democratic approach to investigating technical and pedagogical difficulties to improve communication among the various stakeholders involved in technological implementation.

Loan (2011) set out to discover the digital divide among Kashmir Valley college students and to propose feasible solutions for bridging the gap. The data gathering approach for the analysis was a survey form. The choice to use the questionnaire was made. The findings show that there is a huge gap among Kashmiri university students. Male students utilize it more than female students, and urban students use it much more than rural students, according to statistics. Across all faculties, students in computer science and students in social sciences and humanities are the most likely to utilize the Internet. Students who did not use the Internet did not have Internet connection in their schools, homes, or communities for a variety of

reasons, including a lack of access, an absence of formation, nonexistence of knowledge, a deficiency of interest, a lack of necessity, external threats, and many others. It's preferable to bridge the gap with future initiatives.

Kumar et al (2014) main goals are to discover how computer literacy is used by rural and urban students in India, what the goals of computer computing are for such students, and what problems students have with computer use. Planned interviews with rural and urban pupils were done to gather data. A variety of questions were added to the interview program to obtain information about the kids' computer usage. The goal of this study was to find out more about students' computer literacy skills as well as the digital divide in Indian classrooms. The study's findings were used to develop recommendations for narrowing the digital divide. These findings and recommendations can assist school administrators and government officials in making the required efforts to bridge the digital divide between rural and urban children.

According to **Radovanovi et al (2015),** the exponential development of information and communication technology had a major effect on the online and offline education systems. New technology changes awareness, interactions, and cooperation in a south-eastern EU country like Serbia, while also generating a persistent digital divide in the competencies needed to collect, analyze, understand, and convey information. The authors of this research investigated the digital divide between students and teachers in higher education, with an emphasis on conflicts over digital literacy and collaboration. They used foreign metrics, secondary statistical sources, and primary semi-structured interviews with higher education students and instructors. They demonstrated how different types of stratification interact in the classroom when attempting to incorporate emerging technologies and technology-oriented activities.

According to **Adhikary et al. (2016),** technology-based education has become a significant path to learners' academic and social growth in recent years. However, concerns concerning information literacy and learning outcomes in phases of ICT-enabled education have been highlighted. The findings of a long-term examination of the BYOD project are presented in this paper, which provides new insights into digital division challenges as part of evolving learning practices on three levels such as digital access, digital ability, and digital performance. The findings of the BYOD project's digital divide study in terms of emerging formal and informal teaching and learning strategies. On three levels, the authors examine how the BYOD policy has exacerbated divisions in the learning process between digital access, digital ability, and digital results. The results highlighted crucial concerns regarding the learning process by contextualizing the three levels of the digital divide in the classroom process of BYOD technology adoption.

According to **Marcella Turner-Cmuchal and Stuart Aitken (2016),** disabled students and/or students with SPECIAL Education Needs (SENs) are among the groups most likely to experience barriers to ICT access and use, as well as the groups most likely to advocate educational equality, in today's information and awareness society. Following a profile of a hypothetical impaired student who utilizes ICT as a key instrument to access education and inclusion, the chapter discussed the effects of policies on ICT use in integrated education at the international and European

levels. The case study would demonstrate the types of issues that can arise in a variety of European political and practical situations. Finally, the effective use of ICT to promote inclusive learning for all learners is an example of strong teaching techniques. However, we must acknowledge the need for a new educational system that includes ICT so all students to make decisions about their learning and then make choices.

The goal of **Mei et al. (2018)** paper is to discuss how teachers in higher education use digital learning tools. It also looked into how instructors' perceptions of the sharing culture both inside and outside the organization are influenced by the use of digital tools in the classroom. Teachers are also devoted to using digital media to motivate, engage, and facilitate education on behalf of students, according to the survey. Distribution is a basic requirement for a learning organization focusing on the technical learning communities' concept, according to the respondents. They are aware, however, that sharing with co-workers informal forums are easier than sharing with co-workers in informal situations.

The digital divide and educational inequality, according to **Buzzetto-Hollywood et al. (2018)**, are still a serious social concern in the United States and abroad, affecting low-income, first-generation, and minority students. As a result, higher education institutions are faced with the issue of meeting the needs of students with varying degrees of technical preparation, as well as information and digital literacy gaps that have been demonstrated to obstruct student performance. This report details the efforts of an Atlantic minority organization to assess and discuss the technological and information literacy talents and capacities of impoverished pupils. Students in this study used a multi-methodological approach based on survey data, pre-and post-testing, and five years of placement testing in beginning and intermediate computer application courses. The digital gap is a serious worry for higher education, according to the findings, especially as schools attempt to reach out to more marginalized individuals. The study's results show, in particular, that the professional skills needed to succeed academically do not extend to students who attend a minority institution. Higher education institutions should engage in an in-depth study of students' information and literate technology skills, needs, and desires, both within the institution and after course completion.

Digital library resources, according to **Rafi et al. (2018),** have a substantial impact on the growth of higher education research culture. The goal of this study is to help management build outstanding academic policies by evaluating the efficacy of employing user databases for resources and analysis. This work promotes the management of gaps and the implementation of steps required to implement policies and strategies for a better academic climate. Enhanced academic research can be supported by the ultimate use of traditional database tools, to generate new ideas and increase the cognitive abilities of researchers.

Moon (2018) aimed to show how changes in K-12 education procedures in the United States influence pupils, as the 1:1 interface system has become a compulsory learning tool. This transition causes a knowledge and comprehension gap in the digital realm, putting minors at risk. It has been suggested that requiring school districts to use technology places the ethical duty for teaching students to use the digital world for risk reduction on the shoulders of school districts. The impact of

personal gadgets in education on pupils was the focus of the author's literature review. In the District, the writers polled teachers to find out what they thought was a risk for digital students and what they thought added value to the educational standard of digital citizenship. Through the provision of teacher learning content services, school districts are responsible for filling this need and limiting risk.

Vivakaran and Neelamalar (2018) discussed the significance of social media networks in revitalizing traditional education and learning practices around the world. Although Social Media platforms are primarily intended for online social networking, they do have ample tools that can be used to teach students active learning. This study analyses the usage of social media sites in developing countries, such as India, for educational purposes. The study aims to investigate whether social media networks are infiltrated and obtained in urban and technologically disadvantaged rural areas in higher educational institutions. The study shows how social software is presently gaining traction in Tamil Nadu's academic sector, a state with a different technology climate due to the state's digital internal divide and other issues. Furthermore, variables that encourage higher education faculty members to use social media services, as well as hurdles to their pedagogical usage, were discovered.

According to **Ritzhaupt and Hohlfeld (2019),** the digital divide remains a significant issue not only for the education system but also for many communities in the United States, because ICT has the potential to widen the gap between "haves" and "don'ts" along seven dimensions. While educational opportunities are the only solution to social inequalities, I have also stated that we must be careful not to add to the problem by widening the gap. The formal education system can be both a solution and a source of the digital divide.

Secundo et al. (2020) investigated the effectiveness of new digital technology for the growth of entrepreneurial education and the diffusion of knowledge contamination practices among universities by the Italian Ministry of Higher Education and Research, which was established in 2012. An investigation of Italian entrepreneurship education centers provides evidence of digital technologies' direct impact on fostering and upgrading commercial procedures, as well as their indirect effect on boosting nascent student entrepreneurs' entrepreneurship activities. The findings shed light on the strategic positioning of several new technology groups within the CLabs. The main findings point to a lack of use of CLabs' digital technology, excluding social media and digital networks, which were mainly used to promote the degree and communicate student entrepreneurial results.

The paper by **Hall et al. (2020)** is focused on the last-minute improvements of the European DEIMP (Designing and Evaluating Innovative Mobile Pedagogies) Project (2017-2020). The authors outline 21 design principles underlying innovative mobile learning, which will be of practical use to all using mobile learning in the COVID-19 pandemic. These principles emerged as a result of the three-year European DEIMP Project (2017-2020). The authors also look at major educational changes that have recently been imposed on teachers and educational researchers, as well as key aspects of the current emergency response in education around the world, and the implications for educational technology and mobile learning. In addition to the initiated project reforms, the way education is provided in all the nations and sectors,

whether primary, secondary, or tertiary, has undergone major changes. This paper aimed to provide practical advice that will assist in effectively adapting to the uncertain current and systematically preparing for an unpredictable post-pandemic future. A chronicle of what is going on in each of DEIMP's partner countries' educational systems. The study highlighted design challenges that must be addressed when writers attempt to cross the digital divide in remote education as well as the digital divide in general. In addition, the report outlined 21 practical principles that support creative mobile pedagogies.

According to **Martzoukou et al. (2020**), more studies and debates have emerged in recent years, emphasizing the necessity to develop technologically adaptive, skilled, professional, and capable people in an ever-changing technical and online world. In this arena, current definitions and perspectives go beyond the use of technology instruments or media to create a long-term digital literacy attitude. On the other hand, higher education programs have yet to adopt this strategy. Self-assessment of digital talents was shown to be poor in a variety of domains, including information literacy development, data generation, digital science, and digital identity management. Furthermore, student technology competency was linked to prior experiences in the digital realm in everyday life. The greater students' self-perceived digital knowledge in dealing with digital activities in daily life, the more probable their digital abilities in other digital education domains will become highly self-perceived as well.

According to **Chaudhury et al. (2020)**, technological advancements in cloud computing, artificial intelligence, and data processing provide new opportunities for the education industry to not only develop regulations and procedures but also to personalize learning and teaching practices. This study uncovers complexity and new research patterns that have impacted education as a result of technological progress and emphasize the need for a socio-semiotic lens to go beyond technical boundaries. With the abundance of accessible information and emerging innovations that extend through cultural, social, political, and economic fields, a lifelong learner is vital to success. However, technology alone will not be sufficient to facilitate this transition. To be effective, technology should supplement human cultures of learning and education systems.

Colpitts et al. (2020) identified the COVID-19 pandemic as revealing Japan's inability to respond to the unexpected disruption in the broadest sense. The system must be improved in a variety of ways due to the limited meters available to study Japanese higher education reactions in the aftermath of the outbreak. The goal of this study is to investigate the environmental consequences of fixing digital flaws in Japanese higher education. The study made constructive suggestions for each of the three layers that make up the education "ecosystem". The paper outlined steps to enhance the adaptive and leadership ability of organizations. Meanwhile, more financing for professional development and support networks would help bridge the digital divide between generations. Finally, the authors propose that this technique be included in formal IT networks to improve learning results. The authors propose that language study should be moved to help students. The paper proposes practical ideas for empowering each of the three strata that comprise the educational "ecosystem":

institutions, faculty, and students. The paper identifies measures for institutional strengthening in order to make them more adaptable and to improve leadership capacity.

The primary aim of the Gulf Cooperation Council (GCC) research by **Sarera et al (2020)** is to investigate the effects of COVID-19 on higher education. The study is exploratory, and it employs quantitative survey methods and data collection procedures with a specific goal in mind. The data were collected during the worldwide pandemic and the outcome of the study mentioned that digital education transformation has seen lots of changes and affected the traditional training system. The sudden change in training delivery mode certainly affected the occur trainees but subsequently, they can grab the necessary changes incorporated because of the pandemic.

In the aftermath of India's closure after COVID-19, **Joshi's report (2020)** stressed the expanding value of remote learning. This study examines not only the substantial issues and hurdles to higher education in India, but also how they might be overcome. Like any other country, India also faced the heat of a worldwide lockdown. Almost all the sectors are affected because of this new normal business environment but it is important to note that most of the industries can overcome the initial shocks due to this new normal situation. Education industries slowly adapt to the changes that are necessary to bridge the gaps that exist in the system.

Webb et al. (2021) mentioned the ways of learning and working, for the majority of HEIs and organizations around the world. The article includes a review of academic and policy literature on digitalisation and online learning in universities, as well as qualitative interviews with staff members involved in online teaching and learning at a Scottish university. As a result, the need for digital activities that are practical, accessible, and inclusive has been recognized. In reaction to the outbreak, several initiatives have been established or accelerated. These should be formed and enforced specifically to reach out to people from disadvantaged backgrounds, such as those with little ability or credentials, as well as those beyond the age of 65. Policymakers and higher education institutions must also try to better understand the complexities of digital learning and work, as well as the unintended effects.

The summary of the review shows that the impact of digital divide on higher education is most. The effect showed its impact to a great extent during the time of nation-wide lockdown. As education industry never faced this kind of situation, the sudden change of events affected the students having less access to IT enabled infrastructure.

The question is:

- In what way environmental factors affected the education industry?
- Is it possible to reduce the digital divide gap by merely providing the infrastructure?

Table 2.1: Summary of Review and Major Determinants (Theoretical Framework)

Name of the Author	Title of the Paper	Publi-cation Year	Research Variable
Soomro, K. A., Kale, U., Curtis, R., Akcaoglu, M., & Bernstein, M.	"Digital divide among higher education faculty"	2020	Access to technology, Access to the digital communication device
Calderon Gomez, D.	"The third digital divide and Bourdieu: Bidirectional conversion of economic, cultural, and social capital to (and from) digital capital among young people in Madrid"	2020	Development of digital capital, Development of social capital
Albert D. Ritzhaupt and Tina N. Hohlfeld.	"An Examination of the Digital Divide in Formal Educational Settings"	2019	Incidence of digital exclusion, Collaborative learning, Absence of digital content
Bala, S., & Singhal, P.	"Gender digital divide in India: a case of inter-regional analysis of Uttar Pradesh".	2018	Gender disparity, Poor language skills
Moon, E. C.	"Teaching students out of harm's way: Mitigating digital knowledge gaps and digital risk created by 1: 1 device programs in K-12 education in the USA."	2018	Lack of knowledge on cyber security, E – readiness
Shashi Bala & Puja, S.	"Gender digital divide in India: a case of interregional analysis of Uttar Pradesh."	2018	Gender disparity, Economic Background, ICT Skills
Al-Qallaf, C. L., & Al-Mutairi, A. S.	"Digital literacy and digital content support learning"	2016	Digital literacy and Lack of awareness

Agnew, I., & Ripper, L.	"Using embedded outreach to bridge the digital divide"	2011	Digital incompetency
Loan, F. A.	"The digital divide among the college students of Kashmir, India".	2011	Economic background of the student, Individual capacity
Rahman, M. H., &Naz, R.	"Digital Divide within Society: an account of poverty, community, and e-governance in Fiji".	2006	E-governance, Availability of IT infrastructure
Ameen, K., & Gorman, G. E.	"Information and digital literacy: a stumbling block to development?"	2009	Poor language skills, Inadequate telecommunication
Rahman, M. H., &Naz, R.	"Digital Divide within Society: an account of poverty, community, and e-governance in Fiji".	2006	E-governance, Availability of IT infrastructure
Baum, D. L.	"Towards bridging the digital divide for all-round socio-economic development in India of the 21st century."	2005	Poor internet connectivity, Economic background of the student
van Dijk, J.	"A framework for digital divide research. The Electronic Journal of Communication/ Revue de Communication Electronique",	2002	Access to technology, Access to the digital communication device, Availability of IT infrastructure
Rubery, J., & Grimshaw, D.	"ICTs and employment: The problem of job quality"	2001	ICT Skills, Implementation of the e-learning process

2.4 Research Gap

During the past few decades, the struggle has been seen to concentrate on access to technology as a way of bridging the digital divide, and a sizable portion of the population has been linked to the internet. Inequities exist because more than half of the world's population, especially the poor in emerging, industrialized, and least developed countries, lacks internet access (LDC). In recent years, government initiatives at the policy and program levels, as well as through e-Governance, have highlighted the importance of digital literacy in India. To encourage digital literacy in the higher education sector, the Indian government has launched a variety of programs and platforms (such as Sakshat, Swayam, e-ShodhSindhu, e-PGpathshala, and the National Digital Library of India).

While reviewing the research, it became evident that the digital divide is a severe issue not just in India, but globally. Low literacy, a lack of infrastructure, poor language abilities, a lack of understanding, digital incompetence, and gender inequities are all factors that are present in other nations. When we contemplate the complexity of the digital divide in higher education, it's clear that developing a comprehensive information literacy curriculum will be vital to reducing the gap. When analyzing the literature, researchers become acquainted with the few studies conducted in the sense of the digital divide. The researcher was unable to locate any recent studies on the digital gap in higher education from the perspectives of private and public universities. The current research will make a valuable contribution to the world of knowledge in general, and at the university level in particular.

Following a review of the literature, it was discovered that there were no studies on the digital divide in Odisha's higher education sector. Particularly about the first level (online access), the second level (internet skill), and the third level (Impact of the use of the internet). As a result, a study is conducted to determine the outcomes of internet use and to investigate the gap among students in higher education.

2.5 Summary

The two things which are of great importance in bridging the digital divide are computer literacy and information literacy. Digital skills involve understanding computer applications, the internet, search strategy skills and research techniques, and so on while literacy is the knowledge of different information modes, knowledge of information availability, information retrieval, file format knowledge, audio-visual information knowledge, etc. Due to technical advances in computing, ICT, Web resources, etc., in the last 10 years' innovative change is seen in education and research. Users' requirements altered as a result of the deluge of information and the paradigm shift to electronic media and resources. The global information and resource systems were likewise changed. Assurance of online and digital resources, as well as vital infrastructure enhancements, are not the only options. At the university level, a student information literacy curriculum is increasingly necessary to make the greatest use of available resources. It needs a strong presence in university programs. The present research will contribute significantly to the university and the information world in general.

Chapter 3
Review of Literature

3. Introduction

Research processes are a key factor in determining how quantitative research may be conducted. Any primary research is based primarily on identifying the research problem. It will not produce any significant conclusion unless and until the research problem is specified. The researchers can draw up a strategy so that the study keeps on track via a properly prepared mechanism. Any departure leads to inappropriate results. It is necessary to determine this flow to design the research. The methodology of research is a procedure that helps to identify different research procedures. Hence, the research methodology needs to be planned as per the defined problem. In this research, the research problem is defined through a review of the literature and subsequent validation of the same. Qualitative research is a method that aids in the exploration of sensitive information. As a result of which the method mostly applied here is informal. On the other hand, a quantitative method of research may be applied if the research is based on primary data. In this case, both qualitative as well as quantitative details of this process have been discussed subsequently.

3.1 Exploratory Research

The main purpose of conducting exploratory research is to identify that which is not known. There are different methods available to conduct exploratory research. In this research, the researcher applied a review of the literature and a pilot study. Since it is important to define the research problem well in advance; a proper review of the literature was conducted in the initial phase. This review of literature helped to identify the research gap and subsequently the initial variables. It is important to identify the initial variables as it helps to explore the impact of these variables on the defined research problem. But all the variables are not necessarily applicable to every research problem. Hence, adequate screening is required to identify the research variables suitable for this study. The research on the digital divide got momentum during the period of the pandemic; hence, a new body of literature suddenly becomes more relevant. As a result which review on the digital divide got a new dimension during COVID 19 pandemic. The researcher carefully observed recent and past articles while conducting the reviews and identified the initial variables that are relevant for the present study. The list of these variables is shown in table 3.1.

Table 3.1. List of Initial Variables

Statement 1: In my household, there is no problem associated with internet connectivity

Statement 2: Internet speed is appropriate in my home

Statement 3: The internet service is available all the time

Statement 4: The cost of internet connection is reasonable

Statement 5: The cost of high-speed internet is becoming expensive

Statement 6: I can use the internet on my own

Statement 7: I can configure the connectivity problem

Statement 8: Mobile internet is better than broadband internet

Statement 9: I feel positive about the use of the internet

Statement 10: The internet has a mostly positive effect on society

Statement 11: Access to the internet is equal for all

Statement 12: The internet helps me to find new opportunities

Statement 13: The internet helps me to explore new things

Statement 14: Because of the internet I can perform well in my exam

Statement 15: The Internet helps me to learn new skills

Statement 16: Online education system helps to increase my learning skills

Statement 17: The internet use has become an everyday part of my life

Statement 18: I can connect with my friends and neighbors

Statement 19: The Internet helps me to connect with my neighbors to participate in different activities

Statement 20: Recent pandemic helps me to learn the positive effect of the internet

Statement 21: The Internet helps me to establish good contacts with friends

Statement 22: The Internet helps me to establish new contacts

Statement 23: The internet helps me to build a professional connection

Statement 24: The internet use helps my professional activities to grow to a great extent

Table 3.2. Link of initial variables with research objectives

Research Objectives	**Initial Variables**
To find out the factor responsible for the digital divide among the student in higher education	Statement 1: In my household, there is no problem associated with internet connectivity Statement 2: Internet speed is appropriate in my home Statement 3: The internet service is available all the time Statement 4: The cost of internet connection is

	reasonable Statement 5: The cost of high-speed internet is becoming expensive Statement 6: I can use the internet on my own Statement 7: I can configure the connectivity problem Statement 8: Mobile internet is better than broadband internet
To understand the impact of the digital divide among the students in higher education	Statement 9: I feel positive about the use of the internet Statement 10: The internet has a mostly positive effect on society Statement 11: Access to the internet is equal for all Statement 12: The internet helps me to find new opportunities Statement 13: The internet helps me to explore new things Statement 14: Because of the internet I can perform well in my exam Statement 15: The Internet helps me to learn new skills Statement 16: Online education system helps to increase my learning skills Statement 17: The internet use has become an everyday part of my life Statement 18: I can connect with my friends and neighbors Statement 19: The Internet helps me to connect with my neighbors to participate in different activities Statement 20: Recent pandemic helps me to learn the positive effect of the internet Statement 21: The Internet helps me to establish good contacts with friends Statement 22: The Internet helps me to establish new contacts

	Statement 23: The internet helps me to build a professional connection Statement 24: The internet use helps my professional activities to grow to a great extent

These initial variables are extracted from a different review of the literature and kept for reliability and validity study.

3.2 Types of Data

Every study is based on the correct identification of data, as the main job is to perform research smoothly. Faulty data selection may lead to misleading results that may not eventually lead to a valid conclusion. In the subject of study, there are normally two sorts of data accessible and the primary or secondary data are employed based upon the requirements. Both the data are relevant, but their utilization is entirely determined by the fact that the data set the investigator seeks fulfills the study requirements. Secondary data is less expensive and takes less time to obtain since it is already accessible in a certain location. The main difference is that the aim of data publication is for something else, and if the researcher uses this released and verified data, it may assist the researcher's study objectives.

However, the purpose of gathering primary data is to directly address the research's requirements, and the same data should be linked with the research's primary goal. It is important to use the secondary data adequately so that it links with the research problem. In this study, secondary data was mainly used to develop the initial concept of the study and its relevance. However, to identify the research problem and probable solution to that problem, primary data was the main source of the data. As primary data is important for this research, it is equally important to collect this data properly from the target respondents without any biases. This gives rise to two basic parts of the research methodology, viz. identification of target respondents and selection of that target respondents using an appropriate sampling technique.

3.3 Selection of Target Respondents

The research's main goal is to look into the effects of the digital divide in higher education. During the lockdown, the role of ICT becomes very important to run the institute smoothly. But the impact was not judged from the perspective of government as well as private educational institutions. Since students were the main important stakeholders; it was decided to capture the data from student communities of both government and private educational institutions. In this direction, 3 private and 3 government educational institutions are selected as a study unit.

The data collected during the November 2020 to February 2021. As the educational institutes started opening for officials, the purpose of the study was described and information and communication details of the students collected from them. The respondents were contacted and necessary information collected with the help of a

structured questionnaire.

Table 3.3. Category wise Name of the Institution Identified for the Study

Category	Name of the Institution
Government Institution	Utkal University, Ravenshaw University, and Sambalpur University
Private Institution	KIIT University, XIM University, and Sri University

Based on the data received from the target respondents a total of 396 respondents are finally incorporated into the study. The details are cited in table 3.4.

Table 3.4. Category wise Distribution of the Respondents

Category	Name of the Institution	Total Students	Frequency
Government Institution	Utkal University	4700 (PG Only)	76
	Ravenshaw University	8000	56
	Sambalpur University	7300	44
Private Institution	KIIT University	30000	83
	XIM University	2537	63
	Sri Sri University	1100	74

3.4 Sampling Technique

The sampling technique is a method that helps to identify the target respondents from the population. It is always better if we go for a population study as the chances of errors will be less. But, sometimes, access to the population is not possible; hence, sampling is the method with the help of which the researcher can continue his or her research. Even though the sampling strategy appears to be standard, the majority of the issues stem from inadequate sampling method selection. There are two sorts of sampling techniques: probability sampling and non-probability sampling. Each element in a probability sampling strategy should have an equal chance of being selected, however, with a non-probability sampling technique, the approach is completely different. Here, based on the characteristics, the researcher will decide on the selection of sample elements. As we know a wrong selection of sample units leads to errors in the result, it is important to decide well in advance the specific method of selection of sample elements from the population so that it remains representative.

In this study, the multi-stage sampling technique is applied to get the relevant information. Initially, the researcher identified the study unit with the help of a convenience sampling technique. Since access to student information is not readily

available during lockdown; with the help of personal reference, the researcher can get the relevant data about the stakeholders. Subsequently, a random sampling method was applied to get the final data for the study. Initially, parity was maintained so that the researcher can get more or less the same amount of data from both private educational institutions as well as government educational institutions for comparison purposes.

Stage 1: Identification of Educational Institutions (Convenience Sampling)

Stage 2: Identification of students from each of the selected units (Random Sampling)

3.5 Sample Size Determination

The sample size is selected from the population. It is often creating confusion about the size of the sample. Although it is very difficult to identify the actual sample size fit for any particular study, still the same may be calculated using the formula mentioned below. Yamane (1967) provided this formula with an assumption of 95% confidence level and P = 0.50.

Sample Size = N / (1 + e^2 N);

Where: N is the total population size in the study area (Here, it is 963046)[1]

and e is the standard error. Normally we are taking .05 as the standard error. This deviation is expected as the researcher is dealing with samples, not the population.

Using this formula, the sample size = 963046/ (1 + 0.05^2 x 963046) = 399 (Approximately 400)

So, to get an effective result it is important to select a sample size of 400, though more is always better to get a more accurate result. However, 396 were ably collected in proper form.

3.6 Questionnaire Design

The study's questionnaire design is crucial since it aids in the extraction of accurate data from the target respondents. Certain considerations should be made when designing the questionnaire. The first stage in creating a questionnaire is to link the study's goal to the questions that have been finalized. This is critical since it aids in the extraction of accurate data. The wording of the questionnaire should be carefully considered, and the researcher should avoid using double-barrelled questions, which frequently confuse respondents. Proper coding is also required since it aids respondents in fully comprehending the question. It's crucial to know who's gathering the data. Non-sampling error (response mistakes or interviewer mistakes) is more

[1] http://naac.gov.in/docs/Analysis%20of%20Accreditation%20Reports/Statewise%20Analysis%20of%20Accreditation%20Report-Odhisha.pdf

likely if the collector does not have an appropriate understanding of the study field. The use of a scaling approach in the questionnaire becomes critical. However, there are alternatives. As a result, before finalizing any form of scaling strategies that are expected to be integrated into the questionnaire and their relevance, researchers should exercise caution.

In this study, the questionnaire is divided into three sections as mentioned below:

Section 1: Basic information about target respondents (Demographic Information)

Demographic information are collected to understand the socio economic characteristics of the sample units. As the sample units are collected from two groups, viz. government institutes and private institutes, there is a chance that their nature of responses will vary. This difference of opinion if exists may help to address the issues identified in the research objectives.

Section 2: General Information about internet usage of target respondents

As the topic of discussion is digital divide and usage of internet is the main criteria to understand whether digital divide exists among the target respondents or not, it is important to understand their internet consumption and access to internet. The variables incorporated in this section thus help to identify both the objectives. A further study linked to this internet usage will thus, help the researcher to identify their difference of opinion if any regarding digital divide and its impact.

These two sections mainly target the first objectives of the study.

Section 3: Statements on research factors on a 5-point Likert scale, with 1 indicating strongly disagree, 2 indicating disagree, 3 indicating neutral, 4 indicating agree, and 5 indicating strongly agree.

As, it is focusing on the second objective about their perception towards digital divide, it is important to capture this opinion with the help of Likert scale. The research variables identified through review of literature, are transformed into some statements and then opinions are collected from the target respondents to understand their perception towards digital divide and its impact.

Initially, a pilot study questionnaire is developed and the same is tested using reliability and validity criteria. The primary goal of a pilot study is to determine whether the key research variables are acceptable to the target respondents. The details of this pilot study are discussed subsequently.

3.7 Pilot Study

The researcher can use the results of the pilot study to find any loopholes in the present procedure. It is critical to do a pilot study since it may save the researcher time and money. During the pilot project, two things should be checked: the acceptability of the variables found during exploratory research and literature review, and the reliability and validity of the instruments used in the questionnaire. These

things are investigated using a modest representative sample size in a pilot study. The approach is used before the final research is implemented so that any disparities may be addressed and corrected ahead of time. The questionnaire's reliability and validity are usually the two methods utilized to conduct the pilot study. Because the questionnaire is the sole tool that combines all of the potential study variables, it is critical to assess its reliability and validity. In this study, the set of variables incorporated in the third section of the questionnaire is mainly studied with the help of a pilot study. Small samples of 63 respondents were surveyed initially. The result of the pilot study is discussed subsequently. These sample respondents are asked about their opinion about the research variables identified during review of literature. The researcher, conducted informal discussion with the target respondents multiple time to enquire about their opinion. The informal discussion was conducted both for the respondents from government institutes as well as private institutes. All the initial 24 variables are finalized and transformed into research questions using Likert scale. During final study with the help of 63 respondents these statements are again asked so that a numerical value is captured against each of the 24 statements.

3.7.1. Reliability Study

Reliability shows the internal consistency of the data. If the research variables identified through a review of literature should be internally consistent, then only these variables can be considered for further study. To analyze these, the researchers use various methods and among these Cronbach's Alpha is the most prominent one. In general Cronbach alpha's takes a value between 0 to 1. So, a higher alpha value implies more consistency. The value of alpha for the research variables identified in this study is shown in table 3.6.

Table 3.5. Case Processing Summary

		N	%
Cases	Valid	63	100.0
	Excluded[a]	0	.0
	Total	63	100.0
a. Listwise deletion based on all variables in the procedure.			

The table 3.5 shows the number of observations taken into consideration for the pilot study. These 63 respondents are selected both from the government as well as private educational institutions. Around 56% of respondents are from private educational institutions and the rest of the respondents are from government educational institutions.

Table 3.6. Cronbach's Alpha Value

Reliability Statistics	
Cronbach's Alpha	N of Items
.821	24

Table 3.6 shows the reliability statistics for the variables identified during the study to measure their internal consistency. A higher value of alpha gives more internal consistency. Here, it can be seen that the alpha value is 0.821 which shows internal consistency among the variables. To get a better picture we may proceed toward the next table which is related to item-total statistics.

Table 3.7. Item total Statistics

Item-Total Statistics				
	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
VAR00001	88.5079	77.577	.284	.817
VAR00002	88.6190	75.917	.462	.812
VAR00003	88.6667	76.161	.472	.812
VAR00004	88.5079	77.415	.387	.815
VAR00005	88.8889	71.423	.573	.804
VAR00006	88.9524	72.046	.532	.806
VAR00007	88.8254	73.017	.470	.809
VAR00008	88.9841	71.597	.523	.806
VAR00009	88.9365	72.512	.399	.813
VAR00010	88.9683	72.096	.412	.812
VAR00011	88.9206	73.590	.361	.815
VAR00012	88.6984	75.182	.340	.815
VAR00013	88.7302	75.781	.370	.814
VAR00014	88.7302	75.265	.385	.813
VAR00015	88.6667	75.645	.274	.819
VAR00016	88.6825	78.543	.132	.825
VAR00017	88.8889	77.262	.245	.819
VAR00018	89.0952	74.797	.463	.810
VAR00019	89.0159	76.532	.359	.815
VAR00020	89.0317	74.289	.478	.810
VAR00021	88.8730	74.532	.435	.811
VAR00022	88.6349	80.526	.026	.827
VAR00023	88.8413	76.587	.349	.815

VAR00024	88.6667	80.323	.045	.826

This table shows the improvement in Cronbach's alpha value if some variables are removed. It can be seen that if we remove variable 22, the alpha value will further be increased to 0.827 from the existing 0.821. But, as the improvement in alpha value is not very much significant, it has been decided to keep the variable to test its validity.

3.7.2. Validity Test

The purpose of validity research is to see if the variables chosen for the research are capable of expressing their nature and connection of their own. It's crucial to assess whether the data set is large enough to do a factor analysis before proceeding with the validity investigation. KMO Bartlett's test will provide us with some insight into this. We can do the factor analysis if the KMO value is greater than 0.70. The component analysis is a data reduction approach that aids in the grouping of variables into a single common factor. Factors that are not linked to a single component may be eliminated from the model. Initially, we'll use exploratory factor analysis to determine the number of variables that may be kept.

Table 3.8. KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.771
Bartlett's Test of Sphericity	Approx. Chi-Square	1119.413
	df	276
	Sig.	.000

We can proceed to factor analysis because the KMO value is more than 0.70 and Bartlett's test of sphericity is significant. The following table shows the results of the initial exploratory factor analysis.

Table 3.9. Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	5.458	22.740	22.740	5.458	22.740	22.740
2	3.955	16.481	39.221	3.955	16.481	39.221
3	2.568	10.701	49.922	2.568	10.701	49.922
4	2.288	9.533	59.455	2.288	9.533	59.455
5	2.143	8.928	68.383	2.143	8.928	68.383
6	1.480	6.168	74.551	1.480	6.168	74.551

7	1.338	5.576	80.127	1.338	5.576	80.127
8	.793	3.306	83.433			
9	.712	2.967	86.400			
10	.539	2.246	88.646			
11	.393	1.636	90.282			
12	.380	1.583	91.865			
13	.337	1.404	93.269			
14	.275	1.145	94.414			
15	.252	1.051	95.465			
16	.242	1.006	96.471			
17	.217	.903	97.374			
18	.170	.709	98.084			
19	.109	.453	98.537			
20	.093	.388	98.925			
21	.087	.361	99.286			
22	.081	.339	99.626			
23	.052	.216	99.842			
24	.038	.158	100.000			
Extraction Method: Principal Component Analysis.						

Table 3.9 shows 7 components that explain nearly 80% variation in the data set. So, there is a wider spread available in the initial component matrix.

Table 3.10. Communalities

	Initial	Extraction
VAR00001	1.000	.868
VAR00002	1.000	.795
VAR00003	1.000	.672
VAR00004	1.000	.526
VAR00005	1.000	.868
VAR00006	1.000	.833
VAR00007	1.000	.844

VAR00008	1.000	.869
VAR00009	1.000	.940
VAR00010	1.000	.925
VAR00011	1.000	.882
VAR00012	1.000	.864
VAR00013	1.000	.823
VAR00014	1.000	.785
VAR00015	1.000	.843
VAR00016	1.000	.857
VAR00017	1.000	.804
VAR00018	1.000	.810
VAR00019	1.000	.724
VAR00020	1.000	.734
VAR00021	1.000	.656
VAR00022	1.000	.909
VAR00023	1.000	.654
VAR00024	1.000	.747
Extraction Method: Principal Component Analysis.		

Table 3.11. Initial Component Matrix

Component Matrix[a]							
	Component						
	1	2	3	4	5	6	7
VAR00001		.505				.700	
VAR00002	.533	.436				.542	
VAR00003	.507	.485					
VAR00004	.421	.533					
VAR00005	.773	-.431					
VAR00006	.707	-.440					
VAR00007	.683	-.479					

VAR00008	.682	-.401					
VAR00009		.559		-.540			
VAR00010		.556		-.567			
VAR00011		.600		-.492			
VAR00012	.516	-.561					
VAR00013	.529	-.505					
VAR00014	.532						.505
VAR00015			.725		.493		
VAR00016			.836				
VAR00017			.774				
VAR00018	.527						
VAR00019	.510				-.433		
VAR00020	.624						
VAR00021	.537						
VAR00022				.477	.648		
VAR00023					.463		
VAR00024				.474	.590		
Extraction Method: Principal Component Analysis.							
a. 7 components extracted.							

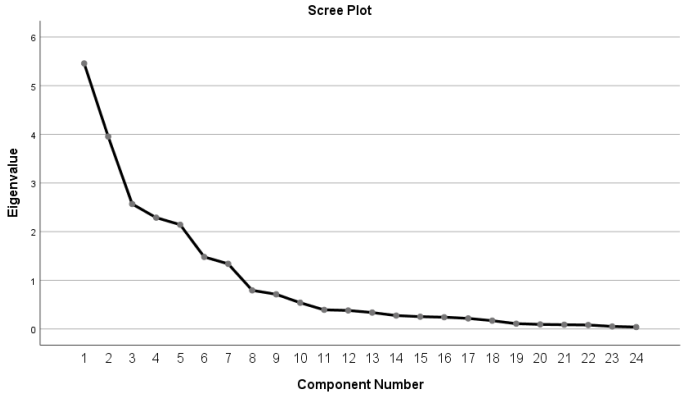

Figure 3.1. Scree Plot

Though these 7 components explain nearly 80% of the variation in the data, it shows a very high amount of spread and cross-loadings among its constructs. As a result of which we can say that some of the variables are not important for this study. To understand how many components to retain, the researcher used Scree plot tools. In this method, we can retain only that many components where the line shows a bend. The curve is shown in figure 3.1.

The Scree plot demonstrates that after the third component, the line bends. As a result, it was chosen to keep three components and use the varimax method to find the rotated component matrix. The result is shown in the table 3.12.

Table 3.12. Rotated Component Matrix after Varimax Rotation

Rotated Component Matrix[a]			
	Component		
	1	2	3
VAR00001		.610	
VAR00002		.674	
VAR00003		.683	
VAR00004		.683	
VAR00005	.882		
VAR00006	.827		
VAR00007	.850		
VAR00008	.784		
VAR00009		.707	
VAR00010		.687	
VAR00011		.667	
VAR00012	.744		
VAR00013	.743		
VAR00014	.668		
VAR00015			.750
VAR00016			.826
VAR00017			.795
VAR00018		.515	.419
VAR00019		.439	
VAR00020		.546	

VAR00021		.511	.407
VAR00022			
VAR00023			
VAR00024			
Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization. [a]			
a. Rotation converged in 5 iterations.			

Even after varimax rotation with the help of three components, both zero loading as well as cross-loadings can be seen against some of the variables. So, these variables do not have much weightage. Hence, they can be removed from the main sets of variables. After removing the non–essential variables, the final rotated component matrix is received as under.

Table 3.13. Final Rotated Component Matrix

Rotated Component Matrix[a]			
	Component		
	1	2	3
VAR00005	.938		
VAR00006	.908		
VAR00007	.922		
VAR00008	.910		
VAR00009		.969	
VAR00010		.961	
VAR00011		.909	
VAR00015			.902
VAR00016			.916
VAR00017			.873
Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.[a]			
a. Rotation converged in 4 iterations.			

Since there are no cross-loadings we can consider this as the final set of variables. So, originally the study started with 24 variables and after the reliability and validity test, it has been reduced to 10 variables. Subsequently, hypotheses will be developed with the help of these 10 variables.

Table 3.14. Component Transformation Matrix

Component	1	2	3
1	.993	.034	.114
2	-.054	.983	.174
3	-.106	-.179	.978
Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.			

The component transformation matrix also justifies the discriminant validity of the data. If there is a low correlation among three separate components, discriminant validity can be supported, as shown in the table above.

We may infer that these 10 factors will eventually continue in the study as research variables because both convergent and discriminant validity is warranted. So, even though the study began with 24 variables, only 10 were eventually used in the final analysis.

The final set of variables is developed in table 3.15.

Table 3.15. List of Final Variables

Factor	Statement	Factor 1	Factor 2	Factor 3	Commun-alities	Alpha Value
Internet usability	Statement 5: The cost of high-speed internet is becoming expensive	**0.938**			**0.880**	**0.804**
	Statement 6: I can use internet on my own	**0.908**			**0.831**	**0.806**
	Statement 7: I can configure the connectivity problem	**0.922**			**0.857**	**0.809**
	Statement 8: Mobile internet is better than broadband internet	**0.910**			**0.833**	**0.806**
Positive Benefits of Internet	Statement 9: I feel positive towards the use of internet		**0.968**		**0.947**	**0.813**
	Statement 10:		**0.961**		**0.924**	**0.812**

	The internet has mostly positive effect on society					
	Statement 11: Access to internet is equal for all		**0.909**		**0.839**	**0.815**
Internet as Learning Skills	Statement 15: Internet helps me to learn new skills			**0.902**	**0.829**	**0.819**
	Statement 16: Online education system helps to increase my learning skills			**0.916**	**0.840**	**0.825**
	Statement 17: The internet use has become an everyday part of my life			**0.873**	**0.762**	**0.819**
Variance Explained		**85.42%**				

3.8. Hypothesis Development

The following hypotheses developed are as follows:

H1: There is a substantial variance of opinion existing among students of government and private educational institutions regarding internet usability.

H2: There is a substantial variance of opinion existing among the students of government and private educational institutions regarding the positive benefits of the internet in daily life.

H3: There is a substantial variance of opinion existing among the students of government and private educational institutions regarding the importance of the internet in enhancing skills.

Under 1st hypothesis 4 sub – hypotheses are developed. For H2 and H3, 3 sub – hypotheses are developed respectively. Each of these sub hypotheses is mentioned below:

Sub – Hypotheses under Hypothesis 1:

H1a: There is no substantial variance of opinion existing among students of government and private educational institutions regarding the cost of high-speed internet.

H1b: There is a substantial variance of opinion existing among students of government and private educational institutions regarding the cost of high-speed

internet.

H1c: There is no substantial variance of opinion existing among students of government and private educational institutions regarding easy use of the internet.

H1d: There is a substantial variance of opinion existing among students of government and private educational institutions regarding easy use of the internet.

H1e: There is no substantial variance of opinion existing among students of government and private educational institutions regarding handling technical aspects of the internet.

H1f: A substantial variance of opinion exists among students of government and private educational institutions regarding handling technical aspects of the internet.

H1g: No substantial variance of opinion exists among students of government and private educational institutions regarding the usage of mobile internet as broadband.

H1h: A substantial variance of opinion exists among students of government and private educational institutions regarding the usage of mobile internet as broadband.

Sub – Hypotheses under Hypothesis 2:

H2a: There is no substantial variance of opinion existing among students of government and private educational institutions regarding positive attitudes towards the internet.

H2b: There is a substantial variance of opinion existing among students of government and private educational institutions regarding positive attitudes towards the internet.

H2c: There is no substantial variance of opinion existing among students of government and private educational institutions regarding the positive effect of the internet on society.

H2d: There is a substantial variance of opinion existing among students of government and private educational institutions regarding the positive effect of the internet on society.

H2e: There is no substantial variance of opinion existing among students of government and private educational institutions regarding an equal opportunity to the internet for all.

H2f: There is a substantial variance of opinion existing among students of government and private educational institutions regarding an equal opportunity to the internet for all.

Sub – Hypotheses under Hypothesis 3:

H3a: There is no substantial variance of opinion existing among students of government and private educational institutions regarding the role of the internet in

learning new skills.

H3b: There is a substantial variance of opinion existing among students of government and private educational institutions regarding the role of the internet in learning new skills.

H3c: There is no substantial variance of opinion existing among students of government and private educational institutions regarding the role of the internet in expanding online education.

H3d: There is a substantial variance of opinion existing among students of government and private educational institutions regarding the role of the internet in expanding online education.

H3e: There is no substantial variance of opinion existing among students of government and private educational institutions regarding the internet as part of our daily life.

H3f: There is a substantial variance of opinion existing among students of government and private educational institutions regarding the internet as part of our daily life.

3.9. Conceptual Model

The conceptual model is derived from the variable are as given in figure 3.2 based on the review of literature.

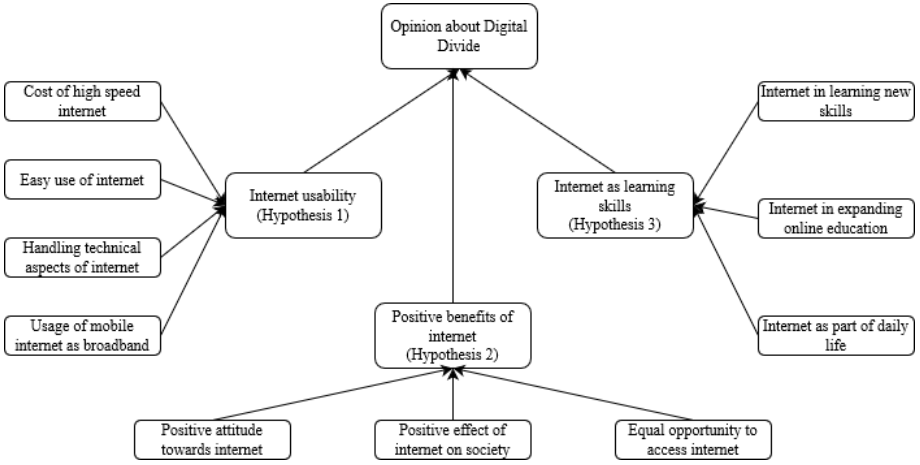

Figure 3.2. Conceptual Model

Source: Based on the review of literature

Chapter 4
Analysis of Data

4. Introduction

This section mainly deals with the analysis of the data collected with the help of a structured questionnaire. There are in total 396 responses collected from two important stakeholders, i.e. students of government and private educational institutions. The section is important in the sense that it helps us to throw some insights into the problems associated with the research objectives. It is a fact that the digital divided problem is very much there, but this problem may widen during the nationwide lockdown in the year 2020. The impact was severe on academic institutions as well. The students suddenly found themselves in a new normal environment like their respective institutions.

The structured questionnaire captured this information and the perception of the students towards the problems associated with the digital divide. The impact of the digital divide may not be seen directly, but it will be more visible with the help of the factors like access to the internet and students' perception. As a result, the questionnaire was separated into three sections: section 1 contains basic information, section 2 contains variables affecting the digital divide, and section 3 contains respondents' perceptions of the idea of the digital divide. To determine the impact of the digital divide, the analysis part is also separated into three sections: general information about target respondents, information about internet usage, and respondents' perceptions of internet usability. The detailed analysis is discussed subsequently.

4.1 General Information about Target Respondents

This section focuses on the basic demographic information of the respondents.

Table 4.1.1. Educational Institution wise Distribution of the Respondents

Educational Institution	Frequency	%
Government	176	44.4
Private	220	55.6
Total	396	100.0

Source: Survey Data

Observation: Table 4.1.1 describes the educational institution wise distribution of the respondents. The table shows that out of the total 396 respondents, around 44% are from government educational institutions and around 56% are from private educational institutions. So, out of the total questionnaire that the scholars distributed, a greater number of responses were received from the private educational institutions. Hence, the participation is high in this segment.

Table 4.1.2. Gender wise and Educational Institution wise Distribution of the Respondents

Educational Institution	Gender	Frequency	%
Government	Male	108	61.4
	Female	68	38.6
Private	Male	112	50.9
	Female	108	49.1

Source: Primary Data

Observation: Table 4.1.2 gives information about gender and educational institution's wise distribution of the respondents. The data reveals that in the case of government institutions number of participations from the female segment is around 39% while the same for private educational institutions is 49%. A higher percentage of participation from private educational institutions may be witnessed. Till now no specific conclusion can be drawn with the help of this data.

Table 4.1.3. Age Group and Educational Institution wise Distribution of the Respondents

Educational Institution	Age Group	Frequency	%
Government	Less than 20 Years	67	38.1
	20 Years – 25 Years	87	49.4
	> 25 Years	22	12.5
Private	Less than 20 Years	118	53.6
	20 Years – 25 Years	79	35.9
	> 25 Years	23	10.5

Source: Primary Data

Observation: Table 4.1.3 shows the age group and educational institution wise distribution of the respondents. The data reveals that a majority of the respondents from government educational institutions are in the second age bracket, i.e., 20 Years to 25 years, followed by the first age bracket, less than 20 years. Whereas, in the case of private educational institutions a majority of the respondents are from the first age bracket, i.e., less than 20 years (54%) followed by the second

age bracket, 20 years to 25 years (36%).

Table 4.1.4. Level of Education and Educational Institution wise Distribution of the Respondents

Educational Institution	Education	Frequency	%
Government	Pursuing Graduation	61	34.7
	Pursuing Post Graduation	101	57.4
	Pursuing PhD	14	8.0
Private	Pursuing Graduation	96	43.6
	Pursuing Post Graduation	108	49.1
	Pursuing PhD	16	7.3

Source: Primary Data

Observation: Table 4.1.4 shows the educational institution wise and level of education wise distribution of the respondents. The data reveals that in the case of government educational institutions, the majority of the respondents are doing their post-graduation (57%) followed by graduation (35%). In the case of private educational institutions also the majority of the respondents are either doing post-graduation (49%) or pursuing graduation (44%). So, irrespective of the nature of the institution most of the participants are either pursuing their graduation or post-graduation courses.

Table 4.1.5. Educational Institution wise Computer Knowledge

Educational Institution	Education	Frequency	%
Government	Computer knowledge with certification	67	38.1
	Computer knowledge without certification	109	61.9
Private	Computer knowledge with certification	102	46.4
	Computer knowledge without certification	118	53.6

Source: Primary Data

Observation: Table 4.1.5 shows educational institution wise computer knowledge. Many of the respondents mentioned that they do have computer knowledge based on practice. But, for operational definition, the scholar segregated the respondents based on certification. It can be seen that many respondents have computer knowledge without certification, but this percentage is more in the case of respondents from government institutions (62%). The same for private educational institutions stands at 54%. The results show that formal computer certificate may not be always an important dimension now a days to understand whether the students have knowledge about ICT. The recent development of online resources is helpful to get

gainful knowledge about computer and internet resources. But if that basic knowledge is missing then surely it will be going to widen the digital divide among various sections of the community. The challenge lies there where people do not have access to formal computer system and learning mechanisms.

Table 4.1.6. Educational Institution wise Monthly Family Income of the main Earners

Educational Institution	Monthly Family Income	Frequency	%
Government	Less than Rs.50,000	92	52.3
	Rs. 50,000 – Rs.1,00,000	61	34.7
	More than Rs. 1, 00, 000	23	13.1
Private	Less than Rs.50,000	21	9.5
	Rs. 50,000 – Rs.1,00,000	118	53.6
	More than Rs. 1, 00, 000	81	36.8

Source: Primary Data

Observation: The monthly income of the main earners of the respondents is divided into three categories, viz. less than Rs.50,000 per month; Rs. 50,000 to Rs.1,00,000 per month and more than Rs.1,00,000 per month. The result shows that in the case of respondents studying in government educational institutions, around 52% are having less than Rs.50,000 as monthly family income; followed by around 35% of respondents who are in the second category. In the case of respondents from private educational institutions, a majority of the respondents were in the second category, followed by the third category. This is because an income disparity exists among the target respondents of government and private educational institutions.

4.2. Information about Internet Usage

Table 4.2.1. Educational Institution wise Number of Computers available at Household

Educational Institution	Desktop/Laptop	Frequency	%
Government	None	84	47.7
	1	80	45.5
	2	12	6.8
	3	0	0.0
	More than 3	0	0.0

Private	None	14	6.4
	1	143	65.0
	2	63	28.6
	3	0	0.0
	More than 3	0	0.0

Source: Primary Data

Observation: Table 4.2.1 shows the educational institution a wise number of computers available in the household. The data reveals that in the case of respondents from government institutions majority of the respondents do not have any computers in their households. This may be the case that they are continuing in online classes using mobile phones. The percentage is relatively less for the students from private educational institutions. The availability of a desktop or laptop in the household will go to create a difference among the target respondents of these two types of institutions.

Table 4.2.2. Educational Institution wise Access to the Internet at Home

Educational Institution	**Access to Internet**	**Frequency**	**%**
Government	No internet connection	12	6.8
	Mobile Internet Only	111	63.1
	Broadband Only	32	18.2
	Both Mobile and Broadband	21	11.9
Private	No internet connection	0	0.0
	Mobile Internet Only	121	55.0
	Broadband Only	56	25.5
	Both Mobile and Broadband	43	19.5

Source: Primary Data

Observation: Table 4.2.2 shows educational institution-wise access to the internet among the two groups. It can be seen that after the internet revolution and the introduction of low-cost smartphones, internet access has increased. Four separate segments are created for this question. It can be seen that most of the respondents from government institutions are depending more on mobile internet only. Around 18% have a broadband connection and 12% have both broadband and mobile internet. Around 9% still do not have internet connectivity and they are mainly using feature phones. In the case of private educational institutions also a percentage of mobile internet users is more (55%). The low cost of the internet is the main reason for this growth. However, around 26% have broadband connections at home. Around 20% of

the respondents have access to both mobile internet as well as broadband connections.

Table 4.2.3. Educational Institution wise Frequency of using the Internet

Educational Institution	Place of using the Internet	Frequency	%
Government	Do not use the internet	12	6.8
	Only at home	89	50.6
	At my educational institution	65	36.9
	whenever I have time (using mobile)	121	68.8
Private	Do not use internet	0	0.0
	Only at home	112	50.9
	At my educational institution	78	35.5
	whenever I have time (using mobile)	145	65.9

Source: Primary Data

Observation: Table 4.2.3 shows the educational institution-wise frequency of using the internet. The data shows that irrespective of the educational institution most of the respondents mentioned that they use the internet whenever they have time. It is to be believed that around 51% of respondents mentioned that they are using the internet at home only. The same can be seen in terms of usage of the internet at educational institutions. The only point of difference is that around 7% of the respondents from government institutions mentioned that they do not use the internet. This may be because they do not have internet access.

Table 4.2.4. Educational Institution wise Time Spent on Internet

Educational Institution	Daily usage of the Internet	Frequency	%
Government	Less than 1 hour	12	6.8
	1 hour – 5 hours	66	37.5
	More than 5 hours	98	55.7
Private	Less than 1 hour	14	6.4
	1 hour – 5 hours	86	39.1
	More than 5 hours	120	54.5

Source: Primary Data

Observation: The table shows the daily usage of the internet among the target respondents. It can be seen that irrespective of the group that they are in almost all the respondents are spending more than 5 hours a day on the internet. Thus, a

significant part of their time they are spent on the internet. So, it is important to see the content that they are following on the internet during these 5 hours.

Table 4.2.5. Educational Institution wise Purpose of using the Internet

Educational Institution	Purpose of using the Internet	Frequency	%
Government	Work/Business	31	6.7
	Education	156	33.5
	Entertainment	112	24.1
	Surfing different social media	166	35.7
Private	Work/Business	56	8.3
	Education	216	32.1
	Entertainment	187	27.8
	Surfing different social media	213	31.7

Source: Primary Data

Observation: Table 4.2.5 shows the educational institution-wise purpose of using the internet. In the case of respondents from government institutions around 36% are using the internet for surfing different social media sites. This is followed by 34% of respondents who are using it for education purposes. The same can be seen for respondents of private educational institutions. A majority of the respondents are using it to access social media, followed by education purposes. Significant percentages of respondents are using it for entertainment purposes as well.

4.3. Factors affecting Digital Divide

To understand the factors that are affecting the digital divide among the two groups, i.e., respondents from government and private educational institutions. To understand the factors, the scholar took access to the internet as one of the important variables. This variable is judged from the perspective of gender, age, computer knowledge, level of education, and income. Each of these variables is judged from the perspective of access to the internet at home. Since both the variables are categorical, the scholar has decided to apply the Chi-Square test of independence. The following hypotheses are developed to understand the factors affecting the digital divide.

Ha: There is no substantial connection between the gender of the respondents and access to the internet at home.

Hb: There is a substantial connection between the gender of the respondents and access to the internet at home.

Hc: There is no substantial connection between the age of the respondents and access to the internet at home.

Hd: There is a substantial connection between the age of the respondents and

access to the internet at home.

He: There is no substantial connection between the computer knowledge of the respondents and access to the internet at home.

Hf: There is a substantial connection between the computer knowledge of the respondents and access to the internet at home.

Hg: There is no substantial connection between the family income of the respondents and access to the internet at home.

Hh: There is a substantial connection between the family income of the respondents and access to the internet at home.

Hi: There is no substantial connection between the level of education and access to the internet at home.

Hj: There is a substantial connection between the level of education and access to the internet at home.

Each of these hypotheses is tested using the Chi-Square test of independence.

Hypothesis 1:

Ha: There is no substantial connection between the gender of the respondents and access to the internet at home.

Hb: There is a substantial connection between the gender of the respondents and access to the internet at home.

Table 4.3.1a. Gender wise and Access to Internet Cross Tabulation

Gender * Access to Internet Crosstabulation							
			Access to Internet				
			No Internet Connection	Mobile Internet Only	Broadband Only	Both Mobile and Broadband	Total
Gender	Male	Count	4	103	32	37	176
		% within Gender	2.3%	58.5%	18.2%	21.0%	100.0%
	Female	Count	8	129	56	27	220
		% within Gender	3.6%	58.6%	25.5%	12.3%	100.0%
Total		Count	12	232	88	64	396
		% within Gender	3.0%	58.6%	22.2%	16.2%	100.0%

Table 4.3.1b. Chi-Square Test Statistic

Chi-Square Tests			
	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	7.560[a]	3	.056
Likelihood Ratio	7.578	3	.056
Linear-by-Linear Association	2.068	1	.150
N of Valid Cases	396		
a. 0 cells (.0%) have an expected count of less than 5. The minimum expected count is 5.33.			

Source: Primary Data

Observation: The chi-square test result against hypothesis 1 is shown in table 4.3.1b. We can accept the null hypothesis and infer that there is no significant relationship between respondents' gender and home internet access because the Pearson Chi-Square value is greater than 0.05. Hence, gender has no role to play to create a digital divide among the target respondents.

Hypothesis 2

Hc: There is no substantial connection between the age of the respondents and access to the internet at home.

Hd: There is a s substantial connection between the age of the respondents and access to the internet at home.

Table 4.3.2a Age group wise and Access to Internet Cross Tabulation

Age * Access to Internet Crosstabulation							
			Access to Internet				Total
			No Internet Connection	Mobile Internet Only	Broadband Only	Both Mobile and Broadband	
Age	Less than 20 Years	Count	6	118	36	25	185
		% within Age	3.2%	63.8%	19.5%	13.5%	100.0%
	20 Years to 25 Years	Count	5	91	46	24	166
		% within Age	3.0%	54.8%	27.7%	14.5%	100.0%
	More than 25 Years	Count	1	23	6	15	45
		% within Age	2.2%	51.1%	13.3%	33.3%	100.0%
Total		Count	12	232	88	64	396

	% within Age	3.0%	58.6%	22.2%	16.2%	100.0%

Table 4.3.2b. Chi-Square Test

Chi-Square Tests			
	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	15.606[a]	6	.016
Likelihood Ratio	13.864	6	.031
Linear-by-Linear Association	6.415	1	.011
N of Valid Cases	396		
a. 1 cell (8.3%) has an expected count of less than 5. The minimum expected count is 1.36.			

Source: Primary Data

Observation: The chi-square test result against hypothesis 2 is shown in table 4.3.2b. We can reject the null hypothesis and infer that there is a significant relationship between respondents' age and home internet access because the Pearson Chi-Square value is less than 0.05. Hence, the age of the respondent is going to play a crucial role in the creation of a digital divide.

Hypothesis 3

He: There is no substantial connection between the computer knowledge of the respondents and access to the internet at home.

Hf: There is a substantial connection between the computer knowledge of the respondents and access to the internet at home.

Table 4.3.3a. Computer knowledge wise and Access to Internet Cross Tabulation

Computer Knowledge * Access to Internet Crosstabulation					
	Access to Internet				Total
Count	No Internet Connection	Mobile Internet Only	Broadband Only	Both Mobile and Broadband	
	6	103	35	25	169
% within Computer Education	3.60%	60.90%	20.70%	14.80%	100.00%
Count	6	129	53	39	227
% within Computer Education	2.60%	56.80%	23.30%	17.20%	100.00%

Count	12	232	88	64	396
% within Computer Education	3.00%	58.60%	22.20%	16.20%	100.00%

Table 4.3.3b. Chi-Square Test

Chi-Square Tests			
	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	1.189[a]	3	.006
Likelihood Ratio	1.190	3	.005
Linear-by-Linear Association	1.056	1	.000
N of Valid Cases	396		
a. 0 cells (0.0%) have an expected count of less than 5. The minimum expected count is 5.12.			

Source: Primary Data

Observation: The chi-square test result against hypothesis 3 is shown in table 4.3.3b. We may reject the null hypothesis because the Pearson Chi-Square value is less than 0.05, indicating that there is a substantial link between respondents' computer competence and home internet access. Hence, the computer knowledge of the respondent is going to play a crucial role in the creation of a digital divide.

Hypothesis 4

Hg: There is no substantial connection between the family income of the respondents and access to the internet at home.

Hh: There is a substantial connection between the family income of the respondents and access to the internet at home.

4.3.4a. Family income wise and Access to Internet Cross Tabulation

Income * Access to Internet Crosstabulation							
			Access to Internet				Total
			No Internet Connection	Mobile Internet Only	Broadband Only	Both Mobile and Broadband	
Income	Less than Rs.50000	Count	3	65	31	14	113
		% within Income	2.7%	57.5%	27.4%	12.4%	100.0%
	Rs. 50000 - Rs.100000	Count	5	105	41	28	179
		% within Income	2.8%	58.7%	22.9%	15.6%	100.0%
	More than Rs.	Count	4	62	16	22	104

	100000	% within Income	3.8%	59.6%	15.4%	21.2%	100.0%
Total		Count	12	232	88	64	396
		% within Income	3.0%	58.6%	22.2%	16.2%	100.0%

4.3.4b. Chi Square Test

Chi-Square Tests			
	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	6.590[a]	6	.000
Likelihood Ratio	6.690	6	000
Linear-by-Linear Association	.156	1	.000
N of Valid Cases	396		

a. 2 cells (16.7%) have an expected count of less than 5. The minimum expected count is 3.15.

Source: Primary Data

Observation: The chi-square test result against hypothesis 4 is shown in table 4.3.4b. We may reject the null hypothesis because the Pearson Chi-Square value is less than 0.05, indicating that there is a significant relationship between respondents' family income and home internet access. Hence, a difference in income of the respondent is going to play a crucial role in the creation of a digital divide.

Hypothesis 5

Hi: There is no substantial connection between the level of education and access to the internet at home.

Hj: There is a substantial connection between the level of education and access to the internet at home.

Education * Access to Internet Crosstabulation							
			Access to Internet				Total
			No Internet Connection	Mobile Internet Only	Broadband Only	Both Mobile and Broadband	
Education	Pursuing Graduation	Count	5	90	33	29	157
		% within Education	3.2%	57.3%	21.0%	18.5%	100.0%
	Pursuing Post Graduation	Count	7	120	49	33	209
		% within Education	3.3%	57.4%	23.4%	15.8%	100.0%

	Pursuing Ph.D	Count	0	22	6	2	30
		% within Education	0.0%	73.3%	20.0%	6.7%	100.0%
Total		Count	12	232	88	64	396
		% within Education	3.0%	58.6%	22.2%	16.2%	100.0%

Table 4.3.5b. Chi-Square Test

Chi-Square Tests			
	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	4.716[a]	6	.001
Likelihood Ratio	6.000	6	.003
Linear-by-Linear Association	1.204	1	.001
N of Valid Cases	396		

a. 3 cells (25.0%) have an expected count of less than 5. The minimum expected count is .91.

Source: Primary Data

Observation: The chi-square test result against hypothesis 5 is shown in table 4.3.5b. We can reject the null hypothesis and conclude that there is a significant relationship between the level of education and home internet access because the Pearson Chi-Square value is less than 0.05. Hence, the level of education of the respondent is going to play a crucial role in the creation of a digital divide.

Hypothesis	**Status**
Ha: There is no substantial connection between the gender of the respondents and access to the internet at home. Hb: There is a substantial connection between the gender of the respondents and access to the internet at home.	**Null Hypothesis Accepted**
Hc: There is no substantial connection between the age of the respondents and access to the internet at home. Hd: There is a substantial connection between the age of the respondents and access to the internet at home.	**Alternative Hypothesis Accepted**
He: There is no substantial connection between the computer knowledge of the respondents and access to	**Alternative Hypothesis Accepted**

the internet at home. Hf: There is a substantial connection between the computer knowledge of the respondents and access to the internet at home.	
Hg: There is no substantial connection between the family income of the respondents and access to the internet at home. Hh: There is a substantial connection between the family income of the respondents and access to the internet at home.	**Alternative Hypothesis Accepted**
Hi: There is no substantial connection between the level of education and access to the internet at home. Hj: There is a substantial connection between the level of education and access to the internet at home.	**Alternative Hypothesis Accepted**

Hence, out of the five factors, viz. gender, age, computer knowledge, monthly family income, and level of education, only gender is not creating any impact on the digital divide, whereas the other four factors are playing a crucial role in creating a digital divide.

4.4. Educational Institution wise Perception of the Respondents Regarding Impact of Digital Divide

This section mainly deals with the perception of the respondents of both government educational institutions and private educational institutions in terms of the digital divide. A total of 10 statements are transformed into hypotheses. These 10 statements are segregated into three groups.

H1: There is a substantial variance of opinion existing among students of government and private educational institutions regarding internet usability.

H2: There is a substantial variance of opinion existing among the students of government and private educational institutions regarding the positive benefits of the internet in daily life.

H3: There is a substantial variance of opinion existing among the students of government and private educational institutions regarding the importance of the internet in enhancing skills.

Under 1st hypothesis 4 sub – hypotheses are developed. For H2 and H3, 3 sub – hypotheses are developed respectively.

Sub – Hypotheses under Hypothesis 1

Sub – Hypothesis Related to Variable 5:

H1a: There is no substantial variance of opinion existing among students of government and private educational institutions regarding the cost of high-

speed internet.

H1b: There is a substantial variance of opinion existing among students of government and private educational institutions regarding the cost of high-speed internet.

Table 4.4.1a. Group Statistics Related to Variable 5

Group Statistics					
	Category	N	Mean	Std. Deviation	Std. Error Mean
Variable_5	Student in Government Institution	183	3.9891	.85156	.06295
	Student in Private Institution	213	4.2019	.76578	.05247

Table 4.4.1b. t Statistics Table Related to Variable 5

Independent Samples Test										
		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Lower
Variable_5	Equal variances assumed	0.038	0.845	-2.618	394	0.009	-0.21281	0.08129	-0.37263	-0.05298
	Equal variances not assumed			-2.597	369.591	0.010	-0.21281	0.08195	-0.37395	-0.05166

Source: Primary Data

Observation: Table 4.4.1b shows the t statistics for variable 5. We can reject the null hypothesis and accept the fact that there is a substantial variance in opinion regarding the cost of high-speed internet among students of government and private

educational institutions because the significant value is less than the 5% level of significance. Table 4.4.1a shows students of private educational institutions are more in favour of this statement.

Sub – Hypothesis Related to Variable 6

H1c: There is no substantial variance of opinion existing among students of government and private educational institutions regarding easy use of the internet.

H1d: There is a substantial variance of opinion existing among students of government and private educational institutions regarding easy use of the internet.

Table 4.4.2a. Group Statistics Related to Variable 6

Group Statistics					
	Category	N	Mean	Std. Deviation	Std. Error Mean
Variable_6	Student in Government Institute	183	4.0109	.83198	.06150
	Student in Private Institute	213	4.2207	.81446	.05581

Table 4.4.2b. t Statistics Table Related to Variable

Independent Samples Test										
		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig.(2-tailed)	Mean Difference	Std. Error Difference	Lower	Lower
Variable_6	Equal variances assumed	3.328	0.069	-2.530	394	0.012	-0.20973	0.08291	-0.37273	-0.04672
	Equal variances not assumed			-2.525	382.483	0.012	-0.20973	0.08305	-0.37301	-0.04644

Source: Primary Data

Observation: Table 4.4.2b shows the t statistics for variable 6. We can reject the null hypothesis and accept the fact that there is a substantial variance of opinion

between students of government and private educational institutions about the ease of using the internet because the significant value is less than the 5% level of significance. Table 4.4.2a shows students of private educational institutions are more in favour of this statement.

Sub – Hypothesis Related to Variable 7

H1e: There is no substantial variance of opinion existing among students of government and private educational institutions regarding handling technical aspects of the internet.

H1f: There is a substantial variance of opinion existing among students of government and private educational institutions regarding handling technical aspects of the internet.

Table 4.4.3a. Group Statistics Related to Hypothesis 7

Group Statistics					
	Category	N	Mean	Std. Deviation	Std. Error Mean
Variable_7	Student in Government Institute	183	4.0109	.87699	.06483
	Student in Private Institute	213	4.1925	.85536	.05861

Table 4.4.3b. t Statistics Related to Variable 7

Independent Samples Test										
		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig.(2-tailed)	Mean Difference	Std. Error Difference	Lower	Lower
Variable_7	Equal variances assumed	1.703	0.193	-2.081	394	0.038	-0.18156	0.08723	-0.35305	-0.01007
	Equal variances not assumed			-2.077	382.006	0.038	-0.18156	0.08739	-0.35339	-0.00973

Source: Primary Data

Observation: Table 4.4.3b shows the t statistics for variable 7. We can reject the null hypothesis and accept the fact that there is a substantial variance of opinion

between students of government and private educational institutions regarding handling technical parts of the internet because the significant value is less than the 5% level of significance. Table 4.4.3a shows students of private educational institutions are more in favour of this statement.

Sub – Hypothesis Related to Variable 8

H1g: There is no substantial variance of opinion existing among students of government and private educational institutions regarding the usage of mobile internet as broadband.

H1h: There is a substantial variance of opinion existing among students of government and private educational institutions regarding the usage of mobile internet as broadband.

Table 4.4.4a. Group Statistics Related to Variable 8

Group Statistics					
	Category	N	Mean	Std. Deviation	Std. Error Mean
Variable_8	Student in Government Institute	183	4.0055	.80177	.05927
	Student in Private Institute	213	4.2160	.80700	.05529

Table 4.4.4b. t Statistics Related to Variable 8

Independent Samples Test										
		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig.(2-tailed)	Mean Difference	Std. Error Difference	Lower	Lower
Variable_8	Equal variances assumed	3.675	0.056	-2.596	394	0.010	-0.21050	0.08110	-0.36994	-0.05106
	Equal variances not assumed			-2.597	385.794	0.010	-0.21050	0.08106	-0.36987	-0.05113

Source: Primary Data

Observation: Table 4.4.4b shows the t statistics for variable 8. We can reject the null hypothesis and accept the fact that there is a substantial variance of opinion

between students of government and private educational institutions about the use of mobile internet as broadband because the significant value is less than the 5% level of significance. Table 4.4.4a shows students of private educational institutions are more in favour of this statement.

Sub – Hypotheses under Hypothesis 2

Sub – Hypothesis Related to Variable 9

H2a: There is no substantial variance of opinion existing among students of government and private educational institutions regarding positive attitudes towards the internet.

H2b: There is a substantial variance of opinion existing among students of government and private educational institutions regarding positive attitudes towards the internet.

Table 4.4.5a. Group Statistics Related to Variable 9

Group Statistics					
	Category	N	Mean	Std. Deviation	Std. Error Mean
Variable_9	Student in Government Institute	183	4.0109	.83856	.06199
	Student in Private Institute	213	4.2817	.74952	.05136

Table 4.4.5b. t Statistics Related to Variable 9

Independent Samples Test										
		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig.(2-tailed)	Mean Difference	Std. Error Difference	Lower	Lower
Variable_9	Equal variances assumed	1.979	0.160	-3.392	394	0.001	-0.27076	0.07982	-0.42768	-0.11384
	Equal variances not assumed			-3.364	368.535	0.001	-0.27076	0.08050	-0.42905	-0.1125

Source: Primary Data

Observation: Table 4.4.5b shows the t statistics for variable 9. We can reject

the null hypothesis and accept the fact that there is a substantial variance of opinion between students of government and private educational institutions about positive attitudes toward the internet because the significant value is less than the 5% level of significance. Table 4.4.5a shows students of private educational institutions are more in favour of this statement.

Sub – Hypothesis Related to Variable 10

H2c: There is no substantial variance of opinion existing among students of government and private educational institutions regarding the positive effect of the internet on society.

H2d: There is a substantial variance of opinion existing among students of government and private educational institutions regarding the positive effect of the internet on society.

Table 4.4.6a. Group Statistics Related to Variable 10

Group Statistics					
	Category	N	Mean	Std. Deviation	Std. Error Mean
Variable_10	Student in Government Institute	183	3.9508	.84696	.06261
	Student in Private Institute	213	4.1643	.73088	.05008

Table 4.4.6b. t Statistics Related to Variable 10

Independent Samples Test										
		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig.(2-tailed)	Mean Difference	Std. Error Difference	Lower	Lower
Variable_10	Equal variances assumed	0.128	0.721	-2.693	394	0.007	-0.21350	0.07929	-0.36938	-0.05762
	Equal variances not assumed			-2.663	362.128	0.008	-0.21350	0.08017	-0.37116	-0.05583

Source: Primary Data

Observation: Table 4.4.6b shows the t statistics for variable 10. We can

reject the null hypothesis and accept the fact that there is a substantial variance of opinion between students of government and private educational institutions regarding the positive effects of the internet on society because the significant value is less than the 5% level of significance. Table 4.4.6a shows students of private educational institutions are more in favour of this statement.

Sub – Hypothesis Related to Variable 11

H2e: There is no substantial variance of opinion existing among students of government and private educational institutions regarding an equal opportunity to the internet for all.

H2f: There is a substantial variance of opinion existing among students of government and private educational institutions regarding an equal opportunity to the internet for all.

Table 4.4.7a. Group Statistics Related to Variable 11

Group Statistics					
	Category	N	Mean	Std. Deviation	Std. Error Mean
Variable_11	Student in Government Institute	183	3.8415	.89075	.06585
	Student in Private Institute	213	4.1831	.85743	.05875

Table 4.4.7b. t Statistics Related to Variable 11

Independent Samples Test										
		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig.(2-tailed)	Mean Difference	Std. Error Difference	Lower	Lower
Variable_11	Equal variances assumed	0.070	0.791	-3.882	394	0.000	-0.34157	0.08799	-0.51456	-0.16858
	Equal variances not assumed			-3.871	380.240	0.000	-0.34157	0.08825	-0.51508	-0.16806

Source: Primary Data

Observation: Table 4.4.7b shows the t statistics for variable 11. We can

reject the null hypothesis and accept the fact that there is a substantial variance of opinion between students of government and private educational institutions about equal access to the internet for all because the significant value is less than the 5% level of significance. Table 4.4.7a shows students of private educational institutions are more in favour of this statement.

Sub – Hypotheses under Hypothesis 3

Sub – Hypothesis Related to Variable 15

H3a: There is no substantial variance of opinion existing among students of government and private educational institutions regarding the role of the internet in learning new skills.

H3b: There is a substantial variance of opinion existing among students of government and private educational institutions regarding the role of the internet in learning new skills.

Table 4.4.8a. Group Statistics Related to Variable 15

Group Statistics					
	Category	N	Mean	Std. Deviation	Std. Error Mean
Variable_15	Student in Government Institute	183	4.0273	.79443	.05873
	Student in Private Institute	213	4.4319	.70798	.04851

Table 4.4.8b. t Statistics Related to Variable 15

Independent Samples Test										
		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig.(2-tailed)	Mean Difference	Std. Error Difference	Lower	Lower
Variable_15	Equal variances assumed	2.379	0.124	-5.358	394	0.000	-0.40460	0.07551	-0.55306	-0.25615
	Equal variances not assumed			-5.312	368.014	0.000	-0.40460	0.07617	-0.55439	-0.25482

Source: Primary Data

Observation: Table 4.4.8b shows the t statistics for variable 15. We can

reject the null hypothesis and accept the fact that there is a substantial variance of opinion between students in government and private educational institutions about the role of the internet in learning new skills because the significant value is less than the 5% level of significance. Table 4.4.8a shows students of private educational institutions are more in favour of this statement.

Sub – Hypothesis Related to Variable 16

H3c: There is no substantial variance of opinion existing among students of government and private educational institutions regarding the role of the internet in expanding online education.

H3d: There is a substantial variance of opinion existing among students of government and private educational institutions regarding the role of the internet in expanding online education.

Table 4.4.9a. Group Statistics Related to Variable 16

Group Statistics					
	Category	N	Mean	Std. Deviation	Std. Error Mean
Variable_16	Student in Government Institute	183	3.8907	.82480	.06097
	Student in Private Institute	213	4.2254	.73067	.05006

Table 4.4.9b. t Statistics Related to Variable 16

Independent Samples Test										
		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig.(2-tailed)	Mean Difference	Std. Error Difference	Lower	Lower
Variable_16	Equal variances assumed	0.099	0.754	-4.281	394	0.000	-0.33464	0.07817	-0.48833	-0.18095
	Equal variances not assumed			-4.242	366.952	0.000	-0.33464	0.07889	-0.48978	-0.17950

Source: Primary Data

Observation: Table 4.4.9b shows the t statistics for variable 16. We can reject the null hypothesis and accept the fact that there is a substantial variance of opinion between students of government and private educational institutions regarding the role of the internet in expanding online education because the significant value is less than the 5% level of significance. Table 4.4.9a shows students of private educational institutions are more in favour of this statement.

Sub – Hypothesis Related to Variable 17

H3e: There is no substantial variance of opinion existing among students of government and private educational institutions regarding the internet as part of our daily life.

H3f: There is a substantial variance of opinion existing among students of government and private educational institutions regarding the internet as part of our daily life.

Table 4.4.10a. Group Statistics Related to Variable 17

Group Statistics					
	Category	N	Mean	Std. Deviation	Std. Error Mean
Variable_17	Student in Government Institute	183	4.0109	.81866	.06052
	Student in Private Institute	213	4.2488	.79447	.05444

Table 4.4.10b. t Statistics Related to Variable 17

Independent Samples Test										
		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig.(2-tailed)	Mean Difference	Std. Error Difference	Lower	Lower
Variable_17	Equal variances assumed	4.319	0.038	-2.929	394	0.004	-0.23790	0.08121	-0.39756	-0.07823
	Equal variances not assumed			-2.923	381.344	0.004	-0.23790	0.08140	-0.39794	-0.07795

Source: Primary Data

Observation: Table 4.4.10b shows the t statistics for variable 17. We can reject the null hypothesis and accept the fact that there is a substantial variance in view about the internet as part of our everyday lives among students of government and private educational institutions because the significant value is less than a 5% level of significance. Table 4.4.10a shows students of private educational institutions are more in favour of this statement.

The summary of the findings is mention in table 4.5.

Table 4.5. Summary of the Findings

Hypotheses	**Results of Hypotheses**
H1a: There is no substantial variance of opinion existing among students of government and private educational institutions regarding the cost of high-speed internet. H1b: There is a substantial variance of opinion existing among students of government and private educational institutions.	H1b Accepted
H1c: There is no substantial variance of opinion existing among students of government and private educational institutions regarding easy use of the internet. H1d: There is a substantial variance of opinion existing among students of government and private educational institutions regarding easy use of the internet.	H1d Accepted
H1e: There is no substantial variance of opinion existing among students of government and private educational institutions regarding handling technical aspects of the internet. H1f: There is a substantial variance of opinion existing among students of government and private educational institutions regarding handling technical aspects of the internet.	H1f Accepted
H1g: There is no substantial variance of opinion existing among students of government and private educational institutions regarding the usage of mobile internet as broadband. H1h: There is a substantial variance of opinion existing among students of government and private educational institutions regarding the usage of mobile internet as broadband.	H1h Accepted
H2a: There is no substantial variance of opinion existing	H2b Accepted

among students of government and private educational institutions regarding positive attitudes towards the internet. H2b: There is a substantial variance of opinion existing among students of government and private educational institutions regarding positive attitudes towards the internet.	
H2c: There is no substantial variance of opinion existing among students of government and private educational institutions regarding the positive effect of the internet on society. H2d: There is a substantial variance of opinion existing among students of government and private educational institutions regarding the positive effect of the internet on society.	H2d Accepted
H2e: There is no substantial variance of opinion existing among students of government and private educational institutions regarding the equal opportunity to the internet for all. H2f: There is a substantial variance of opinion existing among students of government and private educational institutions regarding an equal opportunity to the internet for all.	H2f Accepted
H3a: There is no substantial variance of opinion existing among students of government and private educational institutions regarding the role of the internet in learning new skills. H3b: There is a substantial variance of opinion existing among students of government and private educational institutions regarding the role of the internet in learning new skills.	H3b Accepted
H3c: There is no substantial variance of opinion exist among students of government and private educational institutions regarding the role of the internet in expanding online education. H3d: There is a substantial variance of opinion existing among students of government and private educational institutions regarding the role of the internet in expanding online education.	H3d Accepted
H3e: There is no substantial variance of opinion existing among students of government and private educational	H3f Accepted

institutions regarding the internet as part of our daily life. H3f: There is a substantial variance of opinion existing among students of government and private educational institutions regarding the internet as part of our daily life.	

Chapter 5
Findings, Suggestions and Conclusion

5. Introduction

This section of the thesis deals with the recommendations based on the findings and conclusion. The concept of the digital divide is relatively new and it helps to give an idea about its implications in creating variances among the users of technology. The data thus captured keeping in mind this basic requirement. Unless it is not specified, the actual meaning implication is very difficult. Keeping this point in mind, the findings are mentioned which have a direct link with the real-life problems that the decision-makers are facing. The findings of the study will be backed by suggestions to get an idea about the problems that the different stakeholders are facing. The findings of the study are divided into four segments. They are:

- Findings based on general information about the target respondents
- Findings based on the internet usage
- Findings based on the factors affecting the digital divide
- Findings based on the perception of the respondents regarding the digital divide

5.1. Findings based on General Information about Target Respondents

- Table 4.1.1 shows the educational institution wise distribution of the respondents. At this stage, care is taken so that adequate representation is available for both groups for comparative analysis. The data shows that out of the total 396 respondents, a majority are from private educational institutions. Around 44% of the respondents are from government educational institutions. The data is sufficient to consider for a comparative study.
- Table 4.1.2 illustrates the distribution of responders by gender and educational institution. According to the data, the percentage of women who participated in this survey is low among respondents from government educational institutions. Although it will have no direct impact on the study, it may lead to a different outcome if the scholar considers gender as one of the key variables in the creation of a digital divide.
- Table 4.1.3 illustrates the distribution of responders by age group. It demonstrates that the majority of responders from both educational

institutions are between the ages of 20 and 25. Since gender is also an important variable to see the impact of the digital divide, this will surely go to affect the result.

- Table 4.1.4 shows the level of education-wise distribution of the respondents in each of the two educational institutions. It shows that in both the institutions a majority of the respondents are either pursuing their graduation or post-graduation. Hence, this variable is also effective to measure the impact of a digital divide among target respondents.

- Table 4.1.5 shows the educational institution-wise status of computer knowledge. The categories are identified based on certification related to basic computer education. It is clear that the majority of responses from government educational institutions claim to have computer knowledge without certification and this percentage is significantly higher than the respondents from private educational institutions. This signifies those respondents from government educational institutions do not have adequate exposure to computers, hence there may be a chance that this factor is going to create a digital divide among the target participants.

- Table 4.1.6 shows the educational institution-wise and monthly family income-wise distribution of the respondents. It can be seen that income disparity is very much present between both groups. A higher percentage of the respondents under government institutions have less than Rs.50000 as monthly family income. The lower-income also raises the concern about the affordability of the internet and other devices like smartphones, laptops, desktops, etc. As a result, this element may contribute to the creation of a digital divide.

5.2. Findings of Internet Usage

This segment explains the findings regarding internet usage among the target audience. It is critical to include internet access and usage while discussing concerns about the digital divide.

- Table 4.2.1 shows the educational institution a wise number of computers or laptops available in the household. Here, also we can see a majority of the respondents from government institutions mentioned that they do not have any computer or laptop. They are basically, using their smartphone for all purposes. This also signifies that affordability may be an issue. As a result of which, it also indirectly creates a kind of digital divide among the target respondents.

- Table 4.2.2 shows educational institution wise access to the internet at home. The data reveals that a small group of respondents from government institutions mentioned that they do not have any internet access. While a significant number of respondents from both governments as well as private educational institutions mentioned that they are accessing the internet from their mobile phones only. A rapid increase in mobile internet during the last

couple of years is one of the primary reasons that people start using mobile internet as the main source of internet in any kind of work. The data also suggests that a majority of the respondents from private institutions are also having both mobiles as well as broadband connections at home for uninterrupted internet connectivity. Hence it can be seen that a wide disparity exists between the groups in terms of internet access.

- Table 4.2.3 shows the educational institution wise frequency of using the internet. It shows that a small group of students of government educational institutions does not use the internet. This is mainly due to the kind of phone that they are using which does not support mobile internet. Apart from this, there is a wide disparity among the target respondents. Although, a majority of the respondents mentioned that they are using the internet at home but some of them also mentioned that they are using it at the educational institutions when it was open. But there is no specific trend that we are getting out of it as many respondents mentioned that they are using it whenever they have time.

- Table 4.2.4 shows educational institution wise time spent on the internet in a typical day. It can be shown that the majority of respondents spend more than 5 hours each day on average on the internet. This percentage is huge. Hence the purpose of using the internet becomes very relevant. If the purpose is related to academics, then surely it will help them. If it is not, then the internet is surely affecting the growth of individuals.

- Table 4.2.5 shows educational institutions' wise purpose for using the internet. The data shows that the majority of the respondents from both groups are using the internet for educational purposes only. This shows that during the nationwide lockdown and sudden implementation of online teaching, students started using their internet for educational purposes. But this is not the only purpose for them. A significant number of respondents are using the internet for entertainment as well as for surfing social media.

5.3. Factors Affecting Digital Divide

This segment deals with the factors affecting the digital divide among the target respondents. Based on the reviews the scholar has identified five factors, viz. age, gender, level of education, household income of the respondents, and computer knowledge. These five variables are compared from the perspective of internet access. For this purpose, five hypotheses are developed and the same is tested using the Chi square test of independence. The findings are discussed subsequently.

- Table 4.3.1a and table 4.3.1b are chi-square test results related to hypothesis 1. The result shows that there is no significant connotation between gender and access to the internet. So, the gender-wise disparity is not visible among the target respondents. So, the gender-wise existence of the digital divide can be ruled out. The gender-wise discrimination is not visible in this case.

- Table 4.3.2a and 4.3.2b are chi-square test results related to hypothesis 2. It

shows that there is a similar connection between age and access to the internet. As respondents are moving into a higher age bracket, they are having access to both mobile internet as well as broadband connections. This may be due to increased usage of the internet for various purposes including academics.

- The chi-square test findings for hypothesis 3 are shown in Tables 4.3.3a and 4.3.3b. It demonstrates that computer competence and internet access are inextricably linked. It can be observed that access to the internet makes a difference among the various groups, and this is one of the key reasons for the digital divide.
- Tables 4.3.4a and 4.3.4b show chi-square test results related to hypothesis 4. It shows that there is a substantial connection between family income and internet access. As the family income increases internet access also increases. As a result, one of the key causes of the target respondents' digital gap is this.
- The chi-square test findings for hypothesis 5 are shown in tables 4.3.5a and 4.3.5b. It demonstrates that there is a strong link between educational attainment and internet access. It shows that as the respondents are moving towards a higher level of education, access to mobile internet also keeps on increasing. This is a case, which shows that internet access is not uniformly distributed among the target respondents. Hence, we can conclude that this is also a reason for the digital divide.

5.4. Perception of the Respondents towards Digital Divide

- The t-test results for variable 5 are shown in Tables 4.4.1a and 4.4.1b. There is a huge difference of opinion between respondents from government and private educational institutions, as can be shown. As a result, there is a substantial difference in opinion regarding the expense of high-speed internet between students of government and private educational institutions, with students of private educational institutions being more supportive of the statement. This signifies that affording the internet is a problem and it is creating some barriers in terms of using the facility for academic and other purposes.
- The t-test results for variable 6 are shown in Tables 4.4.2a and 4.4.2b. There is a huge difference of opinion between respondents from government and private educational institutions, as can be shown. As a result, there is a huge difference in opinion regarding the ease of using the internet among students in government and private educational institutions. Table 4.4.2a shows students of private educational institutions are more in favor of this statement. It signifies that those students of private educational institutions can use the internet as per their requirements due to easy availability and accessibility, whereas the same may not be the case for students of government educational institutions.
- The t-test results for variable 7 are shown in Tables 4.4.3a and 4.4.3b. There

is a huge difference of opinion between respondents from government and private educational institutions, as can be shown. As a result, there is a substantial divide in opinion between the government and private students when it comes to addressing technical parts of the internet. Table 4.4.3a shows students of private educational institutions are more in favour of this statement. Since the difference of opinion existing between these two groups and students of private educational institutions are more in favor of the statement, this signifies that a digital divide exists among them in terms of handling the technical aspects. Due to the wide accessibility of the internet, they can solve some of the technical issues without proper technical assistance.

- The t-test results for variable 8 are shown in tables 4.4.4a and 4.4.4b. There is a huge difference of opinion between respondents from government and private educational institutions, as can be shown. As a result, there is a major difference of opinion regarding the use of mobile internet as broadband among students at government and private educational institutions. Table 4.4.4a shows students of private educational institutions are more in favor of this statement. The difference of opinion suggests that students of private educational institutions have greater access to both mobile internet as well as broadband. The broadband connectivity provides uninterrupted internet access to the students at high speeds. A dual connection also ensures uninterrupted internet services for a long period.

- The t-test results for variable 9 are shown in tables 4.4.5a and 4.4.5b. There is a huge difference of opinion between respondents from government and private educational institutions, as can be shown. As a result, there is a huge difference in opinion regarding good attitudes toward the internet among students in government and private educational institutions. Table 4.4.5a shows students of private educational institutions are more in favour of this statement. The result shows that students of private educational institutions have a more positive attitude towards the internet and its facilities than their government counterparts. So, they are using the internet for the betterment and can visualize the prospects that are associated with internet-based services.

- The t-test results for variable 10 are shown in tables 4.4.6a and 4.4.6b. There is a huge difference of opinion between respondents from government and private educational institutions, as can be shown. As a result, there is a huge divide in opinion regarding the positive impact of the internet on society among students in government and private educational institutions. The students of private educational institutions feel that there is a more positive impact of the internet on society than their government counterparts. Although the internet has negative side effects as well, given the situation the same is not considered by a section of the target respondents.

- The t-test results for variable 11 are shown in Tables 4.4.7a and 4.4.7b. There is a huge difference of opinion between respondents from government and

private educational institutions, as can be shown. As a result, there is a major divide in opinion among students in government and private educational institutions over providing equitable access to the internet to all. The results show that the students of private educational institutions are more in favour of the statement. Thus, they believe that internet access is not uniform and difference exists may be in terms of service or in terms of the device that are being used by the students.

- The t-test results for variable 15 are shown in Tables 4.4.8a and 4.4.8b. There is a huge difference of opinion between respondents from government and private educational institutions, as can be shown. As a result, there is a major difference of opinion regarding the importance of the internet in learning new skills among students in government and private educational institutions. Table 4.4.8a shows students of private educational institutions are more in favour of this statement. It is important to see that the difference of opinion exists in terms of learning new skills. The students of private educational institutions believe that the internet helps them to learn new skills, which is not the case for students of government institutions.

- The t-test results for variable 16 are shown in tables 4.4.9a and 4.4.9b. There is a huge difference of opinion between respondents from government and private educational institutions, as can be shown. As a result, there is a major divide in opinion between government and private students regarding the importance of the internet in increasing online education. Table 4.4.9a shows students of private educational institutions are more in favour of this statement. A difference of opinion exists here and it is to be believed that the students of private educational institutions are getting better opportunities to access online education with the help of internet facilities than their government institution counterparts.

- The t-test results for variable 17 are shown in Tables 4.4.10a and 4.4.10b. There is a huge difference of opinion between respondents from government and private educational institutions, as can be shown. As a result, there is a major divide in attitude about the internet as a part of our daily lives among students in government and private educational institutions. Table 4.4.10a shows students of private educational institutions are more in favour of this statement. A difference of opinion exists here also as students of private educational institutions are getting more access to the internet than the students of government educational institutions.

5.5. Suggestions

- It is important to understand that technology adoption is an important parameter to reduce the disparity that may arise as a result of technology-based service incorporation. All the time cost of adoption is not the only factor that decides the fate of the digital divide. Lack of training to adopt the technology sometimes creates roadblocks. So, it is important to provide adequate training to all the stakeholders before deciding on the impact of the

digital divide.

- Adoption of participative learning is important that can boost on the blended learning model. Most of the time, if the classes are online, then students are not going to concentrate in the full class. Thus, attention disorder is a problem. If the instructor is able to create a participative learning mechanism, then they will get an idea about their learning curve.

- The budget is an important constraint to implement technology-enabled solutions. Be it in academics, administration, or other non-academic activities. Unless an adequate and exclusive budget is available it is not possible to adopt technology-enabled solutions. Educational institutes may look for other grants except for government resources to minimize the budgetary constraints. Some of the factors to bring technology innovation is related to the external environment and most of the time this environment is beyond the control of the implementing agencies. This indicates it is important to utilize your occur resources in such a manner so that they can produce value-added services at no cost.

- The adopted system should have a review process that helps to adopt new technology over some time. This domain is very dynamic and needs continuous changes. If not, then it will again increase the problem of the digital divide. More importantly, there is a need to develop a low-cost model that helps to cater to the need of the vulnerable society of the economy. Most of the time high-end technology won't solve the problem. This critical factor needs to be taken into consideration.

- Both in-house libraries, as well as community libraries, needs to educate people and other stakeholders in the community as well as in the organization to bring necessary changes. They should be the early adopters of technology-driven models in an educational institute.

- The government's role cannot be overlooked because it is the only significant stakeholder with the authority to effect necessary changes. In some cases, the digital divide is so large that private interventions are impractical. This is most common in economically depressed areas. If a student comes from this area, they are likely to be disconnected from modern technology-enabled learning mechanisms, emphasising the importance of government intervention.

- The theoretical model enables the development of a virtual laboratory for teaching students with special educational needs. Based on the laboratory experience of the students, research into new ways of presenting information and improving existing ones could be conducted.

- Local governments and community groups play critical roles in developing and supporting programs to combat digital exclusion. Unless local information is not gathered it won't be possible to understand the exact nature of the problem. Hence, the intervention of the local government is going to play a crucial role. Project sustainability, particularly community network

initiatives, needs ongoing interest and participation of community members, as well as their ownership of all project aspects.

- Adequate segregation needs to be there to identify the needy segment before implementing new changes. Most of the time the training programs are organized without a proper plan. Hence, it becomes ineffective. Proper gap analysis is needed to identify the right set of technology implementation for the right group of beneficiaries.
- Stakeholders want higher education institutions to demonstrate responsiveness, efficacy, and efficiency because they want proof of their claims of excellence in providing great education (Toquero, 2020). This is especially important during this epidemic.
- The new standard also includes a redesign of course evaluation and course material structure to facilitate online learning. It's a brand-new technology that allows pupils to take an exam while feeling less rushed and with more free space. As a result, we may see the emergence of a new breed of performing students. Similarly, E-Lectures are now being used in several courses as an alternate method of presenting pre-recorded lectures to students. Students will be able to experience the new learning area as a result of all of this innovation.
- By making interactive activities like polling or texting into the chat window a normal part of class, students will be less enticed to do other things during class and thus less likely to turn off their video to hide themselves. An online platform will be effective provided the participants are visible and engaging.
- Provision of necessary technology devices, as well as amenities such as internet access and power source, among other things, for online educational and learning activities. This will help to promote online teaching, which has become a popular trend in education in recent times.
- Lecturer and education initiatives in the use of technology devices for instruction and learning workouts. These can be accomplished through a continuous and periodic workshop. In this regard, lecturers would be trained and revealed to the most up-to-date technological devices required for online learning and instruction workouts.

5.6. Scope of Future Study

The possible scope for future study is as follows.

- Assessment of e-government services and their impact on all groups and communities.
- Digital division in the banking sector
- Digital division in the hospitality sector
- Digital division in rural and urban areas

- Digital division in organized and unorganized sector
- Digital division in private and government schools etc.

5.7. Limitations of the Study

A study based on primary data has its limitations. Although adequate caution was taken to reduce the chances of sampling and non–sampling errors, some amounts of errors still may remain in the study. The study is mainly restricted to higher educational institutions only, but the impact of the digital divide may be seen at the school level as well and at this level the impact is severe. The same has not been considered in this study. Since the study is restricted to some selected educational institutions, the generalization of the result needs adequate precautions. Most importantly, the study has been conducted under a specific socio-economic dimension in some selected geographical regions of Odisha. So, the result may change in case the geographical location changes.

5.8. Conclusion

The COVID-19 epidemic serves as a wake-up call to everyone concerned that blended knowledge delivered via online mode is the only option available in the face of such widespread devastation. Apart from having a negative impact on children, it has prompted corporations, governments, and politicians to develop backup emergency management plans that bridge the digital divide to provide education online during school closures caused by social distancing measures. Digital knowledge is essential for closing the gap between different stakeholders in terms of using technology-enabled services. To understand the right kind of technology requirement, a market study is essentially required. Qualitative research can also be used to understand the gap that exists in digital learning. Informal information gathering is always beneficial. Only the digital divide gap problem can be addressed if a service gap is identified and addressed.

The study looked into the issue of inclusivity in education, specifically how it was affected by the Covid-19 pandemic. The form of improved was used, so relevant literature was examined. The study's findings revealed that, while education system is typically targeted at pupils with one or more learning disabilities, it is important that this be considered in the adoption of virtual teaching following the shift from onsite to online during the Covid-19 pandemic. However, the study found that after the Covid-19 pandemic, students faced a variety of challenges, including difficulty accessing teaching aids, using technological tools for online courses, inconsistencies in and students' behaviours toward online and face-to-face modes of learning, and issues related to isolation, all of which hampered their access to quality online education. Meanwhile, factors such as poor electricity supply, internet connectivity, and knowledge of technological devices, among others, are hampered students' web - based learning skills and, as a result, academic performance.

Furthermore, the benefits derived from the fusion of knowledge and ICT should not be restricted to a few rich countries or cities but should go out to the

underserved as well. There is a small group of people who face substantial and numerous hurdles to engaging in the digital world. Frequently, these folks are unable to cope with change without assistance. People with mental health issues, disabilities, or the elderly may not be able to use online information centers. Socially isolated people may not realize how beneficial it would be to incorporate modern technologies into their life. These folks will not be able to overcome the deep, numerous hurdles that prohibit them from using internet technologies without assistance. Infrastructure-based internet access will not influence the expectations of stakeholders who do not perceive how important the internet is to them or who are afraid of utilizing it. Fear of losing out on services that will be channel moved shortly may encourage consumers to act, but their concerns about the internet or of leaving protected surroundings may also offset this incentive.

Right now, the most important problem that the educational institutes are facing is implementing a blended mode of learning but for that adequate infrastructure, the requirement is a problem. It may be possible for private educational institutes but the same may not be possible for government educational institutes because of budgetary constraints. So, there is a need to develop the required infrastructure either through PPP mode or in a phased manner. It is critical to show someone how the internet may assist them better their lives to persuade them to engage in the digital world. One more point that needs to be added is related development of adequate internet facilities in every part of India. This is a situation that needs more attention. The growth of the internet is there but more growth can be seen in urban and semi-urban areas rather than rural areas. But the digital divide is more in that part of the society where people are vulnerable.

Many people live formal education because of a lack of technology-based resources like the internet and smartphones. If these are not addressed, then there won't be any solution for the mentioned problems. It is critical to provide appropriate help to those who are learning to utilize the internet. Friends and relatives are frequently unable to assist, but the stakeholders can. By embedding information into the lead organizations' and groups' typical session leaders, the embedded outreach strategy creates a legacy of assistance. This helps those learning to use the internet to get the help they need from someone they can trust in a safe environment.

References

Adhikari, J., Mathrani, A., & Scogings, C. (2016). Bring your own devices classroom. Interactive Technology and Smart Education.

Agnew, I., & Ripper, L. (2011). Using embedded outreach to bridge the digital divide. Working with Older People.

Albert D. Ritzhaupt and Tina N. Hohlfeld. (2019). An Examination of the Digital Divide in Formal Educational Settings. In A. I. Anthony H. Normore (Ed.), Crossing the Bridge of the Digital Divide: A walk with global leaders (pp. 20-36). Charlotte: Information Age Publishing Inc.

Ali, W. (2020). Online and remote learning in higher education institutes: A necessity in light of COVID-19 pandemic. Higher Education Studies, 10(3), 16-25.

Al-Qallaf, C. L., & Al-Mutairi, A. S. (2016). Digital literacy and digital content supports learning. The Electronic Library.

Ameen, K., & Gorman, G. E. (2009). Information and digital literacy: a stumbling block to development?. Library Management.

Angus, L., Snyder, I., & Sutherland-Smith, W. (2003). Families, Cultural Resources and the Digital Divide: ICTs and Educational (dis)Advantage. Australian Journal of Education, 47(1), 18–39. doi:10.1177/000494410304700103

Ani, O. E., Uchendu, C., & Atseye, E. U. (2007). Bridging the digital divide in Nigeria: a study of internet use in Calabar Metropolis, Nigeria. Library Management.

Baah, F. O., Teitelman, A. M., & Riegel, B. (2019). Marginalization: Conceptualizing patient vulnerabilities in the framework of social determinants of health—An integrative review. Nursing inquiry, 26(1), e12268.

Bagur-Femenías, L., Buil-Fabrega, M., & Aznar, J. P. (2020). Teaching digital natives to acquire competences for sustainable development. International Journal of Sustainability in Higher Education.

Bala, S., & Singhal, P. (2018). Gender digital divide in India: a case of inter-regional analysis of Uttar Pradesh. Journal of Information, Communication and Ethics in Society.

Betts, L. R., Hill, R., & Gardner, S. E. (2017). "There's Not Enough Knowledge Out There": Examining Older Adults' Perceptions of Digital Technology Use and Digital Inclusion Classes. Journal of Applied Gerontology, 073346481773762. doi:10.1177/0733464817737621

Beynon-Davies, P., & Hill, R. (2007). Evaluating a digital divide index in a regional context. Journal of Systems and Information Technology.

Billon, M., Marco, R. & Lera-Lopez, F. (2009). Disparities in ICT adoption: A multidimensional approach to study the cross-country digital divide. Telecommunications Policy, 33 (10-11), 596-610.

Buam, D. L. (2005). Towards bridging the digital divide for all-round socio-economic development in India of the 21st century. Social Responsibility Journal.

Buzzetto-Hollywood, N. A., Elobeid, M., & Elobaid, M. E. (2018, June). Addressing information literacy and the digital divide in higher education. In I n SITE 2018: Informing Science+ IT Education Conferences: La Verne California (p. 916).

Calderon Gomez, D. (2020). The third digital divide and Bourdieu: Bidirectional conversion of economic, cultural, and social capital to (and from) digital capital among young people in Madrid. New Media & Society, 1461444820933252.

Calderón Gómez, D. (2020). The third digital divide and Bourdieu: Bidirectional conversion of economic, cultural, and social capital to (and from) digital capital among young people in Madrid. New Media & Society, 146144482093325. doi:10.1177/1461444820933252.

Castelli, F. R., & Sarvary, M. A. (2021). Why students do not turn on their video cameras during online classes and an equitable and inclusive plan to encourage them to do so. Ecology and Evolution, 11(8), 3565-3576.

Castells, M. (2001): The internet galaxy. Oxford University Press.

Chakraborty, J. & Bosman, M. (2002). Race, income, and home PC ownership: a regional analysis of the digital divide. Race & Society, 5 (2), 163-177.

Chaudhari, V., Murphy, V., & Littlejohn, A. (2019). The Educational Intelligent Economy – Lifelong Learning – A Vision for the Future. International Perspectives on Education and Society, 109–126. doi:10.1108/s1479-367920190000038007.

Chaudhari, V., Murphy, V., & Littlejohn, A. (2019). The Educational Intelligent Economy–Lifelong Learning–A vision for the future. In The educational intelligent economy: Big data, artificial intelligence, machine learning and the internet of things in education. Emerald Publishing Limited.

Cheang, Lim Swee, Lei. Guo. (2015). Digital inclusion: the Singapore Perspective. In K. Anderson (Ed.), Digital divides: The new Challenges and opportunities of e-Inclusion (pp. 149-161). London: CRC Press

Ching, C. C., Basham, J. D., & Jang, E. (2005). The Legacy of the Digital Divide: Gender, Socioeconomic Status, and Early Exposure as Predictors of Full-Spectrum Technology Use among Young Adults. Urban Education, 40(4), 394–411. https://doi.org/10.1177/0042085905276389

Chowdhury, G. (2013). Sustainability of digital information services. Journal of Documentation.

Colpitts, B. D., Smith, M. D., & McCurrach, D. P. (2020). Enhancing the digital capacity of EFL programs in the age of COVID-19: the ecological perspective in Japanese higher education. Interactive Technology and Smart Education.

Cooper, J. (2006). The digital divide: The special case of gender. Journal of Computer Assisted Learning, 22(5), 320-334.

Corrocher, N., & Ordanini, A. (2002). Measuring the digital divide: a framework for the analysis of cross-country differences. Journal of Information Technology, 17(1), 9–19. doi:10.1080/02683960210132061.

Cotten, S. R., Anderson, W. A., & McCullough, B. M. (2013). Impact of internet use on loneliness and contact with others among older adults: cross-sectional analysis. Journal of medical Internet research, 15(2), e39.

Dasgupta, S., Lall, S., & Wheeler, D. (2001). Policy reform, economic growth, and the digital divide: An econometric analysis (Vol. 2567). World Bank Publications.

DiMaggio, P., & Garip, F. (2012). Network Effects and Social Inequality. Annual Review of Sociology, Vol. 38:93-118 SSRN. https://doi.org/ 10.1146/annurev.soc.012809.102545

DiMaggio, P.J., Hargittai, E., Neuman, W.R. & Robinson, J. (2001). Social implications of the Internet. Annual Review of Sociology, 27, 307-336.

Divya Jain (October 12, 2020), Online education: Challenges faced by rural communities, Available at https://www.financialexpress.com/education-2/online-education-challenges-faced-by-rural-communities/2103301/, accessed on 15.03.2021

Drori, G. S., & Jang, Y. S. (2003). The Global Digital Divide. Social Science Computer Review, 21(2), 144–161. doi:10.1177/0894439303021002002.

Drori, G. S., & Jang, Y. S. (2003). The global digital divide: A sociological assessment of trends and causes. Social science computer review, 21(2), 144-161.

Dutta, Subrat. (2003) "Impact of Information Communication Technology on Society." Yojna. 47, no. 7: 24.

Edoho, F. M. (2013). Information and communications technologies in the age of globalization. African Journal of Economic and Management Studies.

Espino-Díaz, L., Fernandez-Caminero, G., Hernandez-Lloret, C. M., Gonzalez-Gonzalez, H., & Alvarez-Castillo, J. L. (2020). Analyzing the impact of COVID-19 on education professionals. Toward a paradigm shift: ICT and neuroeducation as a binomial of action. Sustainability, 12(14), 5646.

Fletcher, A., Gaysford, S., & Adele. (2000). OFT Study on E-Commerce and Competition. Retrieved from http://www.out-law.com/page-954.

Fong, M. W. L. (2009). Digital divide: The case of developing countries. Issues in Informing Science and Information Technology, 6(2), 471-478.

Fourie, I., & Bothma, T. (2006). Addressing the digital divide in teaching information retrieval. The Electronic Library.

Fox, S. (2011). Americans living with disability and their technology profile. Pew Internet & American Life Project. Accessed September, 22, 2011.

Fuchs, C. (2008). The Role of Income Inequality in a Multivariate Cross-National Analysis of the Digital Divide. Social Science Computer Review, 27(1), 41–58. doi:10.1177/0894439308321628.

Gamage, P., & Halpin, E. F. (2007). E-Sri Lanka: bridging the digital divide. The Electronic Library.

Ganesh, S., & Barber, K. F. (2009). The silent community: Organizing zones in the digital divide. Human Relations, 62(6), 851–874. doi:10.1177/0018726709104545.

Ganesh, S., & Barber, K. F. (2009). The silent community: Organizing zones in the digital divide. Human Relations, 62(6), 851-874.

Gatzweiler, Franz and Baumüller, Heike and Husmann, Christine and von Braun, Joachim, Marginality: Addressing the Root Causes of Extreme Poverty (March 1, 2011). Zentrum für Entwicklungsforschung (ZEF) Center for Development Research University of Bonn, Working Paper Series 77, Available at SSRN: https://ssrn.com/abstract=2235654 or http://dx.doi.org/10.2139/ssrn.2235654

Germain-rutherford, A. & Kerr, B. (2008). An Inclusive Approach To Online Learning Environments: Models And Resources . Turkish Online Journal of Distance Education , 9 (2) , 64-85 . Retrieved from https://dergipark.org.tr/en/pub/tojde/issue/16916/176499

Government of India, 2017. All India Survey on Higher Education (2016-17), online, Available at http://aishe.nic.in/aishe/viewDocument.action?documentId=239, accessed on 21.03.2021

Government of Odisha, 2018, Odisha Economic Survey 2017-18, Planning and Convergence Department: Bhubaneswar

Graham, M. (2011). Time machines and virtual portals. Progress in Development Studies, 11(3), 211–227. doi:10.1177/146499341001100303.

Greenfield, A. 2006: Everyware: The dawning age of ubiquitous computing. Peachpit Press.

Guillén, M. F., & Suárez, S. L. (2005). Explaining the global digital divide: Economic, political and sociological drivers of cross-national Internet use. Social forces, 84(2), 681-708.

Hakkarainen, K., Ilomäki, L., Lipponen, L., Muukkonen, H., Rahikainen, M.,

Tuominen, T., Lakkala, M. and Lehtinen, E., (2000). Students' skills and practices of using ICT: Results of a national assessment in Finland. Computers & Education, 34(2), pp.103-117.

Hall, T., Connolly, C., Grádaigh, S. Ó., Burden, K., Kearney, M., Schuck, S., ... & Kosmas, P. (2020). Education in precarious times: a comparative study across six countries to identify design priorities for mobile learning in a pandemic. Information and Learning Sciences.

Hargittai, E. (2002). Second-level digital divide: Differences in people's online skills. First Monday, 7 (4).

Henry, L. (2019). Bridging the urban-rural digital divide and mobilizing technology for poverty eradication: challenges and gaps. St Augustine.

Higher Education in India (December 30, 2019), Available at https://www.drishtiias.com/to-the-points/Paper2/higher-education-in-india-1, Accessed on 25.03.2021.

Hilbert, M. (2011). Digital gender divide or technologically empowered women in developing countries? A typical case of lies, damned lies, and statistics. Women's Studies International Forum, 34(6), 479–489. https://doi.org/10.1016/ j.wsif.2011.07.001

Hilbert, M. (2015). Digital Divide(s). The International Encyclopedia of Digital Communication and Society. https://doi.org/10.1002/9781118767771.wbiedcs 012

Hoffman, D. L., Novak, T. P., & Chatterjee, P. (1995). Commercial scenarios for the Web: Opportunities and challenges. Journal of Computer-Mediated Communication [On-line], 1 (3). Available at: http://www.ascusc.org/jcmc/vol1/issue3/hoffman.html, Accessed on 18.03.21.

Hoffman, D. L., Novak, T. P., & Schlosser, A. (2000). The evolution of the digital divide: How gaps in Internet access may impact electronic commerce. Journal of computer-mediated communication, 5(3), JCMC534.

India Report-Digital Education (June, 2020), Remote Learning Initiatives across India, Department of School Education & Literacy, Ministry of Human Resource Development, Government of India, Available at https://www.education.gov.in/sites/upload_files/mhrd/files/India_Report_Digital_Education_0.pdf, Accessed on 21.03.21.

Inegbedion, H. E. (2021). Digital divide in the major regions of the world and the possibility of convergence. The Bottom Line.

International Telecommunication Union. (2007). Telecommunication Indicators Handbook. Geneva: ITU.

Islam, A., & Tsuji, K. (2011). Bridging digital divide in Bangladesh: study on community information centers. The Electronic Library.

Islam, M. S. (2013). Digital divide & its impact on economic growth in SAARC countries. IJAR BAE, 2(2), 14-26.

Jena, K.P. (2020). Online learning during lockdown period for covid-19 in India. International Journal of Educational Research, Volume-9, Issue- 5(8), Pg.82-92.

Joshi, S. (2021). Rising importance of remote learning in India in the wake of COVID-19: issues, challenges and way forward. World Journal of Science, Technology and Sustainable Development.

Juniu, S. (2005). Digital Democracy in Higher Education: Bridging the Digital Divide. Innovate: Journal of Online Education, 2(1),. Retrieved March 29, 2021 from https://www.learntechlib.org/p/104314/.

Kaitatzi-Whitlock, S. (2021). Toward a digital civil society: digital ethics through communication education. Journal of Information, Communication and Ethics in Society.

Khalid, M. S., & Pedersen, M. J. L. (2016). Digital Exclusion in Higher Education Contexts: A Systematic Literature Review. Procedia - Social and Behavioral Sciences, 228(June), 614–621. https://doi.org/10.1016/j.sbspro.2016. 07.094

Kumar, B. S., Basavaraja, M. T., & Gagendra, R. (2014). Computer literacy competencies among Indian students: the digital divide. Asian Education and Development Studies.

Kumar, R. (2011). Research Methodology: A step-by-step guide for beginners (3rd ed.). London: Sage Publications Ltd. https://doi.org/10.1017/CBO9781107415324.004

Larsen, K. 2018. Disclosable Version of the ISR – Odisha Higher Education Program for Excellence and Equity - P160331 - Sequence No: 03 (English), World Bank Group: Washington, D.C

Lazar, J., & Stein, M. A. (Eds.). (2017). Disability, human rights, and information technology. University of Pennsylvania Press.

Lederman, D. (March 18, 2020). Will shift to remote teaching be boon or bane for inline learning? Inside Higher Ed. Retrieved from file:///D:/COVID/Most%20teaching%20is%20going%20remote.%20Will%20that %20help%20or%20hurt%20online%20learning.html, Accessed on 25.03.2021.

Levine, L. (2018). Closing the digital divide: A justification for government intervention. In The M in CITAMS@ 30. Emerald Publishing Limited.

Levine, L. (2018). Closing the Digital Divide: A Justification for Government Intervention. The M in CITAMS@30, 9–36. doi:10.1108/s2050-206020180000018003

Loan, F. A. (2011). The digital divide among the college students of Kashmir, India. IFLA Journal, 37(3), 211–217. doi:10.1177/0340035211418729

Loan, F. A. (2011). The digital divide among the college students of Kashmir, India. IFLA journal, 37(3), 211-217.

Mansell, R. (2002). From Digital Divides to Digital Entitlements in Knowledge Societies. Current Sociology, 50(3), 407–426.

Martinez, J. (June 22, 2020). Take this pandemic moment to improve education. EduSource. Retrieved from https://edsource.org/2020/take-this-pandemic-moment-to-improveeducation/633500, accessed on 25.03.2020

Martzoukou, K., Fulton, C., Kostagiolas, P., & Lavranos, C. (2020). A study of higher education students' self-perceived digital competences for learning and everyday life online participation. Journal of documentation.

Marvin, C. 1988: When old technologies were new: Thinking about electric communication in the late nineteenth century. Oxford University Press

Matt Blomberg, Darcey Altschwager, Hyunjin Seo, Ellie Booton & Maxine Nwachukwu (2021) Digital divide and marginalized women during COVID-19: a study of women recently released from prison, Information, Communication & Society, 24:14, 2113-2132, DOI: 10.1080/1369118X.2021.1963462

Mbodila[1], M., Jones, T., & Muhandji, K. (2013). Integration of ICT in education: Key challenges.

Mei, X. Y., Aas, E., & Medgard, M. (2019). Teachers' use of digital learning tool for teaching in higher education. Journal of Applied Research in Higher Education.

Middleton, K. L., & Chambers, V. (2010). Approaching digital equity: is wifi the new leveler?. Information Technology & People.

Mihelj, S., Leguina, A., & Downey, J. (2019). Culture is digital: Cultural participation, diversity and the digital divide. New Media & Society, 146144481882281. doi:10.1177/1461444818822816.

Mihelj, S., Leguina, A., & Downey, J. (2019). Culture is digital: Cultural participation, diversity and the digital divide. New Media & Society, 21(7), 1465-1485.

Miller, B. P., & Shrum, W. (2011). The gender digital divide in the research sectors of Ghana, Kenya, and Kerala: Are women more connected over time?. Gender, Technology and Development, 15(1), 25-52.

Mishra, D. L., Gupta, D. T., & Shree, D. A. (2020). Online Teaching-Learning in Higher Education during Lockdown Period of COVID-19 Pandemic. International Journal of Educational Research Open, 100012. doi:10.1016/j.ijedro.2020.100012

Mishra, S. V. (2020). COVID-19, online teaching, and deepening digital divide in India.

Moon, E. C. (2018). Teaching students out of harm's way: Mitigating digital knowledge gaps and digital risk created by 1: 1 device programs in K-12

education in the USA. Journal of Information, Communication and Ethics in Society, 16(3), 290-302.

Mossberger, K., Tolbert, C. J., & Gilbert, M. (2006). Race, place, and information technology. Urban Affairs Review, 41(5), 583-620.

Mowlana, H. 1997: Global information and world communication. Sage Publications.

Mubarak, F., Suomi, R., & Kantola, S. P. (2020). Confirming the links between socio-economic variables and digitalization worldwide: the unsettled debate on digital divide. Journal of Information, Communication and Ethics in Society.

Munoz-Repiso, A. G., & Tejedor Tejedor, F. J. (2006). Use of information and communication technology in higher education and lecturers' competencies. Current Development in Technology–Assisted Education, 1788.

Mutula, S. M. (2008). Digital divide and economic development: case study of sub-Saharan Africa. The Electronic Library.

Nandi, B. (2002). Role of Telecommunications in Developing Countries in the 21st Century. Paper Presented at 14th Biannual Conference, International Telecommunication Society, Seoul, South Korea.

Nayak, R. (2011), "Role of ICT in Indian educational sector", Available at https://www.financialexpress.com/archive/role-of-ict-in-indian-educational-sector, accessed on 22.03.2021

Nedungadi, P. P., Menon Rajani, Gutjahr Georg, Erickson Lynnea, & Raman Raghu. (2018). towards an inclusive digital literacy framework for digital India. Education + Training, 60(6), 516–528. https://doi.org/10.1108/ET-03-2018-0061

Network Wizards (1999, July). Internet domain survey. Available: http://www.nw.com/zone/WWW/report.html, Accessed on 18.03.2021

Nieminen, H. (2016). Digital divide and beyond: What do we know of Information and Communications Technology's long-term social effects? Some uncomfortable questions. European Journal of Communication, 31(1), 19–32. doi:10.1177/0267323115614198.

Nikam, K., Ganesh, A. C., & Tamizhchelvan, M. (2004). The changing face of India. Part I: bridging the digital divide. Library Review.

Norris, P. (2001). Digital Divide: Civic Engagement, Information Poverty, and the Internet Worldwide. New York: Cambridge University Press.

Norris, P. (2001). Digital divide: Civic engagement, information poverty, and the Internet worldwide. New York: Cambridge University Press.

Obeidat, O., & Genoni, P. (2010). Assessing the digital divide in a Jordanian academic library. Library Review.

Operario, D., King, E. J., & Gamarel, K. E. (2020). Prioritizing community partners and community HIV workers in the COVID-19 pandemic. AIDS and

Behavior, 24(10), 2748-2750.

Page, I. (2020). Higher Education in Odisha: Reformative Steps. UNIVERSITY NEWS, 58, 13.

PATEL, D. (2013). Education System in India. Education, 2(2).

Pegu, U. K. (2014). Information and communication technology in higher education in india: Challenges and opportunities. International Journal of Information and Computation Technology, 4(5), 513-518.

Peña-López, I. (2010). Framing the digital divide in higher education. RUSC. Universities and Knowledge Society Journal, 7(1), 2-6.

Press Information Bureau, Government of India (June 11, 2020), "Union HRD Minister virtually releases "India Rankings 2020" for Higher Educational Institutions in New Delhi", Available at https://www.education.gov.in/sites/upload_files/mhrd/files/NIRF_Rankings_2020.pdf Accessed on 25.03.2021.

Prieger, J. E. (2012). The Broadband Digital Divide and the Economic Benefits of Mobile Broadband for Rural Areas. SSRN Electronic Journal. doi:10.2139/ssrn.2258112.

Prieger, J.E. (2007). Regulation delay and timing of product innovation. International Journal of Industrial Organization, 25 (4), 219-236.

Radovanović, D., Hogan, B., & Lalić, D. (2015). Overcoming digital divides in higher education: Digital literacy beyond Facebook. New Media & Society, 17(10), 1733–1749. doi:10.1177/1461444815588323.

Radovanović, D., Hogan, B., & Lalić, D. (2015). Overcoming digital divides in higher education: Digital literacy beyond Facebook. New media & society, 17(10), 1733-1749.

Rafi, M., JianMing, Z., & Ahmad, K. (2019). Evaluating the impact of digital library database resources on the productivity of academic research. Information discovery and delivery.

Rahman, A. (2015). Toward a Comprehensive Conceptualization of Digital Divide and its Impact on E-Government System Success. E-Services Adoption: Processes by Firms in Developing Nations, 291–488. doi:10.1108/s1069-096420150000023003 .

Rahman, M. H., & Naz, R. (2006). Digital Divide within Society: an account of poverty, community and e-governance in Fiji. E-Learning and Digital Media, 3(3), 325-343.

Rai, A., & Sharma, A. K. (2018). Gender and Digital Divide : How do Women in South Asia Respond ?, 1(1), 446–457.

Rao, S. S. (2005). Bridging digital divide: Efforts in India. Telematics and Informatics, 22(4), 361–375. doi:10.1016/j.tele.2005.01.007.

Ravi, N. R. (2015). Structure and Organisation of Higher Education in India: A Macro-Perspective, Indian Journal of Educational Studies: An Interdisciplinary Journal 2015, Vol.2, No.1, ISSN No. 2349-6908

Rodino-Colocino, M. (2006). Laboring under the digital divide. New Media & Society, 8(3), 487–511. doi:10.1177/1461444806064487

Rubery, J., & Grimshaw, D. (2001). ICTs and employment: The problem of job quality. Int'l Lab. Rev., 140, 165.

Sachdeva, N., Tuikka, A., & Suomi, R. (2013). Digital disability divide in information society: the case of impairments. In Proceedings of the Possibilities of Ethical IT Conference, University of Southern Denmark, Kolding (pp. 405-412).

Sarea, A., Alhadrami, A., & Taufiq-Hail, G. A. M. (2021). COVID-19 and digitizing accounting education: empirical evidence from GCC. PSU Research Review.

Sarkar, S. (2012). The role of information and communication technology (ICT) in higher education for the 21st century. Science, 1(1), 30-41.

Sassi, S. (2005). Cultural differentiation or social segregation? Four approaches to the digital divide. New Media & Society, 7(5), 684–700.

Sassi, S. (2005). Cultural differentiation or social segregation? Four approaches to the digital divide. New Media & Society, 7(5), 684-700.

Secundo, G., Rippa, P., & Meoli, M. (2020). Digital transformation in entrepreneurship education centres: preliminary evidence from the Italian Contamination Labs network. International Journal of Entrepreneurial Behavior & Research.

Selwyn, N., Gorard, S., & Williams, S. (2001). Digital Divide or Digital Opportunity? The Role of Technology in Overcoming Social Exclusion in U.S. Education. Educational Policy, 15(2), 258–277.

Sharanya Menon (2020), "Education in India needs an overhaul", Available at https://idronline.org/state-of-school-education-india-pre-covid/?, Accessed on 22.03.2021

Shashi Bala & Puja, S. (2018). Gender digital divide in India : a case of interregional analysis of Uttar Pradesh. Journal of Information, Communication and Ethics in Society, 16(2), 173–192. https://doi.org/10.1108/JICES-07-2017-0046

Shenoy, V., Mahendra, S., & Vijay, N. (2020). COVID 19 lockdown technology adaption, teaching, learning, students' engagement and faculty experience. Mukt Shabd Journal, 9(4), 698-702.

Singer, H. 1970: Dualism revisited: A new approach to the problems of the dual society in developing countries. Journal of Development Studies 7, 60–75.

Singh, G., Walsh, C. S., Walterova, I., & Tveit, L. (2012). Digital local agenda: bridging the digital divide. Transforming Government: People, Process and Policy.

Singh, N. (2007). Bridging the digital divide in India: some challenges and opportunities.

Singh, S. (2010). Digital Divide in India. International Journal of Innovation in the Digital Economy, 1(2), 1–24. doi:10.4018/jide.2010040101

Soomro, K. A., Kale, U., Curtis, R., Akcaoglu, M., & Bernstein, M. (2020). Digital divide among higher education faculty. International Journal of Educational Technology in Higher Education, 17, 1-16.

Steele, C. (Sep 20, 2018), "The Impacts of Digital Divide", Available at http://www.digitaldividecouncil.com/the-impacts-of-digital-divide/, Accessed on 22.03.2021.

Strover, S. (2003). Remapping the Digital Divide. The Information Society, 19(4), 275–277. doi:10.1080/0197224030948.

Swalehin, M. (2010). Digital Divide: a Sociological Analysis (Doctoral dissertation, Aligarh Muslim University).

Taghavi, M., Bakhtiyari, K., Taghavi, H., Attar, V. O., & Hussain, A. (2014). Planning for sustainable development in the emerging information societies. Journal of Science & Technology Policy Management.

Tam, G. & El-Azar, D. (March 13, 2020). 3 ways the coronavirus pandemic could reshape education. World Economic Forum: Global agenda. Retrieved from file:///D:/COVID/3%20ways%20the%20coronavirus%20pandemic%20could%20r eshape%20education%20World%20Economic%20Forum.html, Accessed on 23.03.2021

Thomas, D., & Finn, A. (2018). Households' valuation of new broadband networks. Internet Research.

Turner-Cmuchal, M., & Aitken, S. (2016). ICT as a tool for supporting inclusive learning opportunities. In Implementing Inclusive Education: Issues in Bridging the Policy-Practice Gap. Emerald Group Publishing Limited.

Turner-Cmuchal, M., & Aitken, S. (2016). ICT as a Tool for Supporting Inclusive Learning Opportunities. International Perspectives on Inclusive Education, 159–180. doi:10.1108/s1479-363620160000008010

UGC (2020, April). Report of the UGC committee on examinations and academic calendar for the universities in view of COVID-19 pandemic and subsequent lockdown. Retrieved from: https://www.ugc.ac.in/pdfnews/4276446_UGC-Guidelines-onExaminations-and-Academic-Calendar.pdf, Accessed on 25.03.2020.

United Nations Conference on Trade and Development (UNCTAD). (2019). Digital Economy Report 2019: Value creation and capture: implications for developing countries.

Van Dijk, J. (2000). Widening information gaps and polices of prevention. In: Hackers, K., van Dijk, J. (Eds.) Digital Democracy: Issue of Theory and

Practice (pp.166-183), London: Sage Publications.

van Dijk, J. (2002). A framework for digital divide research. The Electronic Journal of Communication/ Revue de Communication Electronique, 12 (1), 1-6 Retrieved 28.03.2021 http://www.cios.org/EJCPUBLIC/012/1/01211.html

Van Dijk, J. (2002). A framework for digital divide research. The Electronic Journal of Communication/ Revue de Communication Electronique, 12 (1), 1-6.

Vivakaran, M. V., & Neelamalar, M. (2018). Utilization of Social Media Platforms for Educational Purposes among the Faculty of Higher Education with Special Reference to Tamil Nadu. Higher Education for the Future, 5(1), 4–19. doi:10.1177/2347631117738638

Vivakaran, M. V., & Neelamalar, M. (2018). Utilization of social media platforms for educational purposes among the faculty of higher education with special reference to Tamil Nadu. Higher Education for the Future, 5(1), 4-19.

Waverman, L., Mesch, M. & Fuss, M. (2005). The Impact of Telecoms on Economic Growth in Developing Countries. In: Vodafone policy paper series (no.2), Africa: The impact of mobile phones (pp. 10-24). Retrieve March 18, 2021 from http://www.vodafone.com/center/index/about/about/_us/policy/policy_papers.html

Webb, A., McQuaid, R. W., & Webster, C. W. R. (2021). Moving learning online and the COVID-19 pandemic: a university response. World Journal of Science, Technology and Sustainable Development.

West, M., Kraut, R., & Ei Chew, H. (2019). I'd blush if I could: closing gender divides in digital skills through education.

World Bank, 2018a. World Development Report 2018: Learning to Realise Education's Promise, World Bank: Washington DC

Zhang, W., Wang, Y., Yang, L., & Wang, C. (2020). Suspending Classes Without Stopping Learning: China‟s Education Emergency Management Policy in the COVID-19 Outbreak. Journal of Risk and Financial Management, 13(55), 1-6. https://doi.org/10.3390/jrfm13030055

Zhao, F., Collier, A., & Deng, H. (2014). A multidimensional and integrative approach to study global digital divide and e-government development. Information Technology & People.

Annexure I

Dear Respondent,

This survey is being conducted as part of my PhD research on "Digital Divide in Higher Education System in Odisha". The information collected through this questionnaire will be used only for academic purposes. I am also assuring you about confidentiality of the information that will be provided by you.

The questionnaire is divided into three segments. Please read the questions in each segment carefully before answering. Each question will have specific instructions so that it helps you to fill up the questionnaire.

Section A

1. Name (Optional)_____

2. Place_____

3. Nature of educational institute where you are studying

a) Government educational institute ☐

b) Private educational institute ☐

4. Gender

a) Male ☐

b) Female ☐

5. Age group

a) Less than 20 Years ☐

b) 20 Years – 25 Years ☐

c) > 25 Years ☐

6. Educational Qualification

a) Pursuing Graduation ☐

b) Pursuing Post Graduation ☐

c) Pursuing PhD ☐

7. Computer knowledge

a) Computer knowledge with certification

b) Computer knowledge without certification

8. Monthly family income

a) Less than Rs.50000

b) Rs. 50000 – Rs.1,00,000

c) More than Rs. 1, 00, 000

Section B

Basic information about internet usage

9. How many computers are there in your household (laptop and desktop)?

a) None

b) 1

c) 2

d) 3

e) 3 or more

10. Does your household have access to internet?

a) No internet connection

b) Mobile Internet Only

c) Broadband Only

d) Both Mobile and Broadband

11. Where do you mostly use the internet?

a) Do not use internet

b) Only at home

c) At my educational institute

d) whenever I have time (using mobile)

12. On an average how many hours per day do you spend on internet?

a) Less than 1 hour

b) 1 hour – 5 hours

c) More than 5 hours

13. What is the most important reason for using the internet?

a) Work/Business

b) Education

c) Entertainment

d) Surfing different social media

Section C

Below are the statements represent the perception of the individuals towards the internet usability which in turn gives us an idea about impact of digital divide among the participants. Please read the statement carefully and rate the statement in a 5-point Likert scale where 1 means strongly disagree and 5 means strongly agree.

Statement	**SDA (1)**	**DA (2)**	**N (3)**	**A (4)**	**SA (5)**
Statement 5: The cost of high-speed internet is becoming expensive					
Statement 6: I can use internet on my own					
Statement 7: I can configure the connectivity problem					
Statement 8: Mobile internet is better than broadband internet					
Statement 9: I feel positive towards the use of internet					
Statement 10: The internet has mostly positive effect on society					
Statement 11: Access to internet is equal for all					
Statement 15: Internet helps me to learn new skills					
Statement 16: Online education system helps to increase my learning skills					
Statement 17: The internet use has become an everyday part of my life					

Annexure II

Sources of Variables

Variables	References
Statement 5: The cost of high-speed internet is becoming expensive	Adhikari, J., Mathrani, A., & Scogings, C. (2016). Bring your own device (BYOD) to the classrooms. Smart Education and Interactive Technologies. Agnew, I., & Ripper, L. (2011). Using embedded outreach to bridge the digital divide. Working with Older People. Ching, C. C., Basham, J. D., & Jang, E. (2005). The Legacy of the Digital Divide: Gender, Socioeconomic Status, and Early Exposure as Predictors of Full-Spectrum Technology Use among Young Adults. Urban Education, 40(4), 394–411. https://doi.org/10.1177/0042085905276389
Statement 6: I can use internet on my own	Calderon Gomez, D. (2020). The third digital divide and Bourdieu: Bidirectional conversion of economic, cultural, and social capital to (and from) digital capital among young people in Madrid. New Media & Society, 1461444820933252. Fong, M. W. L. (2009). Digital divide: The case of developing countries. Issues in Informing Science and Information Technology, 6(2), 471-478 Lazar, J., & Stein, M. A. (Eds.). (2017). Disability, human rights, and information technology. University of Pennsylvania Press.
Statement 7: I can configure the connectivity problem	Ali, W. (2020). Online and remote learning in higher education institutes: A necessity in light of COVID-19 pandemic. Higher Education Studies, 10(3), 16-25. Dasgupta, S., Lall, S., & Wheeler, D. (2001). Policy reform, economic growth, and the digital divide: An econometric analysis (Vol. 2567). World Bank Publications.

	Higher Education in India (December 30, 2019), Available at https://www.drishtiias.com/to-the-points/Paper2/higher-education-in-india-1, Accessed on 25.03.2021. Mansell, R. (2002). From Digital Divides to Digital Entitlements in Knowledge Societies. Current Sociology, 50(3), 407–426.
Statement 8: Mobile internet is better than broadband internet	Bagur-Femenías, L., Buil-Fabrega, M., & Aznar, J. P. (2020). Teaching digital natives to acquire competences for sustainable development. International Journal of Sustainability in Higher Education. Calderon Gomez, D. (2020). The third digital divide and Bourdieu: Bidirectional conversion of economic, cultural, and social capital to (and from) digital capital among young people in Madrid. New Media & Society, 1461444820933252. DiMaggio, P., & Garip, F. (2012). Network Effects and Social Inequality. Annual Review of Sociology, Vol. 38:93-118 SSRN. https://doi.org/ 10.1146/annurev.soc.012809.102545 Fox, S. (2011). Americans living with disability and their technology profile. Pew Internet & American Life Project. Accessed September, 22, 2011.
Statement 9: I feel positive towards the use of internet	Bagur-Femenías, L., Buil-Fabrega, M., & Aznar, J. P. (2020). Teaching digital natives to acquire competences for sustainable development. International Journal of Sustainability in Higher Education. Bala, S., & Singhal, P. (2018). Gender digital divide in India: a case of inter-regional analysis of Uttar Pradesh. Journal of Information, Communication and Ethics in Society. Chaudhari, V., Murphy, V., & Littlejohn, A. (2019). The Educational Intelligent Economy–Lifelong Learning–A vision for the future. In The educational intelligent economy: Big data, artificial intelligence, machine learning and the internet of things in education. Emerald

	Publishing Limited. Edoho, F. M. (2013). Information and communications technologies in the age of globalization. African Journal of Economic and Management Studies.
Statement 10: The internet has mostly positive effect on society	Fletcher, A., Gaysford, S., & Adele. (2000). OFT Study on E-Commerce and Competition. Retrieved from http://www.out-law.com/page-954. Fong, M. W. L. (2009). Digital divide: The case of developing countries. Issues in Informing Science and Information Technology, 6(2), 471-478. Chowdhury, G. (2013). Sustainability of digital information services. Journal of Documentation. Billon, M., Marco, R. & Lera-Lopez, F. (2009). Disparities in ICT adoption: A multidimensional approach to study the cross-country digital divide. Telecommunications Policy, 33 (10-11), 596-610.
Statement 11: Access to internet is equal for all	Angus, L., Snyder, I., & Sutherland-Smith, W. (2003). Families, Cultural Resources and the Digital Divide: ICTs and Educational (dis)Advantage. Australian Journal of Education, 47(1), 18–39. doi:10.1177/000494410304700103 Billon, M., Marco, R. & Lera-Lopez, F. (2009). Disparities in ICT adoption: A multidimensional approach to study the cross-country digital divide. Telecommunications Policy, 33 (10-11), 596-610. Chaudhari, V., Murphy, V., & Littlejohn, A. (2019). The Educational Intelligent Economy–Lifelong Learning–A vision for the future. In The educational intelligent economy: Big data, artificial intelligence, machine learning and the internet of things in education. Emerald Publishing Limited.
Statement 15: Internet helps me to learn new skills	Betts, L. R., Hill, R., & Gardner, S. E. (2017). "There's Not Enough Knowledge Out There": Examining Older Adults' Perceptions of Digital Technology Use and Digital Inclusion Classes.

	Journal of Applied Gerontology, 073346481773762. doi:10.1177/0733464817737621 Chaudhari, V., Murphy, V., & Littlejohn, A. (2019). The Educational Intelligent Economy–Lifelong Learning–A vision for the future. In The educational intelligent economy: Big data, artificial intelligence, machine learning and the internet of things in education. Emerald Publishing Limited. Cotten, S. R., Anderson, W. A., & McCullough, B. M. (2013). Impact of internet use on loneliness and contact with others among older adults: cross-sectional analysis. Journal of medical Internet research, 15(2), e39.
Statement 16: Online education system helps to increase my learning skills	Chaudhari, V., Murphy, V., & Littlejohn, A. (2019). The Educational Intelligent Economy–Lifelong Learning–A vision for the future. In The educational intelligent economy: Big data, artificial intelligence, machine learning and the internet of things in education. Emerald Publishing Limited. Cheang, Lim Swee, Lei. Guo. (2015). Digital inclusion: the Singapore Perspective. In K. Anderson (Ed.), Digital divides: The new Challenges and opportunities of e-Inclusion (pp. 149-161). London: CRC Press Graham, M. (2011). Time machines and virtual portals. Progress in Development Studies, 11(3), 211–227. doi:10.1177/146499341001100303. Higher Education in India (December 30, 2019), Available at https://www.drishtiias.com/to-the-points/Paper2/higher-education-in-india-1, Accessed on 25.03.2021.
Statement 17: The internet use has become an everyday part of my life	Joshi, S. (2021). Rising importance of remote learning in India in the wake of COVID-19: issues, challenges and way forward. World Journal of Science, Technology and Sustainable Development. Loan, F. A. (2011). The digital divide among the college students of Kashmir, India. IFLA journal, 37(3), 211-217.

	Rahman, A. (2015). Toward a Comprehensive Conceptualization of Digital Divide and its Impact on E-Government System Success. E-Services Adoption: Processes by Firms in Developing Nations, 291–488. doi:10.1108/s1069-096420150000023003