RESEARCH ARTICLE

The Digital Divide in India: Which Universality Approach is ideal for Gujarat State of India?

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Abstract:

Information Communication Technology is increasingly becoming beneficial to humankind, given the latest developments. Today, there is so much potential to the extent that using ICTs, we are able to communicate, conduct financial transactions such as cash deposits and withdrawals at banks, money transfers, pay school fees and other bills using mobile phones. However, most, of these technologies are within few hands. The gap between those who have and those who do not have access to these technologies in India is on the increase.

This study used a qualitative research approach to explore the digital divide challenge in India's state of Gujarat. The study also examined the approaches that had been undertaken to address the digital divide challenge.

Findings indicate that the digital divide in Gujarat state affects people irrespective of gender, age group, location, literacy level, income and physical ability. The approaches used to mitigate the digital divide and enhance universality were identified as Call Centres, Internet Kiosks, Bhoomi Projects, Gyandoot Projects, Warana Wired Village Projects, Common Service Centers, Social Media, Drishtee Projects, Gyandoot Projects and Village Knowledge Centres. However, the use of Call Centres, Internet Kiosks, Drishtee Projects and Gyandoot Projects were found to be the most suitable approaches for addressing different forms of the digital divide. Findings further reveal that no single approach can address all forms of the digital divide. Therefore, we recommend the use of a set of approaches in order to address the digital divide and foster Universality.

Key Words: Digital Divide, Universal Access, ICT, Diffusion, Gujarat State, India

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Introduction

After India gained its independence from Great Britain in 1947, modernization and industrialization jumped to the forefront of its development agenda. Leaders from the newly independent and resource-starved country realized very early how important mass media and technology diffusion would be for the development of the nation. In addition, such development could be a catalyst to provide educational messages to their citizens (Petchak-Shelat, 2013). This is to explain the impressive access to newspapers, television, and radio across India. After deregulation and privatization in the 1990s, India expressed a desire to be a global economic team player. As a result, the diffusion of digital media alongside the new economic policies in India have made key investments in the telecommunications and infrastructure around the country to secure its place in the global technological future (Petchak-Shelat, 2013).

Information Communication Technology (ICT) is increasingly becoming beneficial to human kind, given the latest developments Borbora (2004). Today, using ICTs, we are able to communicate, carry financial transactions such as cash deposits and cash withdraws at bank ATMs, money transfers, pay school fees and other bills using mobile phones (Kyeyune et al. 2012). Studies by Kituyi *et al.* (2012); Mbarika (2000) and other scholars reveal that ICTs are increasingly being adopted in healthcare service delivery as way of improving access to healthcare at lower costs, especially in developing countries. In India, ICTs are one of the key sectors of the economy, contributing approximately 5.7% to the national Gross Domestic Product (Vanguard, Wednesday November 20th, 2013).

India has been ranked 121 out of 157 countries in terms of its ICT progress index by the International Telecommunications Union (ITU, 2013) thus becoming a global player in terms of ICT innovation, especially, in the area of software development and ICT education. Thus, on a fair standard, India can be classified as an ICT

producing country, especially among the developing countries. Consequently, one would expect India to be thriving up the ladder of ICT access and usage. However, it is shocking that India has one of the world's highest digital gaps. For example, Bowonder and Boddu (2013) argue that there are only 30 million telephone connections and 4.5 million Internet users in the country of over 1 billion people! The disparity in numbers is even higher in terms of gender, age, urban and rural areas (Bansode & Patil, 2011). Given these disparities, it is not surprising that India is yet to realize the full benefits that ICTs bring to economic development. This supports the finding of the International Monetary Fund (IMF, 2001), where ICT producing countries were found to realize fewer benefits from ICTs compared to non-producing countries. What is the underlying reason? I just came back from Chennai, India and observed the same phenomena.

The challenge of the Digital Divide was first appreciated in the early 1990s. It was established that despite the rapid technological growth that has the potential to improve the standards of living while reducing the cost of at the same, most people around the globe did not have access to this technology. Consequently a Committee on the Digital Divide was setup to foster access in member countries, India inclusive. The Telecom Regulatory Authority of India has among other roles, a mandate of promoting access to ICTs across the country. However, there are still pressing challenges to Universal Access. Moreover Borbora (2004) argues that there is need for countries like India to deploy resources in promoting sustainable access to ICTs for economic development and betterment of citizens' lives.

Some of the most commonly used ICTs in India are basic multimedia technologies and home appliances such as DVDs, CDs, and TVs, and radio (Seshagiri & Blom, 2010). These are affordable and can be used communally. Thus, even the poor can manage to own and use them. The challenge however, is that these technologies provide limited benefits to the community. Other than listening to and watching the news and other videos for entertainment, these technologies will not provide high end benefits such as knowledge management and sharing. This is because most of the high-end ICT technologies operate using the Internet so they would at minimum require infrastructure such as electricity, Internet backbone (Cullen, 2001) and a moderate level of literacy among the community (Singh, 2006). Hence, only a small section of Indians are able to harness ICTs fully (Bagla, 2005; Bhatt, 2006). Thus the following questions:

1. What nature of the Digital Divide is prevalent in Gujarat State of India?
2. Which approaches have been undertaken to mitigate the Digital Divide in Gujarat State of India?
3. Which approach is most suitable for mitigating the digital divide and promoting Universality in Gujarat State of India?

1.1 The Concept of Digital Divide

The concept of the Digital Divide is understood in varying ways, depending on the circumstance under which it is being defined. Dubey, Jyoti and Devanand (2011) define the Digital Divide as "a substantial asymmetry between two or more populations in the distribution and effective use of information and communication resources". Further, Bansode and Patil (2011) posit that the digital divide explains the gap that exists between those who have "regular and effective access" to digital technologies and those who do not have access to" regular and effective access" to ICT resources. In the general context however, the digital divide is the difference between the haves and the have not in terms of access to and use of information technologies and services in a given society. Studies by Lor (2003); Mutula (2002); Singh (2004); Cullen (2001); Salinas (2003); Singh (2001); Singh (2004) have all tried to examine the digital divide from different perspective. Lor (2003) for example argues that there exists a digital divide among users of library resources, while Mutula (2002) established that a digital divide exists among different genders. On the other hand, Singh (2004) and Singh (2001) argue that a digital divide is prevalent among different age groups in India. The most critical of the digital divide however is seen in Cullen (2001) who argues that physical disability leads to disparities in access to information and other ICT resources. Salinas (2003) also suggests that the lack of ICT knowledge and skills brings about digital divide.

In this study however, we are looking at the digital divide from a holistic angle. We argue that a digital divide has no boundary and can affect any age group whether young or old; gender-whether female or male; level of education - whether highly educate or not educated at all; physical ability –whether physically impaired or not. The digital divide can even affect the rich! We argue this way because the nature of a given digital divide largely depends of the causes. We appreciate there are various causes of the divide, and therefore argue that these should be addressed holistically for better universal access to ICT services and technology.

1.2 How about Universal Access?

Perhaps the biggest technological challenge of the 21st century is ensuring Universal Access. Universal Access, which originated in the telecommunications regulatory sector, is now becoming a concern for all ICTs. This is because access to information is a human right according the United Nations Human Rights Council (UNHRC, 2011). However, today, ICT is no longer only about telecoms. Today, many forms of ICTs have emerged, although they all still heavily rely on the Internet. For example, there is Social Media, Cloud Computing and many other forms of data processing and information sharing that employ the concepts of data mining and artificial intelligence. It is eminent that ICTs largely revolve around conversion of data into meaningful information through data processing. The others are used to disseminate or share such information. Therefore, just like telecoms, other ICTs such as the Internet need to be universally accessible.

By definition, Universal Access is ensuring that ICTs are accessible to ALL irrespective of age, level of education and technology among others. Universal Access can be actually enforced through legal means by government authorities and/or even Non-Governmental Organizations if such a right is infringed on. Therefore, Universal Access helps in eradicating the Digital divide. As suggested by Kharade and Sharma (2011), governments need to come up with appropriate policies that push for universal access to ICTs and information resources. This is most critical where countries have made significant investments in ICTs; such that, once the citizens cannot access the services, there will be trade-off.

With the above understanding, it is important that a critical review is done to identify the most suitable approaches for ensuring Universal Access. In this paper therefore, we examine the various approaches that have been used to mitigate the digital divide in India with an aim of identifying the most suitable one(s) for Gujarat State.

2. Methodology

This study employed a qualitative content analysis research method. According to Frey, Botan and Kreps (1999), content analysis is a research methods used to "identify, enumerate, and analyze occurrences of specific messages and message characteristics embedded in texts". Content analysis can take the form of qualitative or quantitative (Frey et al. 1999 pg. 3). *Qualitative Content Analysis* enables researchers to obtain meaning out of data by examining the themes and patterns out of them other than paying attention to the frequencies and other numerical expressions. On the other hand, *Quantitative Content Analysis* is one where researchers obtain meaning out of data through subjecting them to numerical and mathematical tests. It is used mainly when there is need to test hypotheses.

Hsieh and Shannon (2005) argue that qualitative content analysis method has become popular in health research. Similarly, due to its power analyze qualitative data; the method has become popular in the ICT and information systems (IS) researcher. Several ICT and IS scholars have since applied the method (see for example Kituyi, Rwashana, Mbarika & Isabalija, 2012); Kituyi & Amulen, 2012). Hsieh and Shannon (2005) posit that content analysis method is most appropriate where there is need to better understand phenomenon without generalizing the findings and also where theory is limited.

In this study, we gathered publications in two categories A and B to enable us thematically study, present our case and answer the research questions. Category A was for publications on the digital divide and universal access, while category B was for approaches used in addressing the digital divide challenge. Over 150 publications were gathered in category A, while 70 publications were gathered in category B from Internet sources. Category "A" papers were sorted based on the key themes and words of the study which included; 1) Digital Divide, 2) Universal Access, 3) ICT, 4) Diffusion, 5) India. While sorting category "A" papers, emphasis was put on a combination of the terms "Digital Divide" on one hand and "Universal Access" on the other. Using this criterion, the following guiding questions were generated to help in the sorting papers, whereby at the end of it all, 70 publications were dropped in category A, while 18 publications were dropped in category B:

QTN1: Does the paper substantially talk about the digital divide?
QTN2: Does the paper substantially talk about universal access?
QTN3: Does the paper talk about digital divide in India?
QTN4: Does the paper talk about universal access in India?
QTN5: Does the paper talk about digital divide in Gujarat State?
QTN6: Does the paper talk about universal access in Gujarat State?
QTN7: Does the paper provide some suggestions for eradicating the digital divide?

QTN8: Does the paper provide some suggestions on improving universal access?

Using the above guiding questions, a total of 92 papers were finally selected for review in both categories. Table 1 presents a breakdown:

Table 1: Paper combinations

QTN1	65	QTN5	17
QTN2	48	QTN6	07
QTN3	86	QTN7	53
QTN4	13	QTN8	23

The selected papers were reviewed with the aim of 1) identifying the digital divide challenge and 2) examining the approaches used to address the digital divide. Data were presented in a qualitative manner using matrixes and tabulations.

3. Findings

We present our findings on two aspects: first, we show the nature of the digital divide that is prevalent in India, who is affected and how. Secondly, we examine the approaches being used to address the divide. Using a matrix, we show each intervention approach that suits in a given category of the divide.

3.1 Nature of the Digital Divide: Who is affected- how and why?

The findings reveal varying results. In terms of internet access and usage, Kharade and Sharma (2011) reveal that there are 57 million users of the Internet in the whole of India. Out of the 57 million users, only 1.2% is in rural areas. Kharade and Sharma (2011) further show that the divide is high among states, with Maharashra State, Delhi State and Tamilnadu State having the least digital divide in terms of Internet users. Karnataka State, Kerala State and West Bengal State were second in the number of internet users, while Orrisa State, Andaman State, Uttranchal State, Assam State and Nicobar State had the highest digital divide in terms of Internet users. Gujarat State was also one of those states with the least Internet users, hence had a relatively high digital divide. Other than the internet, Kharade and Sharma (2011) argue that there is a 70% digital divide in terms of technology and also that the rate of access to computers within the population is 5/1000 people. In terms of mobile phones, the ratio is 9/1000 people. Bansode and Patil (2011) attribute this divide to high illiteracy rates in the country, especially among the rural communities. State-wise, Gujarat State is ranked among the most illiterate states, while Kerala State was best in literacy, whereby over 90% of the citizens were literate (India Online, 2011). The high level of illiteracy was attributed to high school drop-outs.

Although Dubey *et al.* (2011) blames the digital divide challenge on inadequate sensitization of citizens by government, there are indications that the government has played an important role in fostering access to ICTs through provision of the required infrastructure, ensuring political stability and promoting education. The government has also tried to address issues of content design to ensure content is suitable for local communities (Keniston, 2002). There are also suggestions that universal access in India is fueled by the large cost of doing business. Given that the country has over 100 cities, it is very costly for a telecom company to cover them and thereafter extend into rural areas as well. Bowonder and Boddu (2013) argue that Bharat Sanchar Nigam, the biggest telecom company incurs losses in trying to enhance universality. Thus the rural majority have limited opportunities to access ITCs. The fact that 70% of India's population live in rural areas indicates that the digital divide challenge is inevitable. Other factors advanced to explain the digital divide in India include the high cost of electricity, coupled with low access to electricity (Rao, 2005).

3.2 Approaches to mitigating the Digital Divide

Several initiatives have been undertaken to ease the rate of the digital divide in India. Some of these can be adopted to address the challenge in Gujarat State. Most of these initiatives however, appear to be more of projects with little

emphasis on policy. In this section, we explore some of the initiatives and identify those that can be adopted to solve the digital divide problems in India's Gujarat State.

According to Bansode and Patil (2011), Call Centres (CC) are some of the initiatives undertaken to bridge the digital divide in India. A number of Call Centres such as Kisan Call Centre have been set up country wide to provide easy access to information and other internet services. At Call Centres, locals can enter and process their work using computers for free or sometimes with little pay. Bansode and Patil (2011) reveal that Call Centres are the most appropriate way of enforcing universal access in hard-to-reach areas with limited access to electricity and the Internet. They can also host youth programs such as computer training and gaming. There can also be training programs for the rural adult community e.g. adult literacy courses. Therefore, Call Centres are most appropriate in eradicating the digital divide among the youths, women, and illiterate or semi illiterate rural communities. Call Centres in most developing countries are set up by national ICT regulatory agencies. However, in some cases, they are privately funded by the community through membership. At times, Non-Governmental Organizations also set up Call Centres in rural areas or urban slums.

Information Services Kiosks (ISK) are also another initiative started to bridge the digital divide in India. According to Rao (2005) and SKEPL (2001), Information Services Kiosks help rural farmers in accessing basic market information in over 600 different places (Parghi, 2003). These information kiosks are also used to train locals on various issues that enhance their knowledge (Rao, 2005). Besides Information services kiosks, Bansode and Patil (2011) indentify other initiatives such as the Bhoomi Project (BP) and the Gynadoot Project (GP). The Bhoomi project provides land ownership information to over 6.7 million rural Indians who find it difficult to access land offices and verify their land ownership records. On the other hand, the Gyndoot project provides rural internet services to marginalized communities. While most of the listed projects support individual farmers, The Warana Wired Village Project (WWVP) provides infrastructural support to sugar cooperatives needed for handling banking and financial services (Nikam *et al.* 2004).

Other popular initiatives include the Village Knowledge Centres (VKC), the Gyandoot Project (GP), the Drishtee Project (DP) and Common Service Centers (CSC). Common Service Centers, also commonly referred to as Khidmat Centers are also popular initiatives towards bridging the digital divide as seen in Dubey et al. (2011). The Common Service Centers provide banking services to the local communities. While the Drishtee project aims at providing IT support to the private sector service providers operating in rural areas (Borbora, 2004). Borbora (2004) further argues that the Gyandoot project provides internet services to rural youths through information kiosks. On the other hand, Village Knowledge Centres are research based initiatives aimed at managing knowledge creation and sharing among rural dwellers (Borbora, 2004). Table 2 presents a matrix showing the suitability of the various initiatives to different forms of the digital divide.

Table 2: Approach vs. Digital Divide Matrix

Approach Vs. Digital Divide	CC	IK	BP	GP	WWVP	CSC	SM	DP	GP	VKC
RDD	√	√	√	√	√	√	×	√	√	√
GDD	√	√	×	√	×	×	×	×	√	√
USDD	√	√	×	√	×	×	×	×	√	×
ADD	√	√	×	√	×	×	√	×	√	×
LDD	√	√	×	√	×	×	×	×	√	√
TDD	√	√	×	√	√	√	√	√	√	√
PDD	√	√	×	√	√	×	×	√	√	√
PDDD	×	×	√	×	×	√	×	×	×	√

Key:

Types of digital divides		Universality Approaches/Initiatives	
Rural Digital Divide	RDD	Call Centres	CC
Gender Digital Divide	GDD	Internet Kiosks	IK
Urban Slums Digital Divide	USDD	Bhoomi Project	BP
Age Digital Divide	ADD	Gyandoot Project	GP
Literacy Digital Divide	LDD	Warana Wired Village Project	WWVP
Technology Digital Divide	TDD	Common Service Centers	CSC

Poverty Digital Divide	PDD	Social Media	SM
Physical Disability Digital Divide	PDDD	Drishtee Project	DP
		Gyandoot Project	GP
		Village Knowledge Centres	VKC

3.3 So, which approach is suitable for Universality?

As seen in Table 2, it is difficult to qualify any approach as most suitable. This is because, while a given approach may apply in one situation, it may not apply in another. Perhaps the most suitable would be Call Centres (CC), Internet Kiosks (IK), and the Gyandoot Project (GP). However, all these three are limited in terms of eradicating the physical digital divide (PDDD). The Bhoomi Project can help reduce Rural Digital Divide, and the Physical Disability Digital Divide. On the other hand, the Warana Wired Village Project can help mitigate the Rural Digital Divide, the Technology Digital Divide, and Poverty Digital Divide, but fails in mitigating Gender Digital Divide, Urban Slums Digital Divide, Age Digital Divide and Literacy Digital Divide.

1. Similarly, a close examination of Common Service Centers initiatives revealed that they can mitigate Rural Digital Divide, Technology Digital Divide and Physical Disability Digital Divide. Common Service Centers initiatives however fail to address challenges of Gender Digital Divide, Urban Slums Digital Divide, Age Digital Divide, Literacy Digital Divide and Poverty Digital Divide. The Social Media approach, although very popular, it can only mitigate Age Digital Divide and Technology Digital Divide. An examination of the Drishtee Project revealed that it was appropriate for bridging Rural Digital Divide, Technology Digital Divide and Poverty Digital Divide but failed on the rest. Finally, the Village Knowledge Centres helped mitigate Rural Digital Divide, Gender Digital Divide and Literacy Digital Divide. Village Knowledge Centres also mitigated Technology Digital Divide, Poverty Digital Divide and Physical Disability Digital Divide.

4. Conclusion

Given the above, it is useful to combine approaches when faced by different digital divide challenges. For example a combination Call Centres and Village Knowledge Centres can help mitigate all the forms of digital divide. Research shows that not a single problem solving approach is sufficient in most developing countries, especially when it comes to fostering universality (see for example The United Nations Development Agenda (UNDA (2007); Falch and Anyimadu (2003)). This is because challenges of developing countries manifest themselves in varying forms. Important to note also is that, ICT users and potential users differ very much in attribute. For example, very few are well educated. Even among the educated, there are those who are not computer illiterate. The poor and rich may as well lack knowledge. Based on this, it is therefore imperative that to employ the most suitable set of approaches in addressing such challenges of digital divide.

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