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Managing and Creating E- Learning Environment at the Grassroot Level: Sharing Empirical Analysis from India

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ABSTRACT:

With the rapid growth of technology, education, particularly higher education, has also taken the support of ICT and now offers programmes to increase the knowledge, education and literacy status of people. E-learning platform provides anywhere, anytime easy access for up gradation of knowledge and skills. It also provides a platform wherein the individual gets a customized package related to key thematic areas, through a self-guided process. E-learning courses provide an enabling platform by virtue of which the professionals can upgrade their knowledge without going for regular courses. In the inaccessible areas, the e-learning platform can play important role, provided smooth flow of internet connectivity is ensured, otherwise the technological advantages may jeopardize the aspirations of entrants. Therefore, internet accessibility has to be uniform despite topographical hurdles.

In the present paper the researchers have taken Morni Hill Block, District Panchkula, and Haryana as a case study. It is thirty-five (35) Km away from District Headquarters, Panchkula and situated in lower Shivalik hills. It comprises seven clusters including Morni, Mandhan, Tikker Hills, Koti, Baldwal, Thandog and Bhuri, twenty (20) Panchayats and three hundred & sixty-nine (369) villages. The block accommodates 21330 people as per census 2011 in an area of 37.41 sq. Km. Literacy of the block is 64.76 percent which is significantly lower than the district average (81.88 percent). On the other hand, total working population of Morni is relatively higher (47.16 %) than the district average (37.68%) with significantly lower proportion of female participation. In the present paper an attempt has been made to establish a network of e-learning in the villages by developing these clusters as Cluster Digital Learning Centers (CDLCs) and Panchyats as Village Digital Centers (VDCs). For this purpose, these centers need to be equipped with required facilities in terms of infrastructural, human and financial resources for their management which will enable them to attain the objective of Digital India, if supported properly.

Keywords: E-learning, Cluster Digital Learning Centers, Village Digital Centers.

1. INTRODUCTION

E-learning word used for the first time in 1999, is associated with online learning or virtual learning, which means way to learn based on the use of new technologies allowing access to online, interactive and sometimes personalized learning through the internet or other electronic media (intranet, extranet, interactive TV, CD-Rom, etc.), to develop competencies while the process of learning is independent from time and place. The development of the e-learning revolution arose from a number of other educational revolutions Billings and Moursund, 1988 such

as the invention of reading & writing, the emergence of the profession of teacher/scholar; the development of movable type (print technology) and the development of electronic technology. Teaching mathematics by using super computer was the first sincere attempt in the field of e-learning (Eisenberg, 2004). Bernard Luskin 1963 set up the earliest computer in a community college for teaching. In 1993, William D. Graziadei introduced an online computer-conveyed lecture, seminar and evaluation project via electronic mail and the first most online high school was founded by 1994. Till now the e-learning has caught the attention of societies at large all over the world. The global e-learning industry is anticipated to have value over $48 billion trade as per some conservative estimates (Nagy, 2005).

Broadly, e-learning involves the use of digital media and technology to deliver learning experiences. An e-learning experience attempts to simulate the real-world classroom learning. It involves assembling great content, distributing it to facilitate learning, managing the learning process and providing validations (Skiba, 2005). Therefore e-learning is the most important development in education especially with the emergence of internet and rapid growth of technology. Education, particularly higher education has also taken the support of ICT and now offers variety of programmes to increase the knowledge and skill of college entrants (Adms, 2006). E-learning platform provides anywhere, anytime easy access for up gradation of knowledge and skills. It also provides a platform wherein the individual gets a customized package related to key thematic areas, through a self-guided process (Crittenden, 2002). E-learning courses provide an enabling platform by virtue of which the professionals can upgrade their knowledge without going for regular courses (Brown, 2005). In the areas where higher education has limited access, e-learning platform can play an important role, provided smooth flow of internet connectivity is ensured round the clock, otherwise the technological advantages may jeopardize the aspirations of education entrants. Therefore, internet accessibility has to have uniformity despite geophysical constraints to derive maximum social benefits by all sections of the society. In the developing countries e-learning has also captured the attention of education planners, policy-makers and managers.

2. DIGITAL INDIA AND THE ROLE OF E-LEARNING

It has been realized that India has tremendous potential for expansion of e-learning and is already the second largest country after the United States, which has the capacity to use e-learning. Nonetheless, the e-learning is yet to gain momentum in India. An inclusive transformation in the education sector to significantly increase outreach, especially in rural areas, smaller towns and cities, through online learning is major challenge, mainly due to poor internet connectivity. It has been estimated in the McKinsey report that 20-30 percent increase in GDP is expected in next 10 years (Bhattacharya, 2007). Therefore, several global e-learning players have seen a surge in adoption of their platforms from India in the last few years. It was estimated that the number of learners from India is very high and the same is second highest after US. India is a land of diversity with a vast geographical spread. Hence, the existing technology will not serve the purpose. Therefore, innovative and proper e-learning technology would be beneficial for India for its socio-cultural and linguistic settings. It is imperative that both the model of dissemination of learning and content needs to be relevant and suitable for Indian aspirants. The Indian e-market has tremendous potential and far reaching impact owing to the wide spread of information and communication technology (ICT). The mushrooming of web based training modules by industrial players after 1990, is to capture the Indian market (Kaushal, 2015). Indira Gandhi National Open University (IGNOU) also offered its computer programme through internet mode, by converting its print material in HTML form and empanelling internet access points (EIAP) across the country during 1998-99 (Sharma, 2001). However, program could not fetch desired results due to poor planning and execution and connectivity problems.

Therefore, efforts should be made to develop e-content and teaching methods suitable to the learners across the country and e-learning providers should look to develop and source content locally while ensuring the highest standard and quality. The global market may also face challenges from the local content providers (Institutions and Individuals) across India as they may also grab the e-learning

market due to their accessibility which may jeopardize the aspiration before bigger players with multi-national reach. This would require both education and innovation in terms of tools and platforms. From a delivery point of view, product innovations around customization of content for regions will go a long way in improving, adoption and increasing relevance (Nagi, 2005). MOOCs (Massively Open Online Courses) have been the placard of e-learning revolution across the world. While the model has seen success, it is accepted as the only right model for e-learning especially in developing countries like India, although it has high dropout rate. There is enormous potential to innovate and explore more contextual e-learning methods including embedding digital learning in real-world scenarios. E-learning program is intended to make it fun filled and interactive as it is developed by content expert (Naidu, 2012).

It has also been released that sustaining learner's engagement with the content and the platform is a major challenge taking the rapid change in technology into consideration. In traditional classrooms this is achieved by physical presence, the teacher and social behavior. This will become more critical in India as the content reaches varied segments with different needs and motivations. Reaching a large learner base and sustaining interest levels will require integrating social engagement aspects along with learning. E-learning companies in India will increasingly adopt features like study groups and discussions to simulate a classroom study environment. In India, the number of internet users are expected to touch 500 million by the end of 2017, of which nearly 2/3rd are expected to be using mobile technology. During this time several improvements are also expected to happen in the network infrastructure which is the backbone for content delivery. E-learning in India will see tremendous growth and this will shape the global e-learning industry as well and will also attain the mission of digital India (Tyagrajan, 2016).

3. REVIEW OF LITERATURE

(Januszewski, 2003) asserts that education is the most human of processes, through it seek to sustain our roots in the past of human endeavor as we strive for future improvement. (Rada & Schoening, 1997) note that two thousand years ago the Chinese standardized educational technology and Chinese examination system assumed a systematic comprehensiveness that was unknown in the Western countries until the mass education systems of the early 19th century. (Januszewski 2003), reports that in the later 20th century and early 21st century, information and computing technology influenced the education to a great extent. From Computer Assisted Learning (CAL) of the early 1980s, to open and distance learning and with the advent of www, information technology is equated with the modern world, economic success and the future (Watson 2001). The use of digital technology for improving the delivery of education, particularly distance education has enormous potential to raise standards and increase employment. "David Blunkett, explains that traditionally, the notion of "educational technology" has been equated with educational computing. Indeed, computer technology is inarguably at the center of any current-day discussion of educational technology, and there is no doubt that it will remain a hugely important area of the subject for the foreseeable future.

In separate studies, (Maag, 2006) and (Oblinger & Hawkins, 2005) all noted that the benefits of e-learning have not been forthcoming in all instances because of uniform connectivity in developing countries and profit motives of the service provider. (Soueles, 2004) cites that some level of organization change is required for the implementation of e-learning to be successful. It has been realized that with many modern e-learning initiatives the organizations responsible have been primarily concerned with limiting expenditures on content preparation and more emphasis on profit maximization (Oblinger & Hawkins, 2005).

The gap in the adaptability of net users is evident. The impact of the Net Generation is particularly intense and it is hard for faculty not to embrace them in the instructional process. In addition, colleges and universities should cope with the growing demand to provide infrastructural support for learner's personal technologies, such as wireless laptops, PDAs, and IPods. Oblinger and Oblinger (2005), states that the Net Generation is purely a generational phenomenon and it is associated with technology use, it has a

number of implications for colleges and universities.

Prensky (2001) used the distinction of the digital natives and the digital immigrants to differentiate students in the past from the traditional-age college students of today. Digital natives grew up with technology; they live in a digital world. Digital immigrants view technology as an innovation and grew up in an analogue world. For digital natives, "...when asked what technologies they use, you may get a blank stare as they do not think in terms of technology they think in terms of the activity technology enables". A perfect example to distinguish between the two is to see how people find information about a restaurant, where to buy a particular item or to see if a bookstore carries a particular book. The digital immigrant reaches for the "yellow pages" book and the digital native “googles” the information on the internet. As digital immigrants, most faculty and administrators are still working to adapt to this new language and new ways of thinking, communicating, teaching, learning, and socializing (Oblinger and Oblinger, 2005).

The Net Generation have unique characteristics that differentiate these students from other generations which is challenging the traditional classroom teaching structure, and faculty realizes that traditional classroom teaching is no longer effective with these students. Several authors (Brown, 2000; Frand, 2000, Howe & Strauss, 2000, Merritt, 2002, Oblinger, 2003, Tapscott, 1998) have written on the characteristics of the Net Generation learners. Tapscott, (1998) described the Net Generation learners as an assertive, self-reliant, curious person who is enmeshed in an interactive culture that centers around 10 (Ten) broad themes. These themes include: fierce independence, emotional and intellectual openness, Inclusion of diversity, free expression and strong views innovation, preoccupation with maturity, investigations, immediacy, sensitivity to corporate interest and authentication and trust.

The fact that India’s available educational infrastructure cannot meet the current and future e-learning needs of the country is well-known. Despite having more than half the population under 25 years of age, India is expected to face a shortage of 250 million skilled workers by 2022. Additionally, traditional education has failed to transform to be relevant for today’s rapidly changing requirements of the students. The rate of advancement of technologies and resulting opportunities is too rapid for traditional programs and curriculum to keep up. Besides, there is a whole world of skills that are not even in the purview of the traditional education system. Therefore e-learning is bound to play a big role in helping to bring a step change to our education problem (Tyagrajan, 2016). With more than 370 million internet users and many local as well as global business tycoons willing to invest in the future of education, online education in India has picked up pace and this drive will certainly enhance the Gross Enrolment Ratio which is 23.06 percent (All India Survey on Higher Education, 2014-15).

4. BRIEF PROFILE OF STUDY AREA

Geographically, Haryana is situated in the northern part of India between 27° 39’ to 30° 55’ N latitude and 74° 29’ to 77° 36’ E longitude in the Gangetic plains with Shiwalik foothills in the North occupying an area of 44,212 km2 with Chandigarh as its administrative capital. The state is presently divided into 21 districts, 47 sub-divisions, 67 tehsils, 45 sub-tehsils and 116 blocks, 81 cities and 6759 villages. Haryana is predominantly an agricultural state with more than 80.3 percent area under cultivation, and approximately 70 percent of residents of the state are engaged in agriculture, cultivating wheat and rice as major crops.District Panchkula is surrounded by the state of Himachal Pradesh in the North and East, the state of Punjab and Union Territory of Chandigarh in the West and by district Ambala of Haryana state in the South as well as East. The name ‘Panchkula’ is originated from the five irrigation canals making it Panch Kuls (stream) that take water from the Ghaggar in the uphill section and distribute it from Nada Sahib to Mansa Devi, to the five main towns in the district, namely, Panchkula, Barwala, Pinjore, Kalka and Raipur Rani.

The study area comes under highly dissected region of lower Shiwalik range having sparsely vegetated low-lying hills. Morni hills are spread over an area of approximately, 9227.62 hectares out of which 2564.73 hectares are used for agriculture and 6662.89 hectares are under protected forests. River

Ghaggar, the glory of Morni hills, separates Morni from Pinjore sub-division. It originates from Shivalik hills in Himachal Pradesh (Singh, 2001) and descends to plains in Panchkula. This river is one of the most famous low profile intermittent rivers of Haryana. Morni range is an ideal place for holidays with its cool climate, peaceful environment and beautiful natural vistas with myriad opportunities for bird watching, trekking, rock climbing and other adventure sports. It has two main tourist attraction sites, i.e., two lakes)taal and Morni fort). The two lakes (taal) are separated by a hillock. These two lakes are believed to be interconnected mysteriously. The larger lake (bada tal) is developed as a tourist place by the Government of Haryana and smaller lake is used for fisheries by the local inhabitants. The second main attraction of the Morni range is the old fort at an altitude of 1149 m. This fort is believed to belong to the Queen of Morni Hills. The area is also known as bird's paradise due to the presence of Berwala Bird Safari, which is located at a distance of about 5 km from Panchkula on Panchkula-Morni road.

Though the block is within the proximity of Panchkula Township, which is one of the well planned town of tri-city, yet it lacks basic amenities and facilities. It has only one bank branch located in Morni. The condition of road network is poor and in order to reach some village in that area one has to travel considerable distance without any means of transport. Although, sufficient number of primary schools are in existence to cover all the villages, yet the opportunity of higher education is provided only by IGNOU Special Study Centre, with limited number of programmes and courses. The college entrants have no option but to travel to Panchkula, Kalka and Chandigarh in their pursuit of higher education.

5. RESEARCH METHODOLOGY

With the help of Indira Gandhi National Open University (IGNOU), Special Study Center (SSC), Morni Community College Morni, researchers identified 30 learners, who were called e-Kranti volunteers. One day training cum orientation programme was organized at Morni which was attended by 25 volunteers. Finally, 20 e-Kranti volunteers participated in awareness campaign about demonetization and cashless transactions. Each volunteer was given one village for this purpose. Therefore, out of 369 villages (hamlets) 20 villages were selected for this campaign on the basis of stratification and random sampling giving representation to each Bhoj (panchyat- group of villages). While selecting the village (hamlet) from the panchayat population, distance and accessibility factors were also taken into consideration.

A questionnaire was developed with the objective to collect information on number of variables pertaining to demonetization of currency and digitization of villages for promoting cashless economy. Open ended perceptional questions were also included to seek the opinion of key informants mainly to identify the central locations for developing as Central Digital Village (CDVs) and Cluster Digital Learning Centers (CDLCs). Data was also collected from secondary sources of information including District Census Handbook, 2011 (District Panchkula) and other published and unpublished documents.

The campaign cum survey was conducted from 21st December 2016, to 15th January 2017 in Morni Block, covering 449 households in 20 villages across the block, which is 11.39 percent of the total households (3939) residing in the block (Fig-1). These villages (hamlets) were randomly selected by 20 e-Kranti volunteers from among the total 369 villages (hamlets). Since the focus of the survey was to assess the possibility of creating e-learning environment at the village level, the majority of the questions pertained to available internet network, average, speed of connectivity, possible expansion of internet, state intervention for making uniform connectivity, besides the question on the profile of the households. Therefore, total population covered in the study was 2325 which is 10.90 percent of the total population of the block.

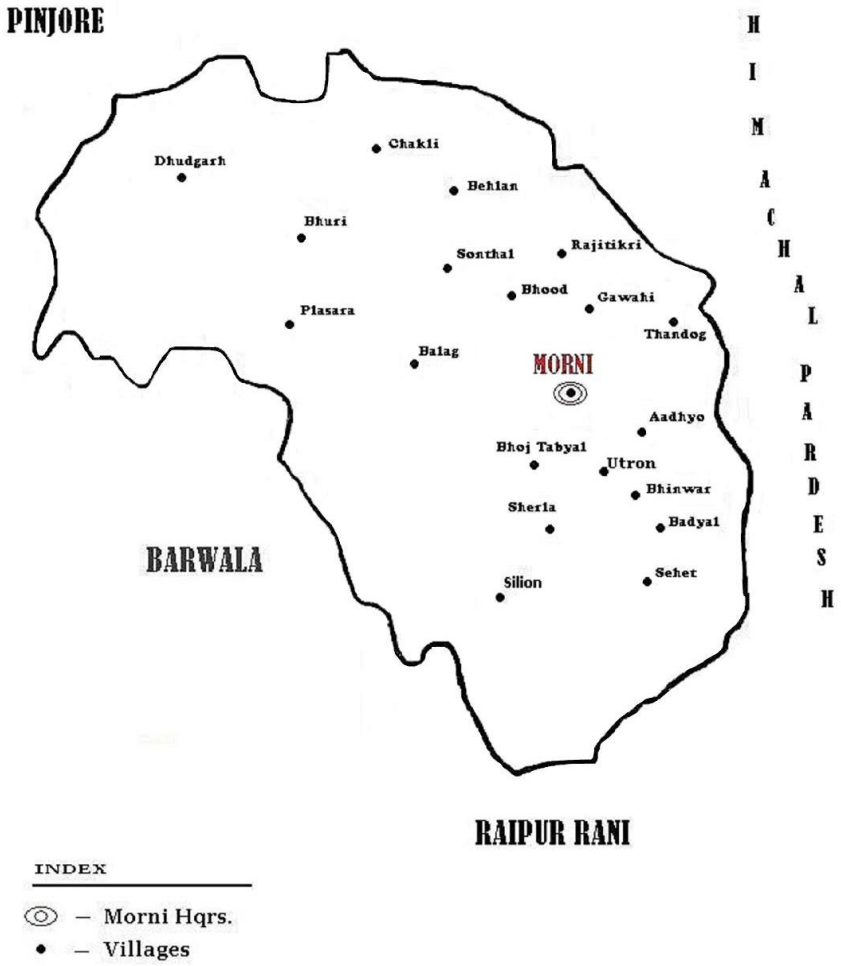

Figure 1: Distribution of sample villages, Block Morni, Distirct Panchkula (Haryana, India)

6. ANALYSIS AND DISCUSSION

Total population of Morni is 21330 which is 8.60 percent of the total population of District panchkula. All the villages in the block have education facility at the primary level. On the other hand only 26.67 percent villages have medical facilities which are significantly low as compared with district average.

Table 1: Infrastructural Facilities in Morni Block

Variables	Block Morni (% of District Panchkula)	District Panchkula
Population	8.60	248063
Percent workers	36.37	30.33
Total Workers	51.61	3819
Education	100	84.95
Medical	26.67	47.57
Drinking Water	100	100
Post office	33.33	15.53
Transport	86.67	80.1
Banks	6.67	4.08
Agricultural Credit Society	47.67	10.19
Pacca Road	93.33	98.06
Power Supply	100	100

Drinking water facilities are available in the entire village whereas only 33.33 percent villages have postal services which are higher than the district average (15.53%). It is also evident that 86.67 percent villages have transportation facilities which are marginally higher (80.01%) than the district average. On the other hand only 6.67 percent villages are served with banking services. All the villages of the districts have power supply facilities.

Table 2: Coverage of Communication Facilities

Variables	Coverage within village(%)	<5 Km (%)	5–10 Km (%)	>10 Km (%)
Telephone	46.67	-	33.33	20.00
Public Call Office (PCO)	33.33	6.66	33.33	26.66
Mobile Phone	100.00	-	-	-
Internet Cafes / Common Service Centre (CSC)	0.00	0.00	26.67	73.33

Source: Census of India, District Census Handbook, Part A District Panchkula, Haryana.

From the table 2 it is evident to note that 46.67 percent villages have landline telephone network, whereas 33.33 percent villages it is available within a range of 5-10 Km and in 20 percent villages the facilities are available beyond 10 km. Similarly, 33.33 percent villages have public call facilities within the villages with 6.66 percent within a distance of 5 Km and 26.66 percent beyond a distance of 10 Km. It is interesting to note that all the villages are equipped with mobile phone connectivity. On the other hand the internet cafe and Common Service Centers (CSCs) are not available even in a single village and approximately three-fourth population of the villages have to travel more than 10 Km to avail such facilities.

Table 3: Response of Sample Population

Variables	No./ Percent	Variable	No./Percent
No of villages covered	20	Available mobile phone	86.12
Household covered	449	Use of Mobile for transaction	23.13
Population of Sample villages	2325	Awareness about online transaction	27.12
No. of bank account	1857 (79.87)	Interest shown for about online transaction	76.32
Debit Card issued	1201 (64.67)	Willingness to learn through online	88.76
Debit card used	916 (76.27)	Internet facilities on Mobile	85.00
Use of Mob. for Social media	95.00	More than one SIM	56.47
Use of mob. for education	12.36	Visit to internet cafe	28.00

Source: Census of India, District Census Handbook, Part A District Panchkula, Haryana.

The analysis of table 3 reveals that out of total sample population 79.87 percent had a bank account and debit card was issued to 64.67 percent out of which 76.27 percent were using

debit card. If we look at the number of accounts opened and debit card used, the percent is significantly low (49.32 percent). It may also be noted that 86.12 percent were having mobile phone, 56. 47 percent are having dual SIM and 23.13 percentage have used mobile for transaction and 27. 12 percent are aware that transaction is possible through mobile. It may also be noted that 76.32 percent sample population have shown interest in the use of mobile for online transactions.

It is interesting to note that internet has enabled rural masses to use social media for communication purposes as 95 percent of sample population has admitted that they use mobile for social media, out of which 28 percent have even visited internet cafe for various purposes. Further analysis of the data thus collected will give a clear picture on various indicators pertaining to social media, as well as time devoted per day for online browsing and chatting which may include browsing with friends or interaction to upgrade knowledge and skills.

It may also be noted that only 12.36 percent sample population use mobile for education such as browsing college websites, viewing results, examination date sheet etc. None of the respondent has reported that mobile was used for downloading and browsing information related to course content. However, some of them were aware that IGNOU course material is available online. It may also be noted that 88.76 percent of the sample population admitted that they may use internet for online learning and even encourage their children to use it for enhancing skill, education and personal development.

7. PROPOSED CDLCS AND CDVS

From the above analysis it is evident that the sample population have inclination to adapt to ICT, therefore it is realized that in order to fulfill the objective of digital India e-learning environment should be created at the grassroot level in order to encourage the rural populace to make use of internet for learning and upgrading skills. The facility, thus created can also be used for providing opportunities of higher education available at the grassroot level. Therefore, a hierarchy of Cluster Digital Learning Centers (CDLCs) at seven clusters and Central Digital Villages (CDVs) in each Panchyat (Fig-2) taking population, infrastructure facilities and locational advantage of the villages into consideration for providing higher education facilities is proposed in the study area. While identifying the (CDVs), the spatial distribution of the villages was also taken into consideration to minimize the day-to-day movement of stakeholders taking the availability of network facilities into consideration. These CDLCs and CDVs will provide suitable platform for stakeholders not only to take advantages of these facilities for improvement in their day to day life but also to strengthen their skills and knowledge through accessibility to education facilities including higher education. These CDLCs and CDVs will have connectivity with the higher level of centre in the hierarchy for updating information. A suitable mechanism will also be developed to monitor the functioning of these centers.

Thus, seven CDLCs and 20 VDCs have been suggested in the present model for digitization of study area and villages and hamlets to be attached with each CDVs are presented in Appendix-1 It also evident to note that there is considerable variation across the CDVs in terms of villages to be attached. This is mainly due to central location of a proposed CDV and its proximity to the villages with its vicinity. Therefore, CDV Koti will serve as many as 45 villages and CDV Sabilpur 3 villages only. It may also be noted that study area is sparsely populated and average population per village (hamlet) is 57.81 people and similarly number of households per village is also low which is 10.67. On the other hand 570 people are residing per sq km which is significantly low as compared to district average. The data also reflects a wide variation when the average house hold per village is analyzed. On an average 4.07 households reside per village in Koti CVDs and 56 households reside in Matour which has the highest number of households per village (hamlets).

Similarly, density of population per village is also very low and it is evident that minimum of 20.46 people reside on an average in the village in Bhoj Kothi. On the other hand Matour, Raipura and Palsara on an average 295, 265.90 and 207.44 people reside in each village respectively. It may also be noted that in eight Panchayats viz- a viz Koti, Balag, kothi,Kudana, Naita, Paunta, Tipra and Dabsu, average population per village is less than 50

persons. Relatively, sparse population distribution in the study area can be attributed to its geo-physical conditions, lack of basic amenities facilities and poor economic base, resulting in migration of villagers to the nearby town in search of livelihood and to have relatively good standard of living. Therefore, it is desirable to create e-learning environment at the grassroot level to provide better access to services including quality higher education through e-learning platform which will address the issue of migration to some extent.

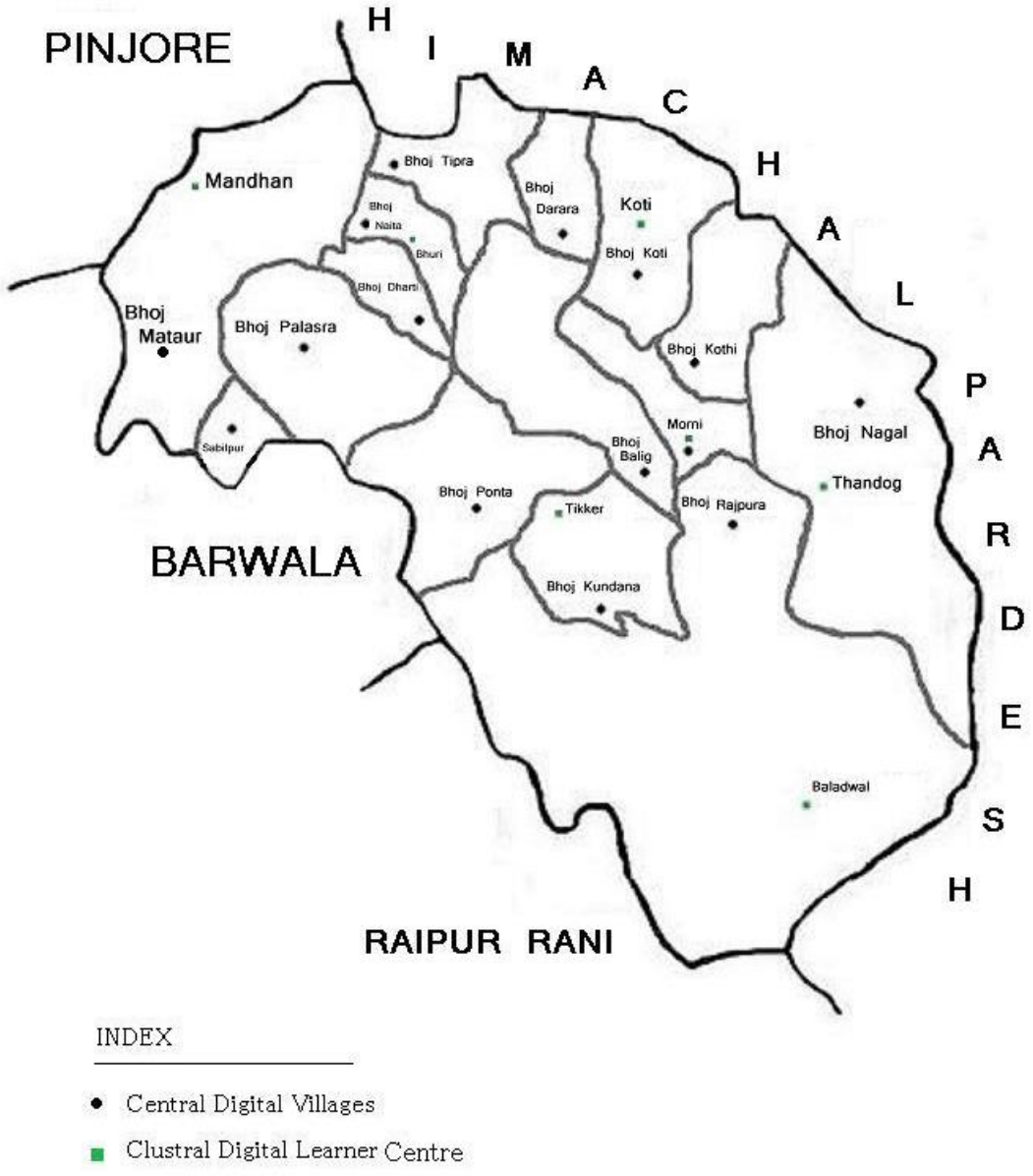

Figure 2: Proposed Central Digital Villages, Block Morni, Distirct Panchkula (Haryana, India)

8. SUGGESTIVE INTERVENTIONS

In order to establish CDVs at the identified locations (20) minimum infrastructural facilities are required to support the centers need to be created as per following details:

- Space may be identified with the help of the members of village committee and government officials responsible for undertaking developmental activities in the village. The space should preferably be in Government building such as Primary school, panchayat bhawan, community center etc. In case of non-availability of government building, a centrally located place may be identified. Efforts should be made to get the land and space free of cost preferably from the members of the village committees.
- Platform may be developed to set up mini computer lab which can accommodate 5-10 PCs with UPS and 2-3 printers. The printers may be inkjet/dot, as per requirement.
- PCs should have the required operating system and software as per the requirement, which may change from time to time.
- Each PC should have digital/ web camera for video/ web conferencing for individual interaction and learning purposes or interacting with the higher level centers.

Wired/Wireless Connectivity as per availability should also be provided with proper network/bandwidth speed so that smooth interaction may take place. The centers should have internet connectivity of more than one service provider, depending on the availability in the CDV.

- Proper internet speed is very important, otherwise, entire efforts will be jeopardized and the interest of the stakeholders will also dwindle and it may take time and energy to restore their faith.
- Considering the geophysical conditions proper arrangement for the power backup may also be provided and provision for Genset/Inverter should also be made.
- The centre should also be equipped with some smart mobile phone in order to make them functional round the clock.
- Proper specification of installing furniture and equipment may be given to maintain the uniformity of the VDCs.
- Arrangement for human resource may also be made for each CDLCs and VDCs for its operation and maintenance.
- Nominal charges may be fixed for use of facility and charges may vary depending on the usages hours. The amount thus collected may be used for its operation and maintenance.
- Higher level center (Cluster Digital Learning Center) should be created with additional facilities covering wider populace.
- These Centers may also be developed as e-learning centers of Open and Distance Learning program delivery mode which can be utilized by IGNOU and National Institute of Open Schooling (NIOS) for making its access in the remote and rural area. This intervention will also facilitate the centers to enhance its resources physical, human and financial.
- This network should be linked with block, district, state and central network, thus creating a hierarchy of e-learning.

9. CONCLUSION

In the present study an attempt has been made to assess the existing scenario of awareness about the e-learning environment at the grassroot level in the study area. Although Government of India is making sincere efforts to promote digitization at the grassroot level with the launch of its program of Digital India, yet a lot of efforts are required to achieve the target considering the varied topography and socio-economic status of the country. Awareness about the program is a major issue to be addressed, but creation of basic infrastructure at the grassroots level is equally important for the successful implementation of the program. In the present study an attempt was made to identify the locations which can be developed as Central Digital Villages and Cluster Digital Learning Centers to provide essential digital services to the villagers. Providing uniform internet accessibility with uniform speed is a distant reality. However, some pilot projects need to be developed to adopt this model and based on its success it can be applied in similar geophysical setting. This will certainly fulfill the dream of rural masses having all the services including higher education within their reach without time and resource constraints. For effective implementation of this model Morni block can be taken as a case study with the intervention of government agencies and can also be replicated elsewhere.

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Appendix 1: Proposed CDVs

Name of CDVs	House Hold with Average	Population with Average	Villages/ Hamlets to be Covered
Baladwala	-	-	Bariwala, Dadyon Rampur, Sherjavan, Sokha, Thapalpur, Turo Vas-I, Turo Vas-Ii, Turo Vas-Iii (09)
Bhoj Koti	183 (4.07)	1008 (22.40)	Aalay, Balet, Barva, Bain, Behnni, Bhadar, Bhalyo, Koti, Chakli, Chakoh, Chhamla, Chpoli, Dalana, Damasha, Darda, Dhardi, Gadyana, Bahni, Dera, Ghati, Jabbal, Jamnia, Kangar, Karag, Kathi, Khaghtua, Kharak, Kharkdera, Khati, Kohlyon, Kudal, Larog, Lohari, Mahmal Majhar, Paroli, Runja, Sanog, Solta, Sonch, Songthal, Thar, Damog, Tikkar,Bijlang (45)
Bhoj Balag	113 (7.06)	577 (36.06)	Balag, Chakla, Chanaidi, Daar, Dayora,Thalapur, Gajhan-I, Gajhan-Ii, Ghat, Jodi Bagra, Kharog, Khech, Madal,Nargwari, Nathan, Rasun (16)
Bhoj Dharti	240 (12.63)	1330 (70.00)	Badiwala, Banolu, Brach, Behlon, Bhangar, Bhoj Dharti, Bhudi, Umrri, Dapana, Kadila,Kattal, Rug, Silion, Silli, Sirmda, Thadi, Thanna, Tikkri, Urdyon (19)
Bhoj Jabyal	281 (14.05)	1361 (68.05)	Bagh, Bhallyon, Bhoj Jabyal, Chaila, Chamkha, Chhoi, Jabyal, Kajar, Khunghatal, Kishanpura, Kol Katal, Kongta, Mandi, Manjali, Morni, Paplok Kayar, Ramsar, Sanoi, Sherla, Jakhron, Tapda (20)
Bhoj Kothi	117 (4.50)	532 (20.46)	Amabri, Badisher, Baluri, Barod, Bijyon, Chakaly, Chhoi, Chilla, Dakar, Dall, Dandoli, Devari, Dhandyon, Bari Sher, Jamanyar, Jhanjar, Johad, Khanyo, Kothi, Paprola, Pathroti, Pyog, Runnja, Sukhbayen, Sunn, Tapar (26)
Bhoj Kudana	247 (8.82)	1334 (47.64)	Baghwali, Barat, Babarwali, Bhamnnol, Bhiyula, Bhogpur, Bhoj Kudana, Bounta, Chella, Dandyali, Dera Tibbi, Dharkhet, Dharwala, Dighra, Duh, Dundal, Gabla, Jhanduwala, Khangri, Kudana, Lad, Loharo, Marad, Mathana, Mau, Meharwala, Samrotha, Tikar (28)
Bhoj Matour	622 (56.55)	3234 (294)	Bhoj Matour, Chadhi, Chodhri Ka Vas, Gabla Vas, Jakhari, Jansu, Majri, Mandhna, Panditon Ka Vas, Sire Ka Vas, Thathr (11)
Bhoj Naita	111 (6.94)	616 (38.50)	Ammdi, Bachro, Bagh, Naita, Bidhana, Dabsu, Johari, Kamaran, Katal, Kharta, Marog, Palasi, Rawari, Rug, Sainda, Samral (16)
Bhoj Ponta	211 (8.12)	1186 (45.62)	Baiska, Bhana Kharun, Banswala, Belwali, Beriwala, Bhogpur, Bhundri, Cheedwala, Chhata Tikkar, Dabor, Dabrawala, Dahk Wala, Dharda, Gumjpur, Johariwala, Katlli, Khetda, Kumbhwala, Lasawa, Masyun, Nakhar, Nikwala, Ponta, Sher Gujra, Thakurduwara, Tibbi (26)
Bhoj Rajpura	458 (45.80)	2659 (265.90)	Bhoj Rajpura, Bhood Patiya, Dharmpur, Beed, Dunga, Jiya, Jouli, Mohli Wala,Ranna, Thathar-I, Thathar-Ii (10)
Bhoj Tipra	163 (9.59)	994 (58.47)	Bhaputi Rug, Bherely, Bho, Bhoj Tipra, Chaplana, Dhaman, Harsho, Jaliram Tipra, Jawala Tipra, Kainan, Katly, Kharuni, Rewadi, Sarandi, Silyon, Sog, Sug (17)
Dabsu & Bhoj Darara	141 (4.86)	843 (29.07)	Bajiriwala, Batoli, Bella, Dabsu, Darla Heel, Deendharla, Dera, Dharla, Dudhala, Gagyana, Gandlam, Ghata, Gularwali, Harta, Jabal, Jamla, Jullu, Kaderan, Kamradi, Katal, Kheel, Lohadi, Moddi, Neemwala, Serta, Silly, Singhwala, Thediwala, Tunn (29)

Name of CDVs	House Hold with Average	Population with Average	Villages/ Hamlets to be Covered
Dudh Garh	-	-	Dadwali, Dudh Garh, Farojpur, Jaspur, Kadiyani, Khetparali, Upprali (7)
Plasra	342 (38.00)	1867 (207.44)	Amboa, Andarwala, Bag, Inderawala, Khairi, Khopar, Led, Nagnasu, Plasra (9)
Raji Tikri & Nagal	634 (25.26)	3325 (133.00)	Badoli, Bagga, Bhoj Nagal, Bhood, Bunga, Chadyana, Chayoga, Dalothi, Dayoda, Degoh, Dekari, Dera, Dhanir, Hara Ghat, Katli, Kayar, Khawba, Lait, Manjhyon, Paploh, Raji Tikri, Sapar, Taluri, Thandut, Thar(25)
Sabilpur	76 (25.33)	464 (154.67)	Balouti, Muwas, Sabilpur (03)
Thandog	-	-	Badiyal, Bagh, Balon, Bhakni, Chain, Chalyonparla-Ii, Chatia, Chhandora Kheel, Chhandu Kayar, Chod, Cholyon- Parla-I, Dhar, Gar Sehat, Gawahi, Jayog, Kohlan, Kunna, Mahroli, Rait, Samlog,Shalyon Redraha, Thaili, Thana,Thandog (24)
Thapli	-	-	Bairla, Balu, Barun, Bharal, Bhud, Dagrana, Jonpur, Kumbhwala, Mataur, Nadawala, Thapli, Thapli Sirvan, Thapli Valku (13)
Uttaron	-	-	Aadayon, Badara, Bhinvar, Chanianna, Chor, Ghat Bagra, Hathia, Kamdol, Katiana, Kauyar,Salyon,Saryon, Telyon, Thehri, Uttaron(15)
Total	3939 (10.67)	21330 (57.81)	369

Note: Thandog, Thapli, Uttaron, Budhgarh and Balawala were notified after 2011 census.

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