

Inclusion of Information & Communication Technologies in digital Education in Lahaul & Spiti, Himachal Pradesh

Alok Nikhil Jha¹, Parul Gulati²

¹*Assistant Professor, Cluster Innovation Centre, University of Delhi, India*

²*Assistant Professor, Cluster Innovation Centre, University of Delhi, India*

ABSTRACT: *This paper presents evolutionary background of education segment in Lahaul & Spiti District of Himachal Pradesh, India. The versatile demography of the Lahaul & Spiti district is severely affected by weather conditions due to which the education segment is compromised. In this paper we have studied the current situation in the domain and have identified improvement opportunities. We have proposed a low cost Information & Communication Technology framework to improve the accessibility of Education and move towards electronic education (e-education) & digital learning. The paper concludes the effectiveness of the proposed model and its economical implementation for a sustainable system of education.*

Keywords: *Education in Lahaul & Spiti, ICT in Education, Technology Framework, Weather conditions.*

I. INTRODUCTION

Himachal Pradesh(HP) is one of the Northern state of India bordered by Jammu & Kashmir in its north and Uttar Pradesh & Haryana in southern end with Punjab in west & south west end and touches International boundary of China (Tibet) on eastern side. The total percentage of rural population is 91% of the total population residing in 17,495 inhabited villages. Himachal Pradesh has the highest percentage of rural population among all the States of the country. Since 2011 census there is almost a 13% growth in population which is 68.65 lakhs compared to figure of 60.78 Lakh in 2001 census as shown in Table 1, which presents the district wise population in the state. According to the 2011 census Lahaul and Spiti district has a population of 31,528; this gives it a ranking of 638th in India (out of a total of 640). Its population growth rate over the decade 2001-2011 has minimized by 5.1%.

Table 1: District wise Population in Himachal Pradesh

| District | 2001 Census Population | | 2011 Census Population | | Per cent Decadal rate of growth | Change in per cent share over the decade |
|---------------------|------------------------|----------------|------------------------|----------------|---------------------------------|--|
| | Total | Per cent share | Total | Per cent share | | |
| Bilaspur | 340885 | 5.61 | 382056 | 5.57 | 12.08 | (-)0.04 |
| Chamba | 460887 | 7.58 | 515844 | 7.57 | 11.92 | (-)0.01 |
| Hamirpur | 412700 | 6.79 | 454293 | 6.63 | 10.08 | (-)0.16 |
| Kangra | 1339030 | 22.03 | 1507223 | 21.98 | 12.56 | (-)0.05 |
| Kinnaur | 78334 | 1.29 | 84298 | 1.23 | 7.61 | (-)0.06 |
| Kullu | 381571 | 6.28 | 437474 | 6.38 | 14.65 | (+)0.10 |
| Lahaul-Spiti | 33224 | 0.55 | 31528 | 0.46 | (-)5.10 | (-)0.09 |
| Mandi | 901344 | 14.83 | 999518 | 14.58 | 10.89 | (-)0.25 |
| Shimla | 722502 | 11.89 | 813384 | 11.86 | 12.58 | (-)0.03 |
| Sirmaur | 458593 | 7.55 | 530164 | 7.73 | 15.61 | (+)0.18 |
| Solan | 500557 | 8.24 | 576670 | 8.41 | 15.21 | (+)0.17 |
| Una | 448273 | 7.38 | 521057 | 7.60 | 16.24 | (+)0.22 |

| | | | | | | |
|----------|---------|--------|---------|--------|-------|---|
| HP total | 6077900 | 100.00 | 6856509 | 100.00 | 12.81 | — |
|----------|---------|--------|---------|--------|-------|---|

The state has 12 districts; In terms of Area, Hamirpur is the smallest district of the Himachal Pradesh which covers an area of 1,118 sq. kilometers (2.01%) and Lahaul & Spiti has the largest area of 13,835 sq. kilometres (24.85%). Table 2 depicts the demographic profile of the Lahaul and Spiti district. The literacy rate in the Himachal state has been satisfactory and has risen up to more than 90% according to the 2011 census. The literacy rate in females, however is low as compared to the other gender and has scope of increment as per the information available in reports. However Lahaul and Spiti district showed a very small improvement of about 4% from 2001 to 2011 on the literacy front and has a sex ratio of 903 females for every 1000 males as shown in Table 2 & Table 3. The state follows regular Indian education pattern comprising schools at various levels that include Primary School, Middle School, Higher Secondary School & Senior Secondary school i.e. the notion of 5+3+2+2 as shown in Table 4.

Table 2: Demographic Profile of Lahaul and Spiti District

| Description | 2001 | 2011 |
|---|--------|--------|
| Actual Population | 33,224 | 31,528 |
| Male | 18,441 | 16,588 |
| Female | 14,783 | 14,976 |
| Population Growth | 6.17% | -5.00% |
| Area Sq. Km | 13,841 | 13,841 |
| Density/km ² | 2 | 2 |
| Proportion to Himachal Pradesh Population | 0.55% | 0.46% |
| Sex Ratio (Per 1000) | 802 | 903 |
| Child Sex Ratio (0-6 Age) | 961 | 1033 |
| Total Child Population (0-6 Age) | 3,664 | 3,125 |
| Male Population (0-6 Age) | 1,868 | 1,537 |
| Female Population (0-6 Age) | 1,796 | 1,588 |

Table 3: District wise and Gender wise Literacy rate in Himachal Pradesh

| District | 2001 Census literacy percentage | | | | 2011 Census literacy percentage | | | |
|---------------------------|---------------------------------|--------------|--------------|--------------|---------------------------------|--------------|--------------|--------------|
| | Persons | Male | Female | Gender Gap | Persons | Male | Female | Gender Gap |
| Bilaspur | 77.76 | 86.04 | 69.55 | 16.49 | 85.87 | 92.39 | 78.70 | 13.49 |
| Chamba | 62.91 | 76.41 | 48.85 | 27.56 | 73.19 | 84.19 | 62.14 | 22.05 |
| Hamirpur | 82.56 | 90.15 | 75.70 | 15.35 | 89.01 | 95.28 | 83.44 | 11.84 |
| Kangra | 80.08 | 87.54 | 73.01 | 14.53 | 86.49 | 92.55 | 80.82 | 11.73 |
| Kinnaur | 72.20 | 84.30 | 64.40 | 19.90 | 80.77 | 88.37 | 71.34 | 17.03 |
| Kullu | 72.90 | 83.98 | 60.88 | 23.10 | 80.14 | 88.80 | 71.01 | 17.79 |
| Lahaul & Spiti | 73.10 | 82.82 | 60.70 | 22.12 | 77.24 | 86.97 | 66.50 | 20.47 |
| Mandi | 75.24 | 85.94 | 64.82 | 21.12 | 82.81 | 91.51 | 74.33 | 17.18 |
| Shimla | 79.12 | 87.19 | 70.07 | 17.12 | 84.55 | 90.73 | 77.80 | 12.93 |
| Sirmaur | 70.39 | 79.36 | 60.37 | 18.99 | 79.98 | 86.76 | 72.55 | 14.21 |
| Solan | 76.56 | 84.75 | 66.89 | 17.86 | 85.02 | 91.19 | 78.02 | 13.17 |
| Una | 80.37 | 87.73 | 73.18 | 14.55 | 87.23 | 92.75 | 81.67 | 11.08 |
| HP total | 76.48 | 85.35 | 67.42 | 17.93 | 83.78 | 90.83 | 76.60 | 14.23 |

Table 4: Education profile of Lahaul and Spiti

| Education | 2011 Census |
|------------------------------------|--------------------------|
| Primary Schools | 205 |
| Middle Schools | 33 |
| High Schools/Sr Sec Schools | 29 |
| Govt Degree College | 1 at Kukumseri (Udaipur) |
| Kendriya Vidyalaya (KVS) | 1 at Keylong |
| DIET | 1 at Tandi |
| University | Nil |

Lahaul & Spiti is a tribal district of Himachal Pradesh having several small villages and is amongst the remotest and most inaccessible areas. Due to demography of the area, which is surrounded by Himalayas and the temperature fall in winter goes in negative; affecting the district badly with (Table 5) snowfalls, landslides and flash floods thereby making it worse for the residents of the district to access basic services. As per the Government reports, the district is considered virtually cut-off from the Himachal Pradesh during the winter season for more than 6 months i.e. Oct/Nov till Apr/May. The winter period is also known as cut-off period where in most of the regular activities are stalled like agriculture, animal husbandry, Primary Health Care centers, Communication systems, road transportation. Due to bad weather conditions all the basic amenities of life are severely affected. The only presence in Information Technology has been the District Centre of National Informatics Centre, Ministry of Communication & Information Technology. The Government has embodied the facilities for e-governance with IT enablement in the existing systems e.g. Integrated Community Services Centres (iCOSC), Land deed registration (HIMRIS), e-Payroll for salary accounting, e-Udaan for helicopter booking. The facilities are more of Government centric for having a proper control on efficient management for specific set of parameters.

One of the major problems faced by the inhabitants of this district is in the education segment especially during the winter block period, during which it becomes extremely difficult to gain access to education. As informed by Centre Resource Co-coordinator, who himself is a teacher, Schools do operate in winters, Students and teachers travel several kilometers to school but parents are reluctant to send their wards due to harsh weather conditions. Schools also provide facilities like mid-day meal, books, pens & copies. It was also stated that female education is improving when compared with male literacy rate in the district.

In view of the above facts it is vital to understand that there is a strong need to have a collaborated system of education wherein students and teachers from different villages, towns and cities can interact with each other and enhance the traditional process of education system. The lack of Information & Communication Technology limits the student's development process.

This paper tries to fill this lacuna by providing a low cost Information & Communication Technology framework to improve the accessibility of Education and move towards electronic education (e-education) & digital learning. The idea is to enhance the education level of the people living in these areas by providing a coherent system of education which maintains a balance between accessibility and sustainability. The framework will provide ICT enabled solutions to the problem in accessibility to get education which will be both time and cost effective and will sustain over a longer period of time.

II. CHALLENGES

With the given information, system looks good but there is a lack of properly valued education among children. Teachers are trained from time to time but due to lack of infrastructure availability, the schools remain localized to the knowledge of teachers only. There is no connectivity from the outside world. The students are left behind in terms of extracurricular learning, skill set development &

overall exposure and interaction with outside world and the scenario becomes more critical in the winter season i.e. Oct/Nov - Mar/Apr period.

The cultural structure of the district embodies the layout of the education with schools and Monastery. The Monasteries are mostly run by self-funded trusts or funded by Departments of Tribal Affairs at state level & national level; however there is lack of proper Communication media in educating in schools or Buddhist studies remains persistent. As per the Government reports, the involvement of domestic labor is quite negligible and almost all skilled and semi-skilled laborers are imported from outside the district, therefore there is a strong need for Skill based education and education which works in the overall development of Student's endeavor as well as the society's, such a system would become significant from the inclusion of information & Communication technologies. The evaluation parameters for students in terms of a correct learning curve would need significant improvement and will be possible by improving the traditional classroom teaching & collaborating with the outside world.

III. PROPOSED FRAMEWORK

The idea is to have Information Communication Technology solution for stated issues by designing a cost effective infrastructure with features of simplified implementation and robustness. Considering the primary issues of quality education and the problems in the accessibility there is a need to develop a collaborative model with the skill development focused institutions. The perspective education model would be then designated to deliver the education in an interactive & collaborative way so as to facilitate the learners with the contents and make a platform which is equally beneficial and reachable to all the learners. It comprises of a Wireless router with higher range of coverage which would be placed in the village or a place connecting two villages.

With current systems specifications, we can reach a radius of more than 40 KMs in a range with good stability in highly cold situations. The wireless device (router) would be powered by Battery or electricity or solar powered cell. The aim is to create a small Intranet of systems in that range. The setup would consist of a low cost system having server configuration which would facilitate the communication with the wireless device and organize communication with the users. The users or students would carry a tablet device, we can account on Akaash Tablet which government has planned to distribute, or else we can arrange a low cost tablet device issued by administration, which would be wirelessly connected with the router and can communicate with teacher & other students in that radius of coverage via server. The framework will have a Sip Server which provides flexibility of incorporating software based Audio Video Chat Engine and can easily be scaled to connect to ISDN lines or traditional phone lines. It means that with Sip Server, we can scale the system to connect to a Phone Line and a Softphone application embedded in computer or tablet or a mobile device which would then connect to other soft phones via the Sip Server connectivity and wireless router as shown in fig. 1.

A small Local Network between other systems can easily be fostered & extended using Ad-Hoc mechanism to connect to other intranets i.e. locally to wireless systems in other village and can be scaled up to a larger domain. This, hence, enables in Cross Collaboration among teachers and students of different villages and thereby assists in cross pollination of knowledge and skills.



Figure 1: Layout of Architecture

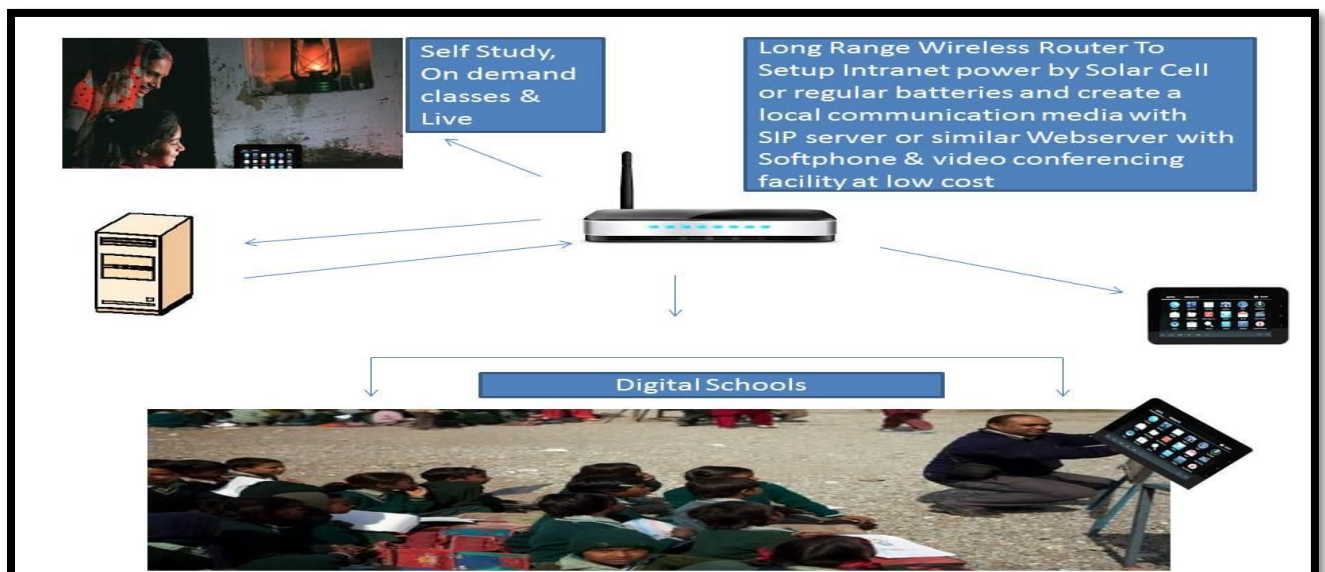


Figure 2: Implementation Architecture

Collaboration feature plays in an important role in development of Quality education. The Collaboration can be glorified as a mechanism to inculcate knowledge & learning among teachers, students and common people. This collaborative teaching model assists the local population in various domains that would be helpful in providing the information about techniques of effective farming, weather forecasting, education, healthcare facilities etc for everyone. The Skill based education should be another area which can be used to train the students, learners & youths at grass root level on technical and commercial trainings and other uncountable aspects. The Skill based collaborative training would be aligned in a way to assist the local population & motivate them and their children to learn by majorly identifying the potential employability activities. Interactive collaborative sessions can be setup with experts and on demand, mode of content learning would be available on the systems of users/learners and students. The implemented model as in fig.2 would carry a value system and measurement parameters to evaluate the involvement of the learners of all categories in the system in place.

IV. CONCLUSION

With the proposed framework, there are chances of improvement of standards of education in Lahaul & Spiti also it is applicable to any demography where physical setup is difficult. This could be

achieved only by exploring and creating a virtual platform in which the possibility of collaborative base for enablement focusing on education segment with microscopic & macroscopic perspective of quality education. This model would be effective as it provides window of involvement & interaction to the learners with alternative interfaces. The proposed infrastructure is a cost effective & a sustainable method which can be easily scaled up to a wider area by following the multiple servers with Ad-Hoc technology of expanding the intranet to larger scale.

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