

Information technology implementation for educational development of rural India – A review

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Abstract : India as a developing country is on its path of revolution in every aspect. But the poor economy and low per capita income of families in India affects the quality of education. As India comprises 70% of rural area it is necessary to develop it so as to develop India as a whole. In this context, special concern is given to how Information Technology has proven beneficial in educational development of rural India also we provide in this chapter, an overview of educational progress of India over decades, facilities for rural children, projects undertaken by government to implement educational surveys and initiative measures. This paper concerns with the availability of education through Information Technology in rural India.

Keywords: Education, ICT, Rural Development.

I. Introduction

The development of a country primarily depends on its education system. Literacy is another proper indicator of economic development. In case of India, it is still developing nation since its education system lacks behind than many other developed nations, it is important that we must understand the need of education and its role in carving future of Indian youths. There are many areas which can be studied regarding development of education system in India.

Information Technology plays a very vital role in developing the rural education system in India as well as it ensures awareness among the rural population about importance of education. Indian education system has got contribution from both public as well as private sector; it is controlled by Central government as well as state government [1].

The following points are to be discussed in the paper with reference to “IT implementation for educational development of rural India”:

- A. Overview of Indian education system.
- B. Problems faced by students in rural area.
- C. Adult literacy.
- D. Women education.
- E. ICT for quality of education.
- F. Advanced technology and tools.
- G. Approaches:
 - (i) Village knowledge centers.
 - (ii) E-learning centers.
 - (iii) Open universities and distance learning.
 - (iv) Increased use of mobile technology.
 - (v) Teachers and online learning activities.

India is on path of being a developed nation yet so far and beyond many other nations but with above approaches and various projects undertaken by our government, it will soon emerge and rise above as a developed nation.

It seems to be paradoxical that modern information technology (IT), associated in our minds with developed country markets and capital-intensive methods of production, has any relevance for a country where many millions still lack basic needs [2].

2. Overview of Indian education system

The state and district administrations generally manage the school and education system in India. In last couple of decades many education supporting institutions came into existence, such as:

- District Primary Education Programme (DPEP)
- Sarva Shiksha Abhiyan (SSA)

- State Implementation Societies
- State Councils of Educational Research and Training (SCERT)
- State Institutes of Educational Management and Training (SIEMAT)
- District Institutes of Education and Training (DIET)
- Block Resource Centers (BRC)
- Cluster Resource Centers (CRC)
- Village Education Committees (VEC), as well as an increased involvement of NGOs, that have acted as a counterweight to what is often an overly bureaucratic and hierarchical administration.

There are broadly four stages of school education in India namely: elementary, secondary education (SE) and higher secondary education (HSE) [3]. Since there is great cultural and linguistic diversity in India schools may be of different types on the basis of course and medium offered like English medium, Semi-English medium, Hindi medium, Marathi medium, Urdu medium, etc. These schools are run by either government organizations or by some private bodies and these private schools may be aided or unaided by government. There are some schools which are not recognized by our government but they do offer education.

II. Problems Faced By Students In Rural Area.

There are many barriers faced by village students however there are some common barriers which if solved providing education would be much more relevant and easier to implement.

2.1 Faculty

Adequate teachers are not present to deliver education; the main reason behind this is low wages. Since low income is paid to the village school teachers, people are not willing to teach in rural schools and this leads to poor quality education and teachers may pay less attention to the students. Many times a single teacher teaches all the offered subjects to a particular class.

2.2 Infrastructure

Village schools do not have proper infrastructure, adequate classrooms are not available and most of the time the KG students study in open grounds or beneath some old big tree in village. Sometimes students of different class have to share a single class. Also absence of toilets is a big issue. Girls and boys need to share a single toilet which is used even by the teaching staff in some cases.

2.3 Lack of transport facilities and study material

Extremely backward villages do not have their own schools and hence they need to educate their children in nearby villages or cities but due to lack of transport facilities children cannot travel far to come to school. Also children don't have proper textbooks of their current course.

III. Adult Literacy

India has a total literacy rate of 74.64% according to "Census of India 2011, Office of Registrar General of India", male literacy rate of 82.14% and female literacy rate of 65.46% according to the 2011 census. According to the UNESCO's Education for All (EFA) Global Monitoring Report 2011, India was home to 283,105,000 illiterates (aged 15 and over) in the year 2008, out of the 795,805,000 adult illiterates around the world. Thus India accounts for 35.57 % of the global adult illiterate population (aged 15 and over), making it home to the largest population of illiterates [4]. Hence if we only concentrate towards children education, the problem of illiteracy will still prevail among the adults of our country. Since the adult population has to rely on work for their living it is impossible for them to attain classes hence information technology provides a great means to solve this problem. This problem can be solved by proposed tablet based educational system, called EduPad. It can considerably reduce the literacy problem in an interactive way than the conventional class room system [5]. Internet can be a great source of education for adults; through the video tutorials they can learn many things, internet is a mine of many things. We can extract data in any form from internet whether as text, images, audio or videos.

IV. Women Education

Our population is growing day by day which is a serious issue but this problem can be solved by adult literacy especially education among women. Women's studies should be promoted as a part of various courses and educational institutions should encourage taking up active programs implemented using information technology to further women's development. Social awareness programs related to female education are always launched at different places but despite of that literacy rate of females in India always lag behind than men. In

1995, 62.3% of the female population in India was illiterate as compared to the 34.5% of males (UNESCO, 1995); In rural areas, the illiteracy rate is at least 67% for women aged 15 and above, and ranges from 80% to 90% for women aged 25 to 59 years [6]. Incomplete education is same as being not educated at all, maximum females in rural India are school dropouts because of various reasons such as

- Early marriage of girls.
- Financial inconvenience in a family where parents don't want to spend money on their daughter's education.
- Male dominated families which do not allow females to study as they think that the only purpose of girls is to cook and look after household chores and children.
- Possessiveness of parents towards girl child, who think that it's not safe to enroll their daughters in schools and colleges, etc.

In order to attain total literacy in India it is necessary to overcome all these barriers and apply special concern towards women education especially in rural areas.

V. ICT For Quality Education.

Information and Communication Technology (ICT) is a development strategy for developed as well as developing nations. It can bring out great social transformations through access to people and creating awareness. ICT can provide great opportunities to poor people by letting them access markets, health, and education. ICT is not related with only item like the internet, computer or telecommunications but it is a convergence of different electronic tools that facilitate the functions of information processing and communication, including transmission and display [7]. ICT can be effectively used for educational development.

Information technology (IT) is mine to technological things and their application but when it comes to improvement of education quality it cannot help while Communication technology had achieved many developments. The hardware, software, the methods used in acquiring, storing, processing and displaying data and information is collectively known as Information Technology (IT), Hardware, know how, programs and the methods used in ensuring that message is transmitted correctly, efficiently and cost effectively are collectively known as Communication Technology (CT), IT and CT as a combination gave birth to ICT, together they are more beneficial than one alone and hence development in both the fields is necessary [8]. Many students are not able to attain schools and colleges due to some personal barriers, ICT help them with distance education also it reduces the cost of teaching by reducing the required number of teachers.

5.1 ICT Tools

ICT tools are efficiently used for imparting knowledge, tools such as Television, Mobile phone, Laptops, Tablets, Radio, Internet, Computer and PCs are effectively used for this purpose. Certain ICT tools like laptops, PCs, mobile phones, and PDAs have their own implication in Education. These devices can be used in imparting education and training for teachers and students. IGNOU still uses radio for pedagogical practices in India [9]. ICT is not for developing a educator's skill instead it is useful in creating a suitable learning environment for students. ICTs include fixed-line telephony, mobile telephony, newspapers, radio, television, radio trunking, very small aperture terminal (VSAT), computer, and internet must be accessible to rural public as per their demand.

5.2 ICT and teachers Training

There are many barriers and challenges in present education system, ICT is a tool which can help remove those barriers but to implement it for imparting education the teachers must be comfortable with ICT tools and hence training teachers and continuing education in a convenient manner for them is necessary for its proper implementation. Also there are frequent shifts in these technologies so it is necessary for teachers and students to understand these changes to impose these techniques [10].

ICT delivers training and teaching practices as well. To enable distance learning program driven by ICT the teachers must be given an opportunity to understand the technology first and they must acquire new knowledge to be promoted. Computer training programmes must be promoted for teachers. Many countries are recognizing the use of ICT for teachers training like south Asian countries and Intel tech teacher training programmes are running across India, Pakistan and Sri Lanka, Microsoft Shiksha in India; and several other initiatives in Nepal and Bhutan are focused on using ICTs for training teachers [9].

Training sessions must be held at district level and for ease at least one teacher from each school must be sent for training to get certain basic knowledge about ICT and its application in school curriculum, the training lectures must be issued by teachers or trainers who are well known with implementation of ICT and its application. Visualiser can be easily operated and used by teachers which is an cost effective, easy to use and

time saving tool for education in schools and colleges, It decreases teacher's preparation time, increases interactivity with students and student concentration in complex issues [11].

VI. Advanced Technology And Tools.

Rural area is still far behind in using technologies such as e-learning, the only way of teaching there is using a blackboard and chalk but in many places modern path of using communication technologies is adopted like televisions and radios. In India (2004), Edusat was launched to support education, ISRO launched EDUSAT successfully for presenting the education videos; Currently, due to advancement in internet technologies with respect to speed and high coverage's, advanced internet technologies and tools like Virtualization, Cloud technologies and Moodle can also be implemented in the rural education system where students can get on-demand services at anytime and anywhere [12]. These technologies can be helpful in providing education.

6.1 Cloud Computing

Cloud computing not being a hardware technology offers various ways for educational purpose. Cloud computing allows organizations to increase computing capacity or add computing capabilities without needing to invest in infrastructure or train additional personnel, it acts as an off-site, online server and offers a robust and flexible way to store important data or programs and to save money without requiring additional service personnel or physical storage technology while this system was piloted in 2008 for 192 schools around the capital city and the Ministry of Education is considering expanding the service to reach an additional 350 schools [13].

6.2 Moodle

Modular Object-Oriented Dynamic Learning Environment (Moodle) is a online learning service for courses that are internet based, it also provides educational websites. It has features such as: Assignment submission, Discussion forum, Files download, Grading, Moodle instant messages, on-line calendar, on-line news and announcement, on-line quiz and Wiki; it has many tools to enhance students and teachers' experience in a course, such as: Assignments, Chats, Choices, Databases Forums, Glossaries Lessons, Quizzes Resources, SCORM Surveys and Wikis [14].

6.3 Wikis

Wikis provide vast information and it can be edited by anyone thus providing opportunity to everyone for placing their knowledge which can then be available to any person using it.

Wikis are generally open sources and hence a cheaper way, wiki's writing is easy to learn and incorporate with technical support available online. It has access control to restrict unauthorized users. Wikis can be accessed from any browser and anywhere we want. It is a great teaching tool provided that it must be used wisely.

6.4 Online Media

Online media also provide a way to implement modern ways to teach, students learn better by observation and visual presentation than hearing only; short videos which are available online help to understand things more clearly. For example: The working of technical instruments and tools could be understood more easily through videos rather than written text depicting their working.

VII. Approaches

7.1 Village knowledge centers.

Village knowledge centers should be established in rural areas one like "The M.S. Swaminathan Research Foundation" (MSSRF) is a non-profit organization founded by the noted Indian Food and Agricultural scientist, Dr. M.S. Swaminathan, in 1998, the foundation started the "Village Knowledge Centers" project [15]. Some conditions are set by them like the villagers should provide a room which will be open to all the community members and the cost of electricity must be funded by the village. Such centers solve the problem of adult literacy and knowledge regarding agriculture, education, social awareness, health awareness can be provided.

7.2 E-learning centers.

An E-learning centre is a place where the people are taught how to read and write by using visual and audio content, the ICT based E-Learning system play a vital role in enhancing on line education for social and economic change in rural society [16]. Such way of issuing education can be delivered anywhere and anytime possible and hence it is a flexible way of learning.

7.3 Open universities and distance learning: Students are many times unable to attain schools due to social or physical barriers. Social barriers include early marriage of females, in our society girls are generally not allowed to study after marriage which leads to illiteracy while physical barriers include unavailability of school nearby and due to poor transport facilities, one cannot attain schools. The concept of open universities and distance learning solve this problem. The flexibility and innovativeness of the open learning system are particularly suited to the diverse requirements of the citizens of our country, including those who had joined the vocational stream [17].

7.4 Increased use of mobile technology: The increasing trend of using androids and smart phones is increasing rapidly, various mobile applications are available that promote education like e-books which can be maintained in our mobile and one can read it anytime, anywhere. Some mobile initiatives enable English learning also but due to small screen size it is many times not feasible to use mobile technology also there is a limit on storage space for data, these problems limit the use of mobile technologies for implementing education.

7.5 Online learning activities: Various websites and portals are available where teachers can share information and activities related to imparting education with each others, Government of India is developing new portals and websites to initiate these ideas on practical basis such that teachers can network and thus transfer the knowledge further. It enables the teachers to share their experiences with each other.

VIII. Conclusion

We had enlightened educational conditions and environment of rural India. There are various areas in which we must provide attention to enhance education in India. Despite of providing facilities for quality education, low attendance of students as well as teachers is issue of concern. Government is providing scholarships and is increasing access to education of girls and students of special category like SC, ST, VJ, NT (A, B, C) with help of Information Technology by providing online scholarship forms, minority scholarships, etc. Also free primary education is provided in government schools to initiate imparting education among rural poor children. ICT had helped in imparting quality education to a great extent in India; it had also eased the problem of training teachers and teaching them about new technologies and tools to implement education in a broader sense. Advanced technological tools are developed a lot in every aspect within last decade; their implementation had increased to a greater extent in imparting knowledge. Internet had become a great source of knowledge for every student of any age group. Tools such as wikis is a home to learners as well as teachers, it may be changed or edited by anyone who knows better thus it provides flexibility. Using Information Technology India had developed its educational system to higher level but it is still far behind in many aspects, these areas can be covered by further implementing IT for the sake of educational development of rural India.

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