

A Scenario on the role of ICT in Governance And Education System

¹Deepa Mehta, ²Suman Kasnia

¹Department of Technical Education, G.P.N. C.
Sirsa, Haryana, India
deepa.mehta15@gmail.com

²Department of Computer Science, S.S.G.Collage
Sirsa, Haryana, India
sumankasnia@gmail.com

Abstract

Information and Communication Technology (ICT) have become common place entities in all aspects of life. Across the past twenty years the use of ICT has fundamentally changed the practices and procedures of nearly all forms of endeavor within business and governance. Within education, ICT has begun to have a presence but the impact has not been as extensive as in other fields. Education is a very socially oriented activity and quality education has increased. The use of ICT in education lends itself to more student-centered learning. India has made impressive strides in the application of ICT in recent years and this is reflected in its vibrant and fast growing economy. Here, we will find out the awareness about the ICT among people and the impact of IT on students. Highlight the factors prevents reaping the benefits of ICTs and technological innovations to access them. Also identifies the bottlenecks in system.

Keywords: *Higher Education, women empowerment, judicial reform, poverty alleviation, e-learning.*

1. Introduction

For developing countries ICTs have the potential for increasing access to and improving the relevance and quality of education. It thus represents a potentially equalizing strategy for developing countries. ICTs greatly facilitate the acquisition and absorption of knowledge, offering developing countries unprecedented opportunities to enhance educational systems, improve policy formulation and execution, and widen the range of opportunities for business and the poor. One of the greatest hardships endured by the poor, and by many others, who live in the poorest countries, is their sense of isolation. The new communications technologies promise to reduce that sense of isolation, and to open access to knowledge in ways unimaginable not long ago. ICT is diverse set of technological tools and resources used to communicate, and to create, disseminate, store, and manage information. These technologies include computers, the Internet, broadcasting technologies (radio and television), and telephony. ICTs are more than just these technologies; older technologies such as the telephone, radio and television, although now given less attention. Moreover, different technologies are typically used in combination rather than as the sole delivery mechanism. For instance, Radio Internet uses both radio broadcasts and computer

and Internet technologies to facilitate the sharing of information and provide educational opportunities in a rural community. ICT is a crucial resource in education. Information and Communication Technology has permeated in every walk of life affecting the technology fields such as launching satellites, managing businesses across the globe and also enabling social networking. Across the globe, countries have recognized Information and Communication Technology (ICT) as an effective tool in catalyzing the economic activity in efficient Governance, and in developing human resources. There is a growing recognition of the newer and wider possibilities that technology presents before the society in the modern times. IT together with Communication Technologies has brought about unprecedented changes in the way people communicate; conduct business, pleasure and social interaction. A usage of ICT tends the person to lead with the situation of flourish or perish. Government started initiatives to develop standards and implementation of ICT policies helped in strengthened India's position in the software driven ICT sector in the world. One the many challenges facing developing countries today are preparing their societies and governments for globalization and the information and communication revolution. We find that the ICT Primers contain information and examples which pertain universally the following:

- Women empowerment
- Development of rural communities
- Legal and Regulatory Issues (Judicial reform)
- Agriculture development
- ICT for Poverty Alleviation
- ICT and Education
- Nets, Webs and the Information Infrastructure

2. The Role of ICT in Women Empowerment

ICT plays big role in women empowerment- Education, vocational training, cooking lessons, economic and social independence - all in the reach. ICTs have created new jobs in the field of information processing for baking, insurance, printing and publishing especially for women. Women in Asian countries hold more than 20 percent of professional jobs in software services. If one goes by statistics, there are about 2 million internet user women in India. IT to generate more than 4.5 million new jobs by 2013 according to International Data Corporation (IDC) research. On the other hand the range of

women's economic activities in developing countries is very broad. It includes formal sector and informal sector employment, as well as self-employment in farming, trading and crafts production etc. "Any technology that is not appropriate for women is not truly appropriate technology Use of ICTs spreads we need to bring people together rather than divide them. By promoting e-Skills we will be fighting the digital divide. This is true whether we are supporting more secure, connected and convenient futures for all women, or in opening up new career options for women who are passionate about working in the ICT sector.

Sex	Male	Female
15-49	78	55 29%
20-24	84	64 23%
15-19	89	74 17%

Table 1. Age Sex Literacy Rate (%) Gender Disparity

3. The Role of ICT in Development of rural communities

The role of ICT for rural communities' highlights the factors preventing rural communities from reaping the benefits of ICTs and technological innovations to access them. Despite the limitations in basic infrastructure and low-level penetration of information technology, many projects are using modern ICTs for the benefit of rural communities. Creating information-rich societies is a key element of sustainable development of rural community. Community network centers can play a key role in meeting the socio-economic aspirations of rural communities. In the times of fast changing technology, improved methodologies and Upgraded means of Information exchange, one can hardly afford not to remain abreast of it. It's a matter of fact that more than 75% of India's population resides in villages. And the huge contribution this percentage can make in the developmental field shall, in no case, be ignored. The idea of integration of urban and rural areas by means of IT has obliged the union govt. to conceive the idea of implementation of IT in rural area. This is being seen a step forward to the realization of the goal of Global village. Some projects taken as an incentive by the govt. for the encouragement of IT in rural areas and for combating corruption are tremendous success. IT in its best role is a boon in liberalization-freedom to behave, act and think in a way one wants. The role of ICT in rural areas is tremendous.

4. The Role of ICT in Judicial Reform

The wordings that "law is not keeping pace with technology". However, whether technology will be harnessed to actually facilitate much needed transparency and access to the justice system, or be simply used to improve efficiency within the judicial branch. The Indian judiciary is facing mounting pressures to reform its apparatus. Even the judiciary itself has come to recognize, on the books, that change is long overdue. While technocrats herald that the enormous backlog of cases may eventually be the death knell for India's judicial branch, reform efforts must go beyond achieving the speedier delivery of justice and work towards tackling other inadequacies of the system if "access to justice for all" is to become a reality. The rural penetration of courts in India is extremely low, which significantly limits access to justice for the many citizens living

far beyond the district courts of city centers. Well organized citizens are now demanding the right to a more transparent and accountable judiciary. The appropriation of ICT is uniform. Variables such as political will and context, institutional capacity and reform goals all play a role in shaping the reform. Plans could, for example, take more of an operational approach by prioritizing the improved efficiency and the rationalization of resources by implementing electronic case management systems. Other strategies may be designed and implemented from an access perspective, seeking to restore faith in the justice system by increasing transparency and accountability. This is done by installing video technology in court rooms, or publishing legal information online. Online case filing systems can increase speed in which citizens can have their cases heard, and real time access to online repositories of legal information drastically expedites the case cycle. As e-government initiatives continue to transform the nature of India's bureaucracy and enhance the quality of government services, there is a mood of great optimism that ICT will also come to play a central role in judicial reform efforts.

5. The Role of ICT in Agriculture development

Today a new paradigm of agricultural development is fast emerging in both developing and developed countries the overall development of rural areas is expanding in new directions; old ways of delivering important services to citizens are being challenged; and traditional societies are being transformed into knowledge societies all over the world. ICTs play a key role in improving the availability of agricultural production and market information in developing countries. ICT-based market information systems have a proven track record for improving rural livelihoods in middle income developing countries where they have been introduced. However, these systems are generally limited in scale and have not been effectively replicated beyond the local level. Broad basing agricultural extension activities; developing farming system research and extension; having location-specific modules of research and extension; and promoting market extension, sustainable agricultural development, participatory research, etc. are some of the numerous areas where ICT can play an important role. IT can help here, by enabling extension workers to gather, store, retrieve and disseminate a broad range of information needed by farmers, thus transforming them from extension workers into knowledge workers. Agricultural extension systems in most developing countries are under-funded and have had mixed effects. Much of the extension information has been found to be out of date, irrelevant and not applicable to small farmers' needs, leaving such farmers with very little information or resources to improve their productivity. ICT helps the extension system in re-orienting itself towards the overall agricultural development of small production systems. With the appropriate knowledge, small-scale producers can even have a competitive edge over larger operations. When knowledge is harnessed by strong organizations of small producers, strategic planning can be used to provide members with least-cost inputs, better storage facilities, improved transportation links and collective negotiations with buyers.

Some agricultural development services that can be provided in the developing world, using ICT, are:

- Online services for information, education and training, monitoring and consultation, diagnosis and monitoring, and transaction and processing;
- E-commerce for direct linkages between local producers, traders, retailers and suppliers;
- The facilitation of interaction among researchers, extension (knowledge) workers, and farmers;
- Question-and-answer services where experts respond to queries on specialized subjects ICT services to block-and district-level developmental officials for greater efficiency in delivering services for overall agricultural development;
- Up-to-date information, supplied to farmers as early as possible, about subjects such as packages of practices, market information, weather forecasting, input supplies, credit availability, etc.;
- Creation of databases with details of the resources of local villages and villagers, site-specific information systems, expert systems, etc.;
- Provision of early warning systems about disease/ pest problems, information regarding rural development programmes and crop insurances, post harvest technology, etc.;
- Facilitation of land records and online registration services;
- Improved marketing of milk and milk products;
- Services providing information to farmers regarding farm business and management;
- Increased efficiency and productivity of cooperative societies through the computer communication network and the latest database technology;
- Tele-education for farmers

ICTs play a key role in improving the availability of agricultural production and market information in developing countries. ICT based market information systems have a proven track record for improving rural livelihoods in middle income developing countries where they have been introduced. However, these systems are generally limited in scale and have not been effectively replicated beyond the local level. This paper attempts an analysis of the ICT play an important role in bringing about sustainable agricultural development and future perspectives in agriculture and ICT. It is recommended that, in drought-prone and less endowed areas, future ICT initiatives provide information services such as facilitation of access to land records, question-and-answer services, information on rural development programs, weather forecasting, marketing information, best package of practices for dry land agriculture, information on crop insurance and post- harvest technology. It is also recommended that, before ICT services are set up in a region, efforts are made to develop among the farmers both a satisfactory level of faith in the intentions of the ICT staff and a firm commitment to the goals of the proposed project. It is also suggested that participatory and rapid rural appraisals are carried out to ascertain what information the farmers need. In the process, the farmers' self-fulfilling faith in the information services provided should be enhanced. It is further recommended that the farmers be instructed in how to get the best possible use out of the services provided.

6. The Role of ICT for Poverty Alleviation

Poverty is a complex condition that involves issues of voice, empowerment, rights and opportunities and material deprivation. With more than 20,000 people dying each day worldwide from extreme poverty, there is a crisis that demands workable solutions and drastic measures that go beyond traditional approaches and which embrace contemporary technology within innovative and sustainable mechanisms that offer a new hope for solving seemingly intractable problems. Some actions must be taken at multiple levels; at the policy-making and strategic decision-making level, the level of program and project design and evaluation, and at the level of project operation, personal interaction and the achievement of individual benefits The following set of associated conditions that have been observed to be necessary in order to ensure ICTs are used optimally in reducing poverty. They are presented in two categories, those that relate more to government actions, and those that relate more to program implementers Associated Conditions that make ICTs Effective Anti-Poverty are:

<u>Conditions for Government Implementers</u>	<u>Conditions for Programme</u>
.. Pro-poor policies for reform	.. Advocacy
.. Reform of public services for benefits Government	.. Clearly identified goals and
.. Conducive telecommunications program design regulations and environment	.. Mainstreaming / embedding
.. Decentralized decision-making	.. Creativity and innovation in
.. Complementary infrastructure , e.g. roads	.. Partnerships
.. Education	.. Skills in information management
.. Monitoring and evaluation the poor	.. Technical skills
	.. Local entrepreneurship
	.. Content development
	.. Participation and ownership by
	.. Evaluation

Table 2. Conditions that make ICTs Effective Anti-Poverty

6.1 Dimensions of poverty

- A hand to mouth existence in which meeting basic needs on a daily basis excludes people from other activities and aspirations.
- Material deprivation & Insecurity.
- Illiteracy and lack of education.
- Inability to maintain social status or social participation.
- Lack of capital to fund ventures.
- Restricted choice and opportunity, inability to develop one's talent, potential and aspirations.
- Health information and facilities are out of reach.
- Lack of freedom and oppressive social structures.

6.2 Successful strategies of ICTs application to alleviate poverty

- Provision of local language and locally relevant content.
- Targeting disadvantaged and marginalized groups.
- Promoting local entrepreneurship.
- Improving poor people's health (by provision of health care information, remote consultation, diagnostic, treatment).

- Strengthening education.
- Promoting trade and e-commerce
- Supporting good governance.
- Building capacity and capability.
- Enriching culture.
- Supporting agriculture.
- Creating employment opportunities.
- Reinforcing social mobilization.
- Framework for poverty alleviation with ICTs.

6.3 ICT Impacts on Poverty Reduction in general perspectives

- ICTs have an important role to play in reducing poverty by improving flows of information and communications.
- ICTs are a valuable tool for information sharing and awareness rising within the wider development community, to combat poverty and advance the International Development Targets.
- The poor may face special constraints in accessing ICTs and using them for their specific needs.
- It is important to assure that relevant information is available to the poor in their own languages.
- There are barriers to adaptation and innovation of applications of ICTs and content such as broadcast programs (e.g. government monopoly of radio broadcasting, linguistic problems).
- The impediments to broad deployment of ICTs as tools of poverty reduction are not unique to ICT as a sector.

6.4 ICT Impacts on Poverty Reduction in economic perspectives

- Reduced transactions costs.
- Time and distance don't matter.
- Enables participation in markets or activities globally.
- ICTs embody a lot of knowledge.

The problem tree for the use of ICT for poverty reduction

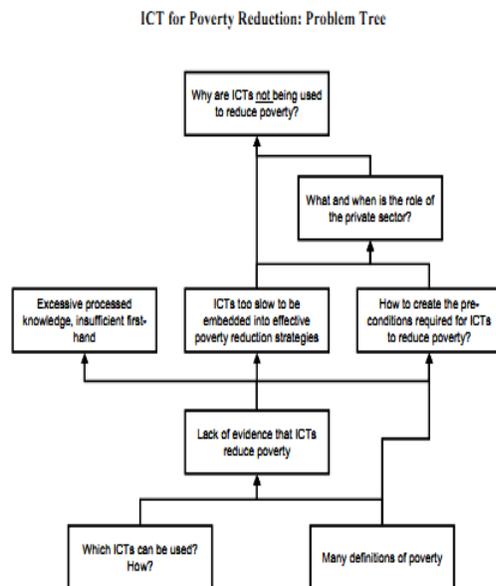


Fig.1 ICT for Poverty Reduction: Problem Tree

Here the main questions are what ICTs actually are; how they are evolving and converging, where they might be going and what the implications are for their further use in poverty reduction. This absence is further associated with a lack of attempt to map applications onto the most suitable technology (either existing or emerging). Most of the analyses imply computers, the Internet and telephones, with differentiation between them in terms of their potential impact within poverty reduction programmes. There is more promise than reality; a greater emphasis on what could be done than on what is actually working right now. This suggests that there has been insufficient grounded research, as well as premature and possibly over optimistic evaluations of what is currently taking place. Much of the focus lies on generating convincing arguments that ICTs are useful in poverty reduction, when a more informed perspective would serve to outline the circumstances under which this can be made true. Whilst there is a good deal of description on what could be done with ICTs to reduce poverty, there is little to help the observer understand what is not being done and why it is not being done. An earlier excessive emphasis on the technology itself is giving way to an emerging consensus that they are most effective when embedded within already effective strategies for poverty reduction. ICT training has a special place in people's view of what they need to face the future and to advance out of poverty.

7. Role of ICT in EDUCATION

ICTs are a potentially powerful tool for extending educational opportunities, both formal and non-formal, to previously underserved scattered and rural populations, groups traditionally excluded from education due to cultural or social reasons such as ethnic minorities, girls and women, persons with disabilities, and the elderly, as well as all others who for reasons of cost or because of time constraints are unable to enroll on campus. One of the most commonly cited reasons for using ICTs in the classroom has been to better prepare the current generation of students for a workplace where ICTs, particularly computers, the Internet and related technologies, are becoming more and more ubiquitous.

7.1 Open and distance learning

Open and distance learning is defined as a way of providing learning opportunities that is characterized by the separation of teacher and learner in time or place, or both time and place; learning that is certified in some way by an institution or agency; the use of a variety of media, including print and electronic; two-way communications that allow learners and tutors to interact; the possibility of occasional face-to-face meetings; and a specialized division of labour in the production and delivery of courses. Distance learning is possible through learner-centered environments i.e. to pay careful attention to the knowledge, skills, attitudes, and beliefs that learners bring with them to the classroom. Learning is a process in which individuals "construct" meaning based on prior knowledge and experience. Experience enables individuals to build mental models or schemas, which in turn provide meaning and organization to subsequent experience. Thus knowledge is not "out there", independent of the learner and which the learner passively receives; rather, knowledge is created through an active process in which the learner transforms information, constructs hypothesis, and makes decisions using

his/her mental models. It is best done in a group setting with the teacher as facilitator or guide.

7.2 ICTs help expand access to education

- Anytime, anywhere: One defining feature of ICTs is their ability to transcend time and space. ICTs make possible asynchronous learning, or learning characterized by a time lag between the delivery of instruction and its reception by learners. Online course materials, for example, may be accessed 24 hours a day, 7 days a week. ICT-based educational delivery (e.g., educational programming broadcast over radio or television) also dispenses with the need for all learners and the instructor to be in one physical location. Additionally, certain types of ICTs, such as teleconferencing technologies enable instruction to be received simultaneously by multiple, geographically dispersed learners (i.e., synchronous learning).

- Access to remote learning resources: Teachers and learners no longer have to rely solely on printed books and other materials in physical media housed in libraries (and available in limited quantities) for their educational needs. With the Internet and the World Wide Web, a wealth of learning materials in almost every subject and in a variety of media can now be accessed from anywhere at anytime of the day and by an unlimited number of people. This is particularly significant for many schools in developing countries, and even some in developed countries, that have limited and outdated library resources. ICTs also facilitate access to resource persons like mentors, experts, researchers, professionals, business leaders, and all over the world.

7.3 ICTs help improving the quality of education

Improving the quality of education and training is a critical issue, particularly at a time of educational expansion. ICTs can enhance the quality of education in several ways:

7.3.1 Motivating to learn.

ICTs such as videos, television and multimedia computer software that combine text, sound, and colorful, moving images can be used to provide challenging and authentic content that will engage the student in the learning process. Interactive radio likewise makes use of sound effects, songs, dramatizations, comic skits, and other performance conventions to compel the students to remember.

7.3.2 Facilitating the acquisition of basic skills.

The transmission of basic skills and concepts that are the foundation of higher order thinking skills and creativity can be facilitated by ICTs through drill and practice. Educational television programs such use repetition and reinforcement to teach the alphabet, numbers, colors, shapes and other basic concepts. Most of the early uses of computers were for computer-based learning (also called computer-assisted instruction) that focused on mastery of skills and content through repetition and reinforcement

7.3.3 Enhancing teacher training

ICTs have also been used to improve access to and the quality of teacher training. Some Institutions are taking advantage of the Internet to provide better teacher professional development opportunities to in service teachers. The government offers self-directed, self-paced Web-based courses for primary and

secondary school teachers. Courses include “Computers in the Information Society,” “Education Reform,” and “Future Society and Education.” Online tutorials are also offered, with some courses requiring occasional face-to-face meetings. Large-scale radio and television-based teacher education has for many years been conducted n education.

At Indira Gandhi National Open University, satellite-based one-way video- and two-way audio-conferencing was held in 1996, supplemented by print-materials and recorded video, to train 9th & 10th primary school teachers and facilitators from 20 district training institutes.

7.3.4 ICT helps transform the learning environment into learner-centered environment

ICT supported education can promote the acquisition of the knowledge and skills that will empower students for lifelong learning. When used appropriately, ICTs especially computers and Internet technologies enable new ways of teaching and learning rather than simply allow teachers and students to do what they have done before in a better way. So learning is of following types:

- Active learning. ICT-enhanced learning mobilizes tools for examination, calculation and analysis of information, thus providing a platform for student inquiry, analysis and construction of new information. Learners therefore learn as they do and, whenever appropriate, work on real-life problems in-depth, making learning less abstract and more relevant to the learner’s life situation. In this way, and in contrast to memorization-based or rote learning, ICT-enhanced learning promotes increased learner engagement. ICT-enhanced learning is also “just-in-time” learning in which learners can choose what to learn when they need to learn it.

- Collaborative learning. ICT-supported learning encourages interaction and cooperation among students, teachers, and experts regardless of where they are. Apart from modeling real-world interactions, ICT-supported learning provides learners the opportunity to work with people from different cultures, thereby helping to enhance learners’ teaming and communicative skills as well as their global awareness. It models learning done throughout the learner’s lifetime by expanding the learning space to include not just peers but also mentors and experts from different fields.

- Creative Learning. ICT-supported learning promotes the manipulation of existing information and the creation of real-world products rather than the regurgitation of received information.

- Integrative learning. ICT-enhanced learning promotes integrative approach to teaching and learning. This approach eliminates the artificial separation between the different disciplines and between theory and practice that characterizes the traditional classroom approach.

- Evaluative learning. ICT-enhanced learning is student-directed and diagnostic. Unlike static, text- or print-based educational technologies, ICT-enhanced learning recognizes that there are many different learning pathways and many different articulations of knowledge. ICTs allow learners to explore and discover rather than merely listen and remember.

7.4 Uses of ICTs in Education

Education policymakers and planners must first of all be clear about what educational outcomes are being targeted. The potential of each technology varies according to how it is used. Five levels of technology use in education: presentation, demonstration, drill and practice, interaction, and collaboration. Each of the different ICTs print, audio/video cassettes, radio and TV broadcasts, computers or the Internet—may be used for presentation and demonstration, the most basic of the five levels. Except for video technologies, drill and practice may likewise be performed using the whole range of technologies. On the other hand, networked computers and the Internet are the ICTs that enable interactive and collaborative learning best; their full potential as educational tools will remain unrealized if they are used merely for presentation or demonstration.

7.4.1 Use of Radio and TV broadcasting in Education

Radio and television have been used widely as educational tools since the 1920s and the 1950s, respectively. There are three general approaches to the use of radio and TV broadcasting in education:

- Direct class teaching, where broadcast programming substitutes for teachers on a temporary basis
- School broadcasting, where broadcast programming provides complementary teaching and learning resources not otherwise available
- General educational programming over community, national and international stations which provide general and informal educational opportunities.

7.4.2 Use of Teleconferencing in Education

Teleconferencing refers to “interactive electronic communication among people located at two or more different places.” There are four types of teleconferencing based on the nature and extent of interactivity and the sophistication of the technology:

- Audio conferencing involves the live (real-time) exchange of voice messages over a telephone network.
- Audio graphic conferencing, when low-bandwidth text and still images such as graphs, diagrams or pictures can also be exchanged along with voice messages, then this type of conferencing is called audio graphic conferencing.
- Videoconferencing, allows the exchange not just of voice and graphics but also of moving images. Videoconferencing technology does not use telephone lines but either a satellite link or television network (broadcast/cable).
- Web-based conferencing, as the name implies, involves the transmission of text, and graphic, audio and visual media via the Internet; it requires the use of a computer with a browser and communication can be both synchronous and asynchronous.

Education system are today in a position to take up the challenges of the new ICTs. It is the education and training field, one of the essential activities of modern society, which has benefited from least from the contribution of the new ITCs and it, is also this sector, which depending on the direction taken by the changes imposed by globalization and international communication will either benefit or suffer from the developments in terms of content, methods and resources.

8. Key Challenges in Integrating ICTs in Education

Communication technologies have come to play a vibrant role in democratizing Education not only in the Developed but also in the Developing Countries. However, in spreading the use of Information and communication technology some major difficulties are felt by the policy makers as well as the implementers. Significant challenges that policymakers and planners, educators, education administrators, and other stakeholders need to consider include educational policy and planning, infrastructure, language and content, capacity building, and financing.

8.1 Capacity building challenges

- Education administrators. Leadership plays a key role in ICT integration in education. Many teacher- or student-initiated ICT projects have been undermined by lack of support from above. For ICT integration programs to be effective and sustainable, administrators themselves must be competent in the use of the technology, and they must have a broad understanding of the technical, curricular, administrative, financial, and social dimensions of ICT use in education.
- Technical support specialists. Whether provided by in-school staff or external service providers, or both, technical support specialists are essential to the continued viability of ICT use in a given school. While the technical support requirements of an institution depend ultimately on what and how technology is deployed and used, general competencies that are required would be in the installation, operation, and maintenance of technical equipment (including software), network administration, and network security. Without on-site technical support, much time and money may be lost due to technical breakdowns. One of the major obstacles to optimizing computer use in high schools has been the lack of timely technical support. In some extreme cases involving schools in remote areas, disabled computers take months to be repaired since no technician is available in the immediate vicinity and so the computers have to be sent to the nearest city hundreds of kilometers away.
- Content developers. Content development is a critical area that is too often overlooked. The bulk of existing ICT-based educational material is likely to be in English or of little relevance to education in developing countries. There is a need to develop original educational content (e.g., radio programs, interactive multimedia learning materials on CD-ROM or DVD, Web-based courses, etc.), adapt existing content, and convert print-based content to digital media. These are tasks for which content development specialists such as instructional designers, scriptwriters, audio and video production specialists, programmers, multimedia course authors, and web-developers are needed. Like technical support specialists, content developers are highly skilled professionals and are not, with the exception of instructional designers, historically employed by primary and secondary

schools. Many universities with distance education programs, and those who otherwise make use of ICTs, have dedicated technical support and content development units.

8.2 Language and content related challenges

English is the dominant language of the Internet. An estimated 80% of online content is in English. A large proportion of the educational software produced in the world market is in English. For developing countries in the Asia-Pacific where English language proficiency is not high, especially outside metropolitan areas, this represents a serious barrier to maximizing the educational benefits of the World Wide Web. In Web-based learning, technical standardization of content has also become a pressing issue. Standardization allows different applications to share content and learning systems. The ease by which Web-based educational content can be stored, transmitted, duplicated, and modified has also raised concerns about the protection of intellectual property rights.

8.3 Cost related challenges

One of the greatest challenges in ICT use in education is balancing educational goals with economic realities. ICTs in education programs require large capital investments and developing countries need to be prudent in making decisions about what models of ICT use will be introduced and to be conscious of maintaining economies of scale. Ultimately it is an issue of whether the value added of ICT use offsets the cost, relative to the cost of alternatives.

8.4 Infrastructure related challenges

A country's educational technology infrastructure sits on top of the national telecommunications and information infrastructure. Before any ICT-based program is launched, policymakers and planners must carefully consider the following:

- In the first place, appropriate rooms or buildings should be available to house the technology, ensure that proper electrical wiring, heating/cooling and ventilation, and safety and security would be needed.
- Another basic requirement is the availability of electricity and telephony.
- Policymakers should also look at the ubiquity of different types of ICT in the country in general, and in the educational system in particular.

It is cheaper, and easier, to introduce a form of technology into education, and keep it working, where education is riding on the back of large-scale developments by governments or the private sector. There are many potential sources of money and resources for ICT use programs like Grants, Private donations, fund-raising events, Community support (e.g. rent-free building), Membership fees, Revenues earned from ancillary activities etc.

8.5 Government Policy Structure related challenges

The growth of any communication technology in a society and hence its applicability for Distance Education depends to a very great extent on the degree to which policy makers recognize the importance of ICTs in promoting a knowledge based society. Many Developing Countries like India have realized the importance of giving a boost to New ICTs for the general betterment of the society.

8.6 Political challenges

The perceptions and attitudes of a political system greatly affect the acceptance and growth of technology in any society. The same holds true for all the ICTs relevant to Distance Education. A political system conscious of the payoffs of ICT for the enhancement of the educational profile of a country will frame appropriate policies for the adoption and dissemination of ICT throughout the length and breadth of the country.

8.7 Economic challenges

In Distance Education, cost is an important factor that guides the adoption and growth of Communication Technology in a country. Developing Countries often lack the initial allocation as well as matching funds to make feasible investments in ICTs. Many countries often acquire costly technology without making provisions for building sufficient infrastructure to run them.

8.8 Cultural challenges

The culture is a complex whole that includes knowledge, beliefs, arts, morals, laws, customs and any other capability and habit acquired by a human being as a member of the society. With regard to cultural patterns there are two groups of policy makers. Policy makers can be Pro-implementation or Anti-implementation. It is precisely the cultural moorings of a society that makes people either in favour of implementing technology or to reject it.

8.9 Technological challenges

Very often, technology becomes the determining factor in the growth of ICT in any society. With regard to the acceptance of a particular technology, the factors such as access, cost, teaching functions, interactive ness and user-friendliness, organizational issues and speed afforded to change are important issues. Handling of New technology needs care and technical proficiency. For this training is an important aspect. Many developing countries lack enough personnel to train manpower in new technology. These often act as constraints before the smooth growth of ICT.

8.10 Human Element related challenges

It is also major importance in the growth and application of new ICT. In many cases, it is seen that the teachers act as a major roadblock against the implementation of new technology. They are not ready to accept any change in their role. With the advent of new ICT teachers are no longer the storehouse of all knowledge, but are more of managers of education. According to a recent survey done inside GJUS & T, Hisar, the following statistics have been collected on the problems faced by people while usage of ICTs for higher education.

	Technical	Non Technical	Others	
Time	4	6	4	8.75
Speed	62	24	8	77.5
Down Server	4	8	6	11.25
Money	0	2	2	2.5

Table 3. Statistics of problems faced while using ITCs

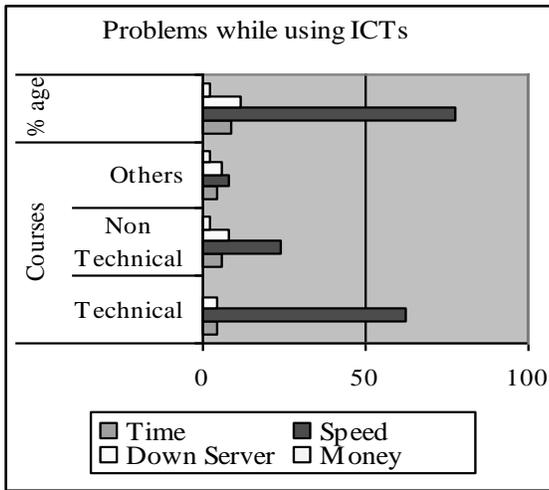


Fig. 2 Statistics of problems faced while using ICTs

The statistics shown in Table 3 and Fig. 2 clearly shows the problems faced while using ICTs. 77.5% people faced problem regarding speed, 11.25% respondents face problem of down server and 8.5% face problem of time of usage of ITC services. 2.5% think that the cost is high.

Social acceptability of ICT is necessary to improve the mobility in the society and increase the pitch for equity and social justice. Education as a qualitative development is not confined within the classroom structure. Unless all these factors are taken proper care of, growth and application of ICTs in Education will continue to be as daunting a task as it ever was.

9. Conclusion and Future Work

India is developing as a knowledge economy and it cannot function without the support of ICT. The gap between demand and supply of higher education has necessitated the governments and institutions to formulate the policies for the better use of ICT. And, in order to bridge the gap, it is necessary to evolve the cooperation between the public and private sectors. The education ICT policy should identify specific ways in which the application of ICT will enhance the educational capacity and the capability of higher education institutions. According to a recent study, innovations such as using Twitter to send messages are really helpful in disseminating education. In a similar fashion, the use of YouTube in sharing video information will go a long way in disseminating education. The consequence of technological underdevelopment of the developing world is an obvious cause of failure in industrial fabrications for domestic educational media.

The research clearly shows the need for better support in the following areas:

- **Shared Computing:** Developments in shared technology under computing will reduce costs and changing the equation on speed, complexity, and risks associated with deploying both application and computing services.

- **Long Cable Runs:** It will save the cost of expansion equipments like special aerial, waterproof copper cable and repeaters, Fibre optic cable and inexpensive media converters etc.
- **Cost Effective Network Design:** Cost effective network is a network that can be implemented and maintained at minimal cost, taking into consideration network efficiency and effective bandwidth utilization.
- **Server Caching Technology:** A cache server is a dedicated network server or service acting as a server that saves Web pages or other Internet content locally. It Conserves bandwidth for video conferencing & ensures fast access to web pages.
- **Telecenters:** Telecentres will lead to innovative economic models and have sparked the development of rurally relevant ICT-based services. Typically, these include education, microfinance, and government-to-citizen services
- **Value Addition to E-Learning:** E-learning should be given importance and should be making in practice at large scale.

10. References

- [1] <http://www.megaessays.com/viewpaper/29102.html>
- [2] http://hdr.undp.org/en/reports/global/hdr2010/papers/HD RP_2010_14.pdf
- [3] http://www.care.org/newsroom/publications/whitepapers/woman_and_empowerment.pdf
- [4] <http://www.articlesbase.com/education-articles/education-is-the-foundation-for-womensempowerment-in-india-prospects-challenges-and-remedies-1451741.html>
- [5] US Department of Labor (1999), Future work—Trends and Challenges for Work in the 21st Century. Quoted in EnGauge, “21st Century Skills,” North Central Regional Educational Laboratory; available from <http://www.ncrel.org/engauge/skills/21skills.htm>; accessed 31 May 2002.
- [6] For a convincing argument for the need to transform notions of “schooling” in light of technology driven social change see Thornburg, David (2000), “Technology in K-12 Education: Envisioning a New Future”; available from <http://www.air-dc.org/forum/abthornburg.htm>; accessed 3 July 2002.
- [7] International Labour Organization, “Learning and Training for Work in the Knowledge Society;” available from www.ilo.org/public/English/employment/skills/recomm/report; accessed 31 May 2002, p. 5.
- [8] Blurton, C., “New Directions of ICT-Use in Education”. Available online <http://www.unesco.org/education/educprog/lwf/dl/edict.pdf>; accessed 7 August 2002.
- [9] Potashnik, M. and J.Capper, “Distance Education: Growth and Diversity;” available from <http://www.worldbank.org/fandd/english/pdfs/0398/0110398.pdf>; accessed 14 August 2002.
- [10] See Taghioff, Daniel (April 2001), “Seeds of Consensus—The Potential Role for Information and Communication Technologies in Development: Empowerment, Appropriateness and Measuring if Needs Really Get

- Met;” available from <http://www.btinternet.com/~daniel.taghioff/index.html>; accessed 14 August 2002.
- [11] <http://www.open.ac.uk>
- [12] <http://www.ignou.ac.in>
- [13] The Commonwealth of Learning, “An Introduction to Open and Distance Learning”; available from <http://www.col.org/ODLIntro/introODL.htm>; accessed 14 August 2002.
- [14] Quoted in Founts, Jeffrey T. (February 2000), “Research on Computers and Education: Past, Present and Future”; available from http://www.gatesfoundation.org/nr/dpwnloads/evaluation/Computer_Research_Summary.pdf; accessed 30 October 2002, p. 11.
- [15] World Bank (1998), The World Development Report 1998/99. Quoted in Blurton, C., New Directions of ICT-Use in Education.
- [16] EnGauge. North Central Regional Educational Laboratory; available from <http://www.ncrel.org/engage/skills/21skills.htm>; accessed 31 May 2002.
- [17] <http://ldt.stanford.edu/~yokonaga/portfolio/ed236x/China.jyy.htm>; accessed 4 August 2002.
- [18] <http://www.ignou.ac.in>. See also Asian Development Bank (1997), Distance Education for Primary School Teachers: Papers and Proceedings of the Regional Seminar on Distance Education (Manila: Asian Development Bank).
- [19] Perraton, H. and C. Creed, “Applying New Technologies and Cost-Effective Delivery Systems in Basic
- [20] Bosch, A., “Interactive Radio Instruction for Mathematics: Applications and Adaptations from Around the World”; available from http://www.techknowlogia.org/TKL_active_pages2/CurrentArticles/main.asp?FileType=HTML&ArticleID=255; accessed 15 August 2002, p. 45.
- [21] Perraton, H. and C. Creed, “Applying New Technologies...”
- [22] Iwanaga, M., “The Present and the Future of Multimedia in Japan’s Open Learning”; available from <http://www.ouhk.edu.hk/cridal/gdenet/Technology/technology.html>; accessed 11 January 2002.
- [23] Kato, Hidetoshi (1995) “Technology and Distance education”, Indian Journal Of Open Learning, pp.11-14
- [24] Ramanujam, C, technology - pedagogy combine: need for quality in distance open learning.
- [25] IGNOU (2001), “Media in Distance Education “Communication Technology for Distance Education, ES-318, pp.28-31.
- [26] IGNOU: A profile(2009 &2010)
- [27] Bansal, kiron and Chaudhary, sonvir.S.(1999), “Interactive radio for supporting distance education: an evaluative study”, Indian Journal of open learning.
- [28] Sukumar ,B.(2001), IGNOU Interactive Radio Counselling: a study, IJOL,10 (1), pp.80-92.
- [29] Choudhary, S.V, (1992), “Television in distance education: the Indian scenario”, Indian Journal of Open Learning, 1(1), pp.23.
- [30] Meera, S.N. (2002) A Critical analysis of information technology in agricultural development: Impact and implications. Unpublished PhD thesis, IARI, New Delhi-110012.
- [31] Narula, S.A., Sharma, N. (2008) “Implementing ICTs in Agribusiness” i4d, September, 20-22 available at www.i4donline.net/September08/September08.pdf
- [32] Narula S. A., (2008) ” Leveraging ICT to Link Farmers to Markets: A Case of Indian E-Business Models” Paper presented in International Conference on Technology and Innovation in Marketing held at IMT, Ghaziabad, India during 18-19 April, 2008; published in Rajat Gera (Ed.) “Technology and Innovation in Marketing”, Allied Publishers, New Delhi
- [33] Narula,S.A.(2009)”Social Networking. For Farmers” i4d,February,available at www.i4donline.net
- [34] <http://www.fao.org/GENDER/en/agri-e.htm>
- [35] <http://www.iteaconnect.org/Conference/PATT/PATT14/Wicklein.pdf>
- [36] <http://www.fao.org/Wairdocs/TAC/X5784E/x5784e08.htm>
- [37] McConnell, S. (2001) ‘Connecting with the unconnected: Proposing an evaluation of the impacts of the Internet on unconnected rural stakeholders.’ Mc Connell International. <http://mcconnellinternational.com/evalnati.html> World Bank, IDA, 2008.
- [38] The Next Billions: Unleashing Business Potential in Untapped Markets, World Economic Forum. January 2009.
- [39] Grameen Bank (www.grameen-info.org), 2009.
- [40] www.kiva.org, 2009.
- [41] www.un-gaid.org, 2009
- [42] Barak, M. (2006). Instructional principles for fostering learning with ICT: Teacher’s perspectives as learners and instructors. Education and Information Technologies, 11, 121-135.
- [43] Dagdilelis, V., Satratzemi, M. & Evangelidis, G. (2004). Introducing secondary education students to algorithms and programming. Education and Information Technologies, 9(2), 159-173.
- [44] The Design-Based Research Collective. (2003). Design-based research: An emerging paradigm for educational inquiry. Educational Researcher, 32(1), 5-8.
- [45] Floyd, C., Budde, R., & Zullighoven, H. (1992). Software development and reality construction. Berlin: Springer Verlag.
- [46] Mingers, J. (2004). Real-izing information systems: Critical realism as underpinning philosophy for information systems. Information and Organization, 14, 87-103
- [47] Nauer, P. (1992). Computing: A human activity. New York: ACM Press.
- [48] Trede, M. (2007). Know your discipline: Teaching the philosophy of computer science. The Journal of Information Technology Education, 6, 105-122. Retrieved September 2, 2008 from <http://jite.org/documents/Vol6/JITEv6p105122Tedre266.pdf>
- [49] Whitaker, R. (2007) Applying phenomenology and hermeneutics in IS design: A report on field experiences. Informing Science: The International Journal of an Emerging Discipline, 10, 63-96.

- [50] <http://inform.nu/Articles/Vol10/DbIHelix063-096.pdf>
Winograd, T., & Flores, F. (1987). Understanding, computers and cognition: A new foundation for design.
- [51] Wulf, T. (2005). Constructivist approaches for teaching computer programming. SIGITE'05, October 20- 22, 2005, Newark, Jew Jersey, USA, 245-248.
- [52] <http://asverma.wordpress.com/2010/03/26/the-use-of-ict-in-education>.
- [53] Distance Education: A systems view – Moore, Kearsley – 1996.
- [54] Designing Web-based training – Barron – 1998
- [55] Design elements for interactive multimedia – Kennedy, McNaught – 1997.
- [56] Benchmarking ICT literacy in tertiary learning settings – Oliver, Towers – 2000.
- [57] Information Technologies for Education and Training – Collis – 2002.
- [58] Weller, Martin, (2002), Delivering Learning on the Net, RoutledgeFalmer, London.
- [59] Shastri, V.K., (2007), Emerging Technologies in Education, Authorpress, New Delhi, India.
- [60] Krishna Kanta Handiqui State Open University, HORIZON, Vol – III, No-1, January, 2009.
- [61] Dash, M., (2004), Education in India, Atlantic Publishers and Distributors, New Delhi, India.
- [62] Young, J. (2002). The 24-hour professor. The Chronicle of Higher Education, 48(38), 31-33.
- [63] Moore, M. & Kearsley, G. (1996). Distance Education: A Systems View. Belmont, CA: Wadsworth.
- [64] Barron, A. (1998). Designing Web-based training. British Journal of Educational Technology, 29(4), 355-371.
- [65] Berge, Z. (1998). Guiding principles in Web-based instructional design. Education Media International, 35(2), 72-76.
- [66] Kennedy, D. & McNaught, C.(1997). Design elements for interactive multimedia. Australian Journal of Educational Technology, 13(1), 1-22.
- [67] Oliver, R. (2000). Creating Meaningful Contexts for Learning in Web-based Settings. Proceedings of Open Learning 2000. (pp 53-62). Brisbane: Learning Network, Queensland.
- [68] Soloway, E. & Pryor, A. (1996). The next generation in human-computer interaction. Communications of the ACM, 39(4), 16-18.
- [69] Starr,L.(2001). http://www.education-world.com/a_tech/tech_075.shtml[July 2002].
- [70] Pandey,V.C.(2004), Information and communication Technology, Isha Books, New Delhi, India.