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CHAPTER 4 CONCEPTUAL FRAMEWORK

4.1 ICT in teaching practices

ICT Enabling teachers to have access to multimedia learning resources, which support constructive concept development, will allow the teacher to focus more on being a facilitator to a learner by providing personal attention. Teachers use ICT to plan lessons more efficiently and more effectively ICT increases efficiency in planning and preparation of work due to a more collaborative approach between teachers. ICT enables teachers to cooperate more and share curriculum plans with colleges.

ICTs are used in education in two general ways: to support existing 'traditional' pedagogical practices (teacher-centric, lecture-based, rote learning) as well as to enable more learner-centric. ICTs are most effective when they help to enable learner-centric pedagogies However, ICTs can enable new types of teaching and learning styles, for the most part they are being used to support traditional learning practices.

4.2 Teacher usage of ICTs

4.2.1 ICTs for administrative tasks

Teachers most often use ICTs for 'routine tasks' (record keeping, lesson plan development, information presentation, basic information searches on the Internet).

4.2.2 More knowledgeable teachers rely less on "computer assisted instruction"

Teachers more knowledgeable in ICTs use utilize computer assisted instruction less than other teachers who use ICTs, but utilize ICTs more overall.

4.2.3 How teachers use ICTs is dependent on their general teaching styles

Types of usage of ICTs correlate with teacher pedagogical philosophies. Teachers who use ICTs the most -- and the most effectively -- are less likely to use traditional 'transmissionmethod' pedagogies. Teachers who use more types of software tend to practice more "constructivist" pedagogies.

4.2.4 Teaching with ICTs takes more time

Introducing and using ICTs to support teaching and learning is time consuming for teachers, both as they attempt to shift pedagogical practices and strategies and when such strategies are used regularly. Simply put Teaching with ICTs takes more time (estimates vary on how much extra time is required to cover the same material; 10% is a common estimate).

4.3 Teacher self-confidence and motivation for use of ICT in teaching Practices

1. Fear prevents many teachers from using ICTs Many teachers still fear using ICTs, and thus are hesitant to use them in their teaching.

2. ICTs motivate some teachers, at least at the start

At least initially, exposure to ICTs can be an important motivation tool to promote and enable teacher professional development.

3. Incentives must be developed to promote effective teacher participation in continuing professional development

Teachers require additional motivation and incentives to participate actively in professional development activities. A variety of incentives can be used, including certification, professional advancement, pay increases, paid time off to participate in professional development

- **4.** Access to ICTs is the most significant factor The most significant factor for continuing the development of teachers' ICT-related skills is for them to have regular access to running and applicable ICT equipment.
- 5. A variety of changes must be implemented to optimize teacher use of ICTs Shifting pedagogies, redesigning the curriculum and assessment, and providing more autonomy to the schools help to optimize the use of ICT. With sufficient enabling factors in place, teachers can utilize ICTs in as 'constructivist' a manner as their pedagogical philosophies would permit.

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6. Functioning technical infrastructure is (obviously) crucial

Teachers must have adequate access to functioning computers, and be provided with sufficient technical support, if they are to use ICTs effectively.

7. Introducing ICTs takes time

Adequate time must be allowed for teachers to develop new skills, explore their integration into their existing teaching practices and curriculum, and undertake necessary additional lesson planning, if ICTs are to be used effectively.

8. Support from administration and the community can be important Support of school administrators and, in some cases, the surrounding community, for teacher use of ICTs is seen as critical if ICTs are to be used at all, let alone effectively. For this reason, targeted outreach to both groups is often necessary if investments in ICTs to support education are to be optimized.

4.4 Subject knowledge and Teacher content mastery is important in the use of ICT

1. Teachers' subject knowledge influences how ICTs are used

The way ICT is used in lessons is influenced by teacher knowledge about their subjects, and how ICT resources can be utilized and related to it.

2. Teacher content mastery and understanding of student comprehension make ICT use more effective

The evidence shows that when teachers use their knowledge of both the subject and the way pupils understood the subject; their use of ICT has a more direct effect on student achievement.

3. ICTs can aid teacher self-learning in subject matter

By providing access to updated and additional learning resources, ICTs can enable teacher self-learning in his/her subject area.

4.5 Teacher technical abilities is not sufficient for knowledge of ICTs

4.5.1 Preparing teachers to benefit from ICT use is about more than just technical skills

Teacher technical mastery of ICT skills is a not a sufficient requirement for successful integration of ICTs in teaching.

4.5.2 'One-off training' is not sufficient

Teachers require extensive, on-going exposure to ICTs to be able to evaluate and select the most appropriate resources. However, the development of appropriate pedagogical practices is seen as more important that technical mastery of ICTs.

4.6 Teachers professional development

1. On-going teacher training and support is critical to the successful utilization of ICTs in education

Teacher training and professional development is seen as the key driver for the successful usage of ICTs in education. Traditional one-time teacher training workshops have not been seen as effective in helping teachers to feel comfortable using ICTs, let alone in integrating it successfully into their teaching. Discrete, 'one-off' training events are seen as less effective than on-going professional development activities. Effective ICT use in education increases teachers' training and professional development needs. However, ICTs can be important tools to help meet such increased needs, by helping to provide access to more and better educational content, aid in routine administrative tasks, provide models and simulations of effective teaching practices, and enable learner support networks, both in face to face and distance learning environments, and in real time or asynchronously. On-going and regular support is essential to support teacher professional development and can be facilitated through the use of ICTs (in the form of web sites, discussion groups, e-mail communities, radio or television broadcasts).

2 Effective teacher professional development should model effective teaching practices

Effective teacher professional development should approximate the classroom environment as much as possible. "Hands-on" instruction on ICT use is necessary where ICT is deemed to be a vital component of the teaching and learning process. In addition, professional development activities should model effective practices and behaviors and encourage and support collaboration between teachers.

3. Effective professional development requires substantial planning A needs assessment should precede the creation of and participation in teacher professional development activities, regular monitoring and evaluation should occur of these activities, and feedback loops should be established, if professional development is to be effective and targeted to the needs of teachers.

4.7 Benefits of ICT in teaching practices and learning practices

Education has largely contributed to an increase in developing knowledge, providing an enabling environment for innovation and in building human capital required for a potential future knowledge economy. Global reforms in education and challenging ICT demands have made a remarkable shift in the structure of the enabling ICT environment and the utilization of ICT technologies in education. Such technologies have become the key driver of the digital network in an era of technology-driven education. More schools, colleges and communities now have access to ICT resources to join the global economy with knowledge workers who have 21st century skills and are inspired by life-long learning. ICT has become part of television, the internet, e-mail, the mobile phone, CD-ROM, DVD, handheld personal devices, and the new inventions. Those who work in academic institutions and development agencies and who are concerned about the challenges of development look to ICT to help find ways to assist students, clients and adults to learn more effectively. ICT has changed the way people communicate, learn, and conduct business. It can help in meeting development learning challenges in many ways

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4.7.1 ICT help teachers to create more 'learner-centric' learning environments

The most effective uses of ICT are those in which the teacher, aided by ICTs, can challenge pupils' understanding and thinking, either through whole-class discussions and individual/small group work using ICTs. ICTs are seen as important tools to enable and support the move from traditional 'teacher-centric' teaching styles to more 'learner-centric' methods.

4.7.2 ICT enables information and knowledge to travel faster and quicker.

New information and communication technologies overcome the barriers of distance and time, and improve the accessibility of information and knowledge. The sharing of information and knowledge speedily, effectively and successfully becomes possible and acts as a key component in achieving goals.ICT is suitable to quickly reaching larger numbers of people across a wide geographical space. The Internet is faster communication tool that is unrivalled for its power, speed and ability to reach an infinite number of users world-wide. Video conferences that allow people to see each other and to exchange information in real time. E-mail is another familiar ICT invention that allows large numbers of people to communicate directly, cheaply and fast. Now a day Distance education use ICT to offers potential learning opportunities to the remote students.

4.7.3 ICT supports information and knowledge sharing

Knowledge sharing and learning are increasingly familiar as being powerful contributors to the development progression. The increasing availability of new information communication technology, such as email, e-discussion tools, immediate messaging, IP phone and Video Conferencing, offers guarantee for widening the scope and degree of knowledge sharing and learning for development.

4.7.4 ICT makes available just-in-time information and knowledge for learning

Just-in-time learning means gaining of knowledge and skills as they are needed. ICT offers the possibility of delivering learning resources and opportunities when learners need them. "Companies can use technology to create just-in-time learning and Decision support systems that harnesses and disseminates the knowledge of the organization and helps managers make better decisions while learning," (Wind and Reibstein, 2000,

http://knowledge.wharton.upenn.edu/article.cfm?articleid=236). Infinite students and teachers contribute in education and training programs to gain knowledge and skills that may have future relevance ICT makes available and accessible just-in-time information and knowledge and provides opportunities for ongoing and life-long learning. Computer and Internet is a means of information and learning resources either by on-line searching or by using CD-ROMs or DVDs for self-paced learning. Well developed education websites and various online publications, as well as powerful search engines are capable of offer a tremendous amount of information and knowledge twenty-four hours a day. Learning is more likely to take place when the learner needs information, knowledge or skills to apply to the solution of an immediate problem or to complete a task. Information and learning becomes more relevant to needs and can be immediately applied.

4.7.5 ICT has bring about radical advances in distance learning

Distance learning is nothing but learning takes place away from the place of teaching, the very important benefit of distance learning is to provide learning opportunities to those who would otherwise be excluded. The major strengths of ICT is its ability to reach out to and include learners and clients who are separated by geography or are prevented from participating in learning activities by transportation, time or financial constraints. Due to its great accessibility and flexibility, distance learning using modern ICT has invigorated both adult education and training, and organizational training and learning. Now many higher educational institutions offering distance education courses have started to leverage the Internet to improve their programme's reach and quality.

4.7.6 ICT can significantly reduce learning costs

Due to new invention in information technology, the personal computer continues to become more and more accessible and affordable. The internet and cellular phone is becoming commonplace for millions of people including those in developing countries. The cost of videoconferencing connection is also lowered if Internet Protocol (IP) is used. By using ICT, training and learning can reach a large number of people at a low marginal

cost. The savings on travel and the economies of scale gained reduce learning costs and bring about cost effectiveness.

4.7.7 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 (which are 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 any time of the day and by an unlimited number of people. This is particularly significant for many peoples in developing countries, and even some in developed countries, that have limited and outdated library resources. ICTs also facilitate access to resource persons, mentors, experts, researchers, professionals, business leaders, and peers—all over the world.

4.7.8 ICTs help prepare individuals for the workplace.

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 everpresent. Technological literacy, or the ability to use ICTs effectively and efficiently, is thus seen as representing a competitive edge in an increasingly globalizing job market.

4.7.9 The ICT helps to improve the quality of education

ICTs can enhance the quality of education in several ways: by increasing learner motivation and engagement by facilitating the acquisition of basic skills, and by enhancing teacher training. ICTs are also transformational tools which, when used appropriately, can promote the shift to a learner-centered environment.

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 listen and become involved in the lessons being delivered. More so than any other type of ICT, networked computers with Internet connectivity can increase learner motivation as it combines the media richness and interactivity of other ICTs with the opportunity to connect with real people and to participate in real world events

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 as Sesame Street use repetition and reinforcement to teach. 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.

3. Enhancing teacher training.

ICTs have also been used to improve access to and the quality of teacher training. For example, At Indira Gandhi National Open University, satellite-based one-way videoand two-way audio-conferencing was held in 1996, supplemented by print-materials and recorded video, to train 910 primary school teachers and facilitators from 20 district training institutes in Karnataka State. The teachers interacted with remote lecturers by telephone and fax

4.7.10 Work on exercises or tasks individually

Students may find information on the Internet or by using an ICT-based encyclopedia such as Microsoft Encarta and search engine. They may find information by extracting it from a document prepared by the teacher and made available to them via ICT, They can use ICT to present their work in a highly professional format and also create documents and slideshows to demonstrate what they have learned, and then share this with other students, with their teacher, and even via email with people all around the world. They may find out information by communicating with people elsewhere using email, such as students in different colleges or even in a different country.

4.7.11 Work independently and individually at your own speed.

Students learn as an individual and not as a homogenous group. ICTs allow each individual to relate to the medium and its content.

4.8 Computers and the Internet use for teaching and learning

There are three general approaches to the instructional use of computers and the Internet, namely:

- 1) Learning about computers and the Internet . in which technological literacy is the end goal;
- 2) Learning with computers and the Internet : in which the technology facilitates learning across the curriculum; and
- 3) Learning through computers and the Internet: integrating technological skills development with curriculum applications.

1) Learn about computers and the Internet

Learning about computers and the Internet focuses on developing technological literacy. It typically includes:

- Fundamentals: basic terms, concepts and operations
- Use of the keyboard and mouse
- Use of productivity tools such as word processing, spreadsheets, data base and graphics programs
- Use of research and collaboration tools such as search engines and email
- Basic skills in using programming and authoring applications such as Logo or Hyper Studio
- Developing an awareness of the social impact of technological change.

2) Learning with computers and the Internet

Technological literacy is required for learning with technologies to be possible, implying a two-step process in which students learn about the technologies before they can actually use them to learn. Learning with the technology means focusing on how the technology can be the means to learning ends across the curriculum. It includes:

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- Presentation, demonstration, and the manipulation of data using productivity tools
- Use of curriculum-specific applications types such as educational games, drill and practice, simulations, tutorials, virtual laboratories, visualizations and graphical representations of abstract concepts, musical composition, and expert systems
- Use of information and resources on CD-ROM or online such as encyclopedia, electronic journals and other references.

3) Learning through computers and the Internet mean

Learning through computers and the Internet combines learning about them with learning with them. It involves learning the technological skills "just-in-time" or when the learner needs to learn them as he or she engages in a curriculum-related activity.

4.9 Fixed and Variable cost of ICT implementation

Blurton argues that "[w]hen considering whether ICT is "cost-effective" in educational settings, a definitive conclusion may not be possible for a variety of reasons. However, when considering the alternative of building more physical infrastructure, the cost savings to be realized from sharing resources, and the societal price of not providing access, ICT as a means of enabling teaching and learning appears to be an attractive and necessary alternative." particular ICT educational application is to focus too much on initial fixed costs—purchase of equipment, construction or retrofitting of physical facilities, initial materials production, and the like. But studies of the use of computers in classrooms, for example, show that installation of hardware and retrofitting of physical facilities account for only between 40% to 60% of the full cost of using the computers over their lifetume, or its *total cost of ownership*. while at first glance it may seem that the initial purchase of hardware and software is the costliest part of the process, the bulk of the total cost of ownership is spread out over time, with annual maintenance and support costs (known as variable or recurrent costs) constituting between 30% to 50% of the total cost of hardware and software. The cost of professional development, another variable cost, also

accumulates over time. For computer-based approaches the total cost of ownership therefore includes:

FIXED COSTS

- Retrofitting of physical facilities
- · Hardware and networking
- Software
- Upgrades and replacement (in about five years)

VARIABLE OR RECURRENT COSTS

- · Professional development
- · Connectivity, including Internet access and telephone time
- · Maintenance and support, including utilities and supplies

In order to determine cost efficiencies, fixed costs must be distinguished from variable costs, and the balance between the two understood. If the fixed costs of a technology project are high and its variable costs are low, then there will be cost advantages to scaling up. This is the case with general educational radio and television broadcasting. Programs such as Sesame Street and Discovery are more cost-efficient the larger their audience since the high cost of production is distributed over a larger viewer base while no staff expenditures are made for learner support

4.10 SAKSHAT: A One Stop Education Portal

The Ministry of Human Resource Development has designed an education helpline named 'Sakshat' SAKSHAT: A One Stop Education Portal launched on October 30, 2006 by His Excellency, the then President of India to facilitate lifelong learning for students, teachers and those in employment or in pursuit of knowledge free of cost to them. The content development task for 'SAKSHAT' was looked after by the Content Advisory Committee (CAC) for the respective subject, which consisted of representatives from educational institutions like IGNOU, Delhi University, Kendriya Vidyalaya Sangthan (KVS), Navodyaya Vidyalaya Sangthan (NVS), National Institute of Open Schooling (NIOS) and

National Council for Educational Research and Training (NCERT) and prominent academicians in the field. In addition, some NGOs had also provided the contents developed by them free of cost for this portal. The high quality e-content once developed will be uploaded on SAKSHAT in all disciplines and subjects. Several projects are in the completion stage and are expected to change the way teaching and learning is done in India.

The vision is to scale up this pilot project 'SAKSHAT' to cater to the learning needs of more than 50 crore people through a proposed scheme of 'National Mission in Education through Information and Communication Technology (ICT). The scheme is to provide connectivity to all institutions of higher learning to world of knowledge in the cyber space, to leverage the potential of ICT, in providing high quality knowledge modules with right e-contents, to address to the personalized needs of learners, in order to take care of their aspirations. These modules are to be delivered through 'SAKSHAT'.

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