ICT as a Tool for Achieving Literacy for All

What is ICT?
Information and communication technologies (ICT) are often associated with high-tech devices, such as computers and software, but ICT also encompasses more “conventional” technologies such as radio, television and telephone technology.

Definition of ICT
The term, information and communication technologies (ICT), refers to forms of technology that are used to transmit, store, create, share or exchange information. This broad definition of ICT includes such technologies as: radio, television, video, DVD, telephone (both fixed line and mobile phones), satellite systems, computer and network hardware and software; as well as the equipment and services associated with these technologies, such as videoconferencing and electronic mail.

What Role can ICT Play in Promoting Literacy?
The five key ways in which ICT can support literacy are outlined below.

1. Enhancing Learning
2. Broadening Access to Literacy Education
3. Creating Local Content
4. Professional Development of Teachers
5. Cultivating a Literacy-conducive Environment
ICT can be used as a tool for acquisition of literacy skills. For example, radio, when used in combination with printed course material, can make literacy lessons more true-to-life and interesting. Also, this combination of audio and visual stimuli is more effective than visual stimuli alone in enhancing vocabulary and sentence construction skills\textsuperscript{22} and can aid information processing and memory.\textsuperscript{23}

**Radio Lessons for Adult Literacy Learners**

The Project on Radio Education for Adult Learners (PREAL) aimed to enhance the functional literacy and reinforce the reading ability of women in rural areas of India through structured radio lessons. PREAL also aimed to use radio technology to increase awareness of the need for literacy and educate listeners on issues relating to daily survival.

The radio lessons taught learners to read no more than three words per class, and followed the instructional protocol of: listen and speak, listen and see, see and read.\textsuperscript{24} The radio programmes were accompanied by written material and were designed to be culturally and linguistically appropriate for the target audience. Lessons had entertainment value, and used storytelling, enactment, audio games, music and folklore to attract and motivate learners, and to strengthen the learning process.

The project involved distributing radio-cassette players and blank cassettes to adult education centres, where the learners gathered to hear the radio lessons. Cassettes were used to tape the radio lessons so that the lessons could be replayed later and also sent to areas outside the range of the radio station.\textsuperscript{25} An important element of the project was training of instructors, to ensure that the lessons delivered via radio were pedagogically sound.

Television, video, video-compact-disc (VCD) and digital video disc (DVD) technologies, provide words, images, movement and animation in combination with audio. This combination can facilitate reading comprehension and accelerate literacy learning. Such forms of ICT can also be entertaining and thereby motivate the target audience to watch and learn. Television and other audio-visual media can also provide a means by which to stimulate discussion and critical thinking.
**Literacy Lessons via Television**

An early initiative by the Pakistan Television Corporation, the “Adult Functional Literacy Programme”, an Education Television (ETV) project, used television in combination with literacy primer books to provide literacy lessons to adult students. Lessons taught learners to read and write simple sentences relating to their daily life and work.

The use of audio-visual techniques illustrated how letters and words are formed and reinforced learning of the elements taught. For example, animated writing on the television screen was used to show how to create the letters of the alphabet (in the “Nastaliq” form of the Arabic script), and simulations of syllable creation demonstrated how to form words.

The half-hour literacy lessons were telecast twice a day, six days per week, so as to reach people at a time that was convenient to them. The lessons were based around subjects of interest to the target audience, including health and nutrition, financial management and child care.

The success of the project was a consequence of two years of careful planning, as well as sound pedagogical principles. Content was designed to meet the needs and interests of the targeted learners, so as to ensure learner interest and motivation. The project was developed in collaboration with the Adult Basic Education Society (ABES) and was implemented with the support of a range of agencies and non-governmental organizations.

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**“Chauraha” Television Programme for Learning the Alphabet**

One of India’s recent initiatives using ICT to enhance literacy learning, this programme involved the regular screening of a television programme titled “Chauraha” (“The Crossroads”), on a State-run television channel. The programme taught the Hindi alphabet using puppets and a drama narrative.

Studies of the impact of computer assisted instruction (CAI) indicate that the use of computers in literacy education can enhance the uptake of literacy skills for a number of reasons. For example, since computers are able to provide users with immediate feedback, learners of literacy can proceed more quickly and effectively than otherwise. In this sense, computers and multimedia computer programs provide an advantage over radio and television in that they enable interactive learning, trial and error, and manipulation of text.

Using computer programs, the learner’s needs and interests can be met. Learners can work independently, flexibly, and at their own pace, developing both oral and aural skills at the same time as learning to read.

In addition, computers can be fun to use, especially for people who have never used them before, so can encourage learners to participate in literacy education and can motivate them to continue to learn - thereby increasing rates of retention of literacy students - as found in literacy education programmes in Egypt.
Furthermore, well-designed educational computer programs are exciting to use, which motivates learners, especially when literacy teachers are well-trained in integrating computer technology into lessons. For example, colours and animation in computer programs engage learners and encourage them to participate. Similarly, by presenting reading lessons in a game form, computer programs encourage learners to compete against themselves and therefore learners willingly engage in repetition and practice without losing interest. Such computer programs, by tirelessly repeating words and correcting errors for large numbers of students at the same time, also take the pressure off overworked teachers.

**Reading-Tutor Software**

Various software programs have been designed to support reading lessons and enhance learning. The range extends from software which assists learners with letter recognition and phonics instruction, to programs which enhance vocabulary building.

Whether or not investment in such software is worthwhile still being debated, however a study by Barker and Torgeson indicates that computer-assisted instruction may be valuable in improving the phonological awareness of children. The eight-week study examined the progress of children using a computer program which aimed to raise phonological awareness. At the end of the eight weeks, the abilities of these children were compared with two control groups of children, and it was found that children who used the phonological software had significantly more success in learning to discriminate and sequence the sounds in words, which improved their word-reading ability.

Other software programs that have been found to be useful for literacy instruction include voice-activated reading software, such as a computerized reading tutor which “listens” as a child reads, and notifies the child when he or she makes mistakes. Such software can also respond when the child clicks for help. A study which has examined the benefits of this type of software is Project LISTEN, an inter-disciplinary research project at Carnegie Mellon University. In trials conducted in 2003-2004, it was found that students using the “LISTEN” reading tutor software gained three times the reading fluency in the month of using the software than in the month they spent doing sustained silent reading.

Such reading-tutor software has particular potential for use among children with few opportunities for guided reading practice. For example, it can be very useful in assisting children whose parents cannot read (and who therefore cannot provide assistance in explaining how written words are pronounced). Such technology can also be useful when there is a large number of children in a classroom, as it gives learners individual attention and reduces a teacher’s working load. Recognizing the potential of this software for the developing world, TechBridge World has initiated “Project Kané”, a project which is exploring the role that LISTEN reading-tutor software can play in improving the literacy skills of children in Ghana.
Multimedia Software for Enhancing Reading Skills

With the aim of facilitating the process of learning to read, the Star Schools programme of the United States Department of Education has developed an online computer program titled “Network for English Acquisition and Reading” (NEARStar). While it is designed to assist children to learn to read, it also targets children who are learning English as a second language.\(^{33}\)

The education methodology used in the program enhances learning by:

- Encouraging active engagement in learning.
- Teaching a mix of literacy skills: phonemic awareness, word recognition, fluency, vocabulary and comprehension.
- Teaching learners to distinguish between the various sounds of the English language.
- Repeated exposure to content, including vocabulary, to foster development of skills.
- Encouraging reading of interactive books.

The program is based on five principles of interactive learning: situated learning; practice and feedback; learning by doing; learning from mistakes; and tell me, show me, let me do it.

The NEARStar computer program is designed to motivate children to learn to read, using multimedia: text, images, animation and audio, as well as game-like exercises, songs and other entertaining activities.

Each lesson is organized around five interactive learning activities that promote opportunities for learning reading skills. The concepts in the lessons are supported with text, pictures, and dialogue. In addition, interactive multimedia provides a meaningful context for the elements learned.

Lessons present pictures and cartoons which teach and reinforce recognition of a letter of the alphabet and of vocabulary beginning with that letter. For example, one lesson shows a \(\text{b}\)aby playing in a \(\text{b}\)ox that has the letter “\(\text{b}\)” on it, in a room which also has a \(\text{b}\)ell and a \(\text{b}\)ird. The software allows the learner to click on the various objects in the room, for example, the box, and see and hear the word “\text{box}” at the same time.

Such activities have been found to not only keep learners interested, but have a positive impact on listening and reading comprehension.\(^{34}\) An independent evaluation of NEARStar software by WestEd in 2002 concluded that students who used this software made significant improvements in reading achievement compared to the control group not using any software for learning.\(^{35}\)
Learning the Urdu Alphabet with Cartoon Qaida
This computer-based project involved developing an interactive, entertaining multimedia literacy course which was distributed on CD-ROM. The course teaches the Urdu alphabet using animated graphics and games.

The interactivity of the courseware, which enables instant feedback, combined with entertaining songs and activities, appeals to children and other learners, encourages participation, and enhances literacy learning.\(^\text{36}\)

The Tata Computer-based Functional Literacy Programme
The Tata Computer-Based Functional Literacy programme (CBFL) in India, uses a mix of methods, including computer software, animated graphics, multimedia presentations and flashcards, to teach reading skills.\(^\text{37}\)

The lessons are based on material developed by the National Literacy Mission and are carefully researched and formulated. Computers deliver the lessons in multimedia form, but these are supplemented with textbooks. Audio voiceovers explain how letters combine to give structure and meaning to various words and pronounce the words (this is particularly useful for languages such as Tamil, in which the same letter can be pronounced differently depending on the context).

The emphasis is on words rather than alphabets. Lessons are designed to be visually stimulating and entertaining, using elements such as puppets, and repetition strengthens what is learned. The process can be styled to suit the learner’s needs and learning speed; and the lessons can be tailored to fit different languages and dialects.

Under the project, a number of learning centres have been established. Each centre has a computer and an instructor (prerak). Because the project relies on computer programs, it has less need for highly trained teachers, which is an advantage in areas which lack teachers. A typical class has between 15 and 20 people and is held in the evening hours.\(^\text{38}\)
Bridges to the Future Initiative

The Bridges to the Future Initiative (BFI) aims to address the education and skills divide separating the rich and the poor by improving literacy, basic education, and technological abilities.

BFI has several areas of activities:

- Development of computer software tools to improve literacy education.
- Teacher training.
- Establishment of community learning and technology centres (CLTCs) for information resources and to support lifelong learning.
- Advanced ICT-supported services for disadvantaged regions.

BFI implements activities in India, Mexico, Ghana and South Africa.39

In India, BFI seeks to improve the basic skills, literacy and vocational skills of out-of-school youth and young adults in poor communities in various states, using innovative and cost-effective ICT tools.

In Mexico the goals of BFI are similar. However, because a large percentage of the illiterate population are speakers of an indigenous language, the project has been developed in two streams: in indigenous languages and in Spanish. On-line and printed educational materials have been designed for each stream.40

Little Explorer

This project, implemented in Mexico by the National Council for Educational Development, uses ICT to improve communication skills and logical reasoning skills of young children.41

The project has an integrated approach, combining the provision of computer hardware and software with the training of teachers. An innovative feature of the Little Explorer project is that it promotes a collaborative educational environment and encourages parental involvement in the children’s literacy education process. By using daily activities as the departure point for learning, the project draws on, and fosters, local practices and customs.

Learning sessions are held in which the children orient the parents in the use of the computer programs. Several cases have been reported which indicate that such interaction between parents and children using the software has also helped parents to learn to read and write. 42
**Audiobooks**
Audiobooks, available on audiocassettes and CDs, are recorded books. They are believed to be useful in raising learners’ interest in reading and, when used in conjunction with written texts, are useful in improving learners’ comprehension of text.

Learners can listen to the audio version of a book and follow along silently with the printed version. In addition, because hearing text read aloud improves reading ability, learners can improve their reading skills by reading the text aloud in conjunction with the audio.43

**Electronic Books and Online Texts**
Electronic books (e-books) are electronic texts that are made available on the Internet and CD-ROM. Some electronic books incorporate text enhancements, such as definitions of words or background information on ideas. Others offer images that complement the story.

Electronic books have the advantage over printed books in that they are searchable, they can be modified (for example, font sizes can be increased to meet the needs of the reader), and they can be enhanced with embedded resources (for example, definitions and details).

Electronic books can only be viewed with a computer (personal desktop computer, laptop computer or a special palm-sized digital reader) and often the text resolution is poor.44

**Talking Books**
“Talking books” are electronic texts that also provide embedded speech. The speech component can read out sections of the book and provide the pronunciation of specific words within the text. Such books support and coach students as they read the text of a story.

Electronic talking books are believed to increase motivation to read as well as promote basic word recognition. Furthermore, research findings indicate that the use of talking books has assisted children to improve their reading comprehension and their decoding skills.

Talking books have the potential to accelerate the speed of learning to read by offering readers immediate access to a word’s pronunciation and thereby easing the need for the learner to rely on context cues to understand new words.

Talking books can be useful tools for literacy teachers as they can be equipped with a system for tracking words with troublesome pronunciations. This system can provide feedback to teachers, enabling them to identify the words that a particular student needs assistance with.45
Simputer: Potential Device for Enhancing Literacy Education

The Simputer (Simple, Inexpensive, Multilingual People’s Computer) is a small handheld computer designed by the Simputer Trust, a non-profit organization, with the aim of enabling the widespread use of computers in India and other developing countries.46

With the intention of making it inexpensive, the Simputer was designed to use an open source (Linux) operating system, and the Simputer Trust encourages free software developers to make their applications compatible with the Simputer.

The Simputer uses a processing chip with low-power consumption so is able to be operated using three AAA batteries (or mains power supply). This keeps its running costs low.

The Simputer has simple user interface based on sight, touch and audio. It features a touch-sensitive screen which can be operated on using a pen-like stylus, and has handwriting recognition software (Tapatap), text-to-speech software, and audio functions, and can be used to access the Internet and send emails. It has a relatively large screen and high memory capacity compared with a Palm computer.

The Simputer is not intended to be a replacement for a personal computer, so is not designed for mass text or data entry. Instead it is intended as a means by which people can communicate and access information, via telephone and the Internet. The computer comes with software that permits the writing of text in Hindi and Kannada so can be used for sending messages in these languages. The Simputer is designed to be applied in sectors such as micro banking, agriculture and education, and can be shared or rented by a number of people.

This device uses icons rather than words, so can be used by people who lack literacy skills.47 However, because of the device’s handwriting recognition and text-to-speech capabilities, there is potential to use this device as a tool in literacy education.

The Simputer was launched for sale in March 2004 at a cost of around US$240 per device. Since then the price has dropped to as low as US$130 depending on the screen size and type. However, the Simputer has not been widely adopted. This is believed to be partly due to the lowering in price of laptops and palm computers, reducing the price-competitiveness of this device. Furthermore, with developments in mobile phones, the device’s usefulness as a communication tool has diminished. Also, although using the device does not require literacy skills, it is necessary to be able to read in order to benefit from written information that is published on the Internet. While this device enables access to the Internet, it does not enable comprehension of the information that is found there, which limits its usefulness as a tool for accessing information.
The One Laptop Per Child ($100 laptop) project, initiated by Nicholas Negroponte, has a similar aim to the Simputer project, in that it hopes to bring the benefits of computers to the developing world. Due to its ease of use, portability and low cost, the $100 laptop also has potential for use as a literacy education tool.

**Dynamic Indicators of Basic Early Literacy Skills Program**

The Dynamic Indicators of Basic Early Literacy Skills (DIBELS) program, developed by the University of Oregon, is software that can be installed in Personal Digital Assistants (PDAs) and utilized to enhance literacy education.

PDAs, also known as palmtops or handheld computers, are small hand-held computers that typically function as a phone, personal organizer and emailing device. Using software such as DIBELS, it is possible for a teacher using a PDA to get a quick indication of which students are on their way to successful early reading and which are not. It allows a teacher to make data-informed decisions, and it identifies strategies for teachers to use in order to assist the learner to improve their reading and writing skills. The device also enables the production of a parents' report, which suggests specific strategies for parents in order to identify and address gaps in early literacy.
Access to literacy education may be limited, or may be denied, for a number of reasons. These include social, cultural, political and geographical factors, as well as lack of time to attend classes, lack of qualified teachers, lack of literacy materials in local languages and issues such as delay in receipt of feedback and results.

ICT can help to overcome many of these barriers. For example, forms of ICT such as radio, television and the Internet can help overcome geographical barriers by facilitating distance learning, thereby bringing literacy education to people who live in areas that are difficult to reach.

Programa Escola Do Rádio
The Programa Escola Do Rádio is one of several non-formal literacy education programmes in Brazil. This project was initiated by a non-governmental organization and aimed to provide low-cost literacy education for youth and adults living in remote areas in the State of Paraiba.

The literacy course is five months long and uses a blend of face-to-face and distance education. Course material is provided via three forms of media: radio, television, and books.

Lessons are presented via 15-minute radio programmes which are repeated three times per day each week. Each lesson involves providing reading and writing activities for learners to do during the week and provides feedback on the previous week’s activities. The radio lessons are supplemented by a weekly television programme which presents information on the various themes covered in the radio lesson. The television series is video-taped so as to enable learners to view the episodes at convenient times.

As a support mechanism the students each have an “Amigo de Fé”, someone they know who has better literacy skills and is able to help them with their activities.\(^{49}\)

Although radio lacks the visual element required for literacy education, this technology is useful in literacy programmes as it is entertaining, easily accessible and affordable. Also, local radio stations usually have close ties with the resident community, so are in touch with the preferences of the community as well as the language and culture, and therefore have an understanding of the needs and literacy requirements of the community. Such an understanding of community needs is vital for the successful implementation of literacy education projects.
Gobi Radio Literacy Programme

This UNESCO project used radio, in combination with printed booklets, to deliver literacy education and other educational programmes to nomadic women in the Gobi Desert of Mongolia.

The target group was 15,000 nomadic women in the six Gobi provinces. These women were provided with radios, batteries, and printed learning materials.

The project, which was initiated in the early 1990s, involved broadcasting regular radio programmes on a range of subjects, including literacy lessons (titled “Shortcut” programmes) and health and income-generating skills (titled “Sunrise” programmes). While viewing their printed booklets, the women listened to the radio and participated in learning activities. The project also trained teachers who, after being trained, would each visit 15 learners from time to time to monitor their progress and address any issues.50

The use of radio and television in literacy education is limited in that these technologies give learners few options in terms of when and how they will learn. Radio and television programmes are usually broadcast at fixed times, which may not be convenient for everyone, and they do not allow learners to stop and start the lesson, so learners cannot learn at their own pace.

By providing literacy course content in a form that can be accessed by learners at a time that is suitable for them and at a speed that can be controlled, audio cassettes, videos, video-compact-discs (VCDs), digital video discs (DVDs), and compact discs (CD-ROMs) can help overcome the issues of lesson times and convenience. Furthermore, because these forms of ICT can be utilized in a learner’s own home, this can overcome social and cultural constraints that many learners may face in terms of attending literacy classes.

Functional Education Project for Rural Areas

The Functional Education Project for Rural Areas (FEPRA) was initiated by Allama Iqbal Open University (AIOU) with the aim of bringing literacy education to people in remote regions of Pakistan.

The project involved setting up literacy centres in the target areas and visiting learners at these literacy centres fortnightly to teach classes and monitor progress. Courses utilized audio cassettes which provided lessons in reading and writing in the local dialects of Siraiki and Punjabi. These cassettes were presented to learners by the teachers in conjunction with flip-charts - which gave visual cues - and printed literacy primers. The cassettes also covered subjects such as Poultry-keeping; Better Yields; and First Aid.51
Telecurso 2000

The “Telecurso 2000” project aims to provide non-formal literacy education for people in Brazil who did not finish school or cannot access school education. Over two million people have participated in the course so far.

The project delivers literacy education courses via television programmes and videotapes, with the support of textbooks. Learners can either watch the programmes at home (on television) or can visit one of many “Telessalas” (video classrooms) to watch the programmes on video. Telessalas are equipped with televisions, video cassette recorders (VCRs), blackboards, chalk, and desks.

The course uses interdisciplinary methodology, is student-centred and is designed in recognition of the fact that different people have different rhythms and modes of learning. Through this course, learners can complete the equivalent of four years of primary education in just over one year. Upon completion of the course, learners can take formal tests and, if successful, qualify for higher levels of education.

The project was developed by Fundação Roberta Marinho and Federação das Indústrias do Estado de São Paulo (FIESP). The success of the project is largely due to the partnerships which have been forged among telecommunication networks, civil society groups, public and private departments and institutions (schools, businesses, churches) which offer their premises as “Telessalas”.

Videoconferencing and teleconferencing are other technologies that can be used in literacy education. The use of these interactive technologies to communicate over long distances can save travelling time and money. For example, rather than bringing a teacher to a school in an outlying area, the use of videoconferencing can bring the teacher’s expertise to the students for a relatively low cost, and allow teachers to share their knowledge with others without requiring an absence from their normal classes.
ICT can enable the rapid and cost-effective creation and distribution of socially, culturally and linguistically appropriate learning content. For example, word-processing software can be used to modify literacy education material that has been developed elsewhere, to make it available in local languages and on locally-relevant subjects.

Similarly, desktop publishing technology is useful in creating local teaching and learning materials and it eliminates the problem of outdated learning content in many countries since it makes production of printed matter much more timely and relevant.

Computers can be used in a number of other ways to create learning content for literacy education. For example, the development of interactive computer programs for literacy learners, which are based on local themes and subject matter. Such learning materials can be easily and cheaply distributed via CD-ROM.

**Malay Nursery Rhymes CD-ROM**

In recognition of the need to foster the continued reading and knowledge of Malay literature, including children’s nursery rhymes, and recognizing the lack of children’s CD-ROMs and software in the Malay language, the National Library of Malaysia initiated a project to create and distribute a CD-ROM containing Malay nursery rhymes.

A multimedia CD-ROM was created which presents the nursery rhymes in an interactive format, enabling children to engage creatively and freely with the material. Due to the interactive nature of the CD-ROM, it is an interesting and entertaining resource for children’s reading and writing classes.

Unlike a textbook, a CD-ROM can fit volumes of information into a light and small package. This technology has enabled the creation of a relatively cost-effective product which can be disseminated easily and cheaply throughout Malaysia.
Bangla Innovation through Open Source

Bangla Innovation through Open Source (BIOS), a non-profit group, was established in August 2002 with the goal of addressing the issues of accessibility and affordability of ICT in Bangladesh.54

This group was set up in recognition of the fact that ICT are not being used effectively on a widespread basis in Bangladesh. BIOS identified two major obstacles to the use of ICT: usability and affordability of these technologies.

BIOS pointed out that some forms of ICT are often not usable by the majority of Bangladeshis because there has been little integration of the Bangla language with modern ICT so far, with the notable exception that typing and printing (using computers) in the Bangla script is now possible.

BIOS also pointed out that many forms of ICT are also not affordable for a major portion of the population of Bangladesh. Use of computers, for example, has been stifled by high software costs and licensing fees. This has led to widespread use of pirated software - a situation that is undesirable in terms of the obligation to adhere to intellectual property laws and regulations.

In recognition of these issues, BIOS has attempted to foster the development of open source technology components and has encouraged the integration of the Bengali language with ICT.

BIOS also advocates for the development of ICT-based learning materials in the Bengali language, including materials such as online Bangla dictionaries, open encyclopaedias and online literature archives.55 When such tools are easily accessible and freely available, they can be useful for literacy education programmes.

One of the projects implemented by BIOS has focused on developing freely-available multimedia learning materials for teachers and students.56 These materials are created by subject matter experts and are based on sound pedagogical theory, using good software design and clear graphics, so as to enhance the usability and interactivity of the materials.57

Digital cameras are another tool that can be used to create local content. Digital cameras can be used by students to collect images of objects of interest to them. When lessons are based around these pictures, this puts learners in greater control of their learning, and ensures lessons are interesting and relevant, making the learning process more effective. By matching words (in the local language) with images they have collected using digital cameras, learners are able to learn to read and write on subjects that are important in their daily life. Then, by sequencing the pictures, learners can create sentences and stories, thereby further developing their literacy skills.
Creating local content using digital cameras

Implemented by the Asia-Pacific Programme of Education for All (APPEAL) through the UNESCO Bangkok office, the “ICT Applications for Non-Formal Education” project supports the use of ICT in non-formal education, so as to enable learners to expand their livelihood opportunities and assist them in improving their quality of life.

The project supports the development of Community Learning Centres (CLC) and Village Knowledge Centres (VKC), and encourages equipping these centres with appropriate ICT. The project also supports the provision by these centres of literacy and basic education courses which utilize relevant ICT.

One such literacy course, offered by a Community Knowledge Centre in the Madurai district of Tamil Nadu state, India, utilizes various forms of ICT, including digital cameras, computers, presentation software and CD-ROMs, with the aim of enabling learners to create their own personalized content for their literacy course.

This personalized approach makes the learning process more effective and sustains the learners’ motivation. It also has the advantage of ensuring learning material is in the students’ own language.

The literacy course offered in the Madurai VKC begins with a lesson on how to use a digital camera. Participants photograph people and objects in their daily lives, including family, household items and surroundings. In the next lesson, participants learn how to put their photographs into slide presentations and how to store them on CD-ROMs, using the computers in the VKC. Then, with the help of the trainer, learners pair each photograph with a letter of the alphabet (in the Tamil language). For example, a photograph of a mother (amma) would be paired with the letter “a”. The slides are used as learning material in literacy courses and print-outs are also prepared so as to enable learners to practice and build their literacy skills outside the VKC.\(^{58}\)
Qualified and trained teachers represent the key to quality teaching and learner motivation. However, in many countries professional expertise is limited and thinly distributed, particularly for the provision of non-formal literacy education. While ICT cannot be substitutes for teachers, ICT can supplement and support teachers by reducing their workload and enhancing their lessons.

In addition, ICT can be used as effective and affordable tools in the professional development of teachers. For example, television, video and DVD technologies can be used to show examples of best practice teaching methodologies. Similarly, computers and computer programs can be used to train teachers in certain subjects. Also, teleconferencing can be used to enable interactive training over long distances, making in-service training affordable and simpler for teachers working in remote areas.⁵⁹

**Television and Video-based Professional Development**

In India and Bangladesh, teacher training programmes have utilized television programmes and videos to demonstrate pedagogical principles and teaching methods. Such programmes have enabled teachers to watch and learn from experienced teachers in real classroom settings.⁶⁰ For example, the Training and Development Communication Channel (TDCC), established in 1995, utilized video, videoconferencing and satellite technology to provide interactive distance education for teachers in remote areas of India.⁶¹
**TV Escola**

Established under the federal Distance Learning programme, the “TV Escola” project used television to provide training and refresher courses for primary and high school teachers in Brazil.\(^{62}\)

The objective of the project was to enhance the ability of teachers to utilize ICT in teaching. Initiated in 1995, this project also encouraged the integration of television, computers and the Internet as tools for literacy education.\(^{63}\)

**Literacy Teachers Formation Programme**

The Literacy Teachers Formation Programme (PROFA) was initiated by the Ministry of Education and Culture of Brazil, as part of efforts to enhance literacy education. This programme built on the successes of the Formar Project which trained public school teachers and literacy trainers in pedagogical techniques for literacy education. PROFA developed the competencies of literacy teachers further, using video-based teaching materials.\(^{64}\)

**ProInfo Programme for Professional Development**

In 1995, the Secretary of Distance Education Department (SEED) of Brazil established the “ProInfo” programme to promote computer access in public schools and facilitate relevant teacher training, using various distance education strategies. As part of this programme, the “Virtualizing” project was established. This project encouraged, via immersion in an e-learning environment, a culture of technology use and appropriate pedagogical strategies among teachers.\(^{65}\)

The Virtualizing project, and others under the ProInfo programme, encouraged teachers to use project-based pedagogical approaches and to have a critical and creative attitude to information and learning.

Teachers were taught to utilize ICT in teaching and to use ICT to create materials for use in classes.

The ProInfo programme also established a website for exchange of information by teachers, peer-learning, and online professional development courses; and developed software for teaching literacy via distance education.\(^{66}\)
For literacy to become widespread in a society, written material should also be readily available in daily life and accessible to all. Such an environment cultivates opportunities for coming into contact with, and creating, written material and thereby reinforces and promotes the development of literacy skills.

ICT can be utilized to help make written information part of everyday life. For example, television can be a tool for bringing written material into daily life when text is screened in conjunction with images on the television screen, such as subtitles on television programmes.

Similarly, short message service (SMS) technology, which allows subscribers to use their dial pads to type and send text-based messages through their mobile phone, encourages the development of skills in reading and writing and is therefore a means by which written material, and literacy skills, can become a part of everyday life.

Desktop publishing technology is another tool for creating a literacy-conducive environment, as it can facilitate production and distribution of local newspapers and can enhance information-sharing. Also, the relatively low cost of creating printed matter using desktop publishing can increase the quantity of circulation of print materials, thereby increasing the opportunities for access to written material.

A vast range of information, books, and other written text is available on the Internet and can be accessed at any time and from anywhere that has the infrastructure set up to provide it. The Internet therefore has great potential in terms of enabling people to have everyday access to written material.

Community learning centres (CLCs) and other information hubs have become a common way of cultivating sharing of knowledge and learning. With the introduction of ICT, particularly Internet CLCs are serving as a means to cultivate literacy by providing free or low-cost access to written material as well as courses in reading and writing skills.⁶⁷
The Educational Model for Life and Work

The Educational Model for Life and Work project (MEVyT), an initiative of the Mexican Government, seeks to enable free access to educational opportunities for people over 15 years of age who have not completed their basic education.

The MEVyT project has involved the setting up of community centres which are equipped with ICT, including an average of ten computers, a television, video equipment, CD-ROMs and educational videos, Internet access, and electronic and printed learning materials.

The MEVyT initiative has resulted in the creation of a diverse range of literacy education materials, which are designed in accordance with specific contexts and cultures. Target audiences include indigenous groups; itinerant agricultural day labourers; children not covered by the regular school system; as well as educationally deprived Mexicans who live in the United States.68

Initiative B@bel

Today, more than 90% of content on the Internet exists in only 12 languages, so many users of the 6,000 languages in the world are unrepresented. This limits the ability of groups who do not speak the 12 main languages to access information on the Internet, and there are implications for the continuity of the underrepresented 6,000 languages if they do not appear on the Internet - one of the most important communication media today. Recognizing this, UNESCO established Initiative Babel, which seeks to reduce linguistic barriers to information by bringing all written languages into the digital world. Initiative B@bel uses ICT to support linguistic diversity. The initiative involves activities to promote multilingualism on the Internet, enabling wider and more equitable access to information networks.69

Gyandoot Intranet

The “Gyandoot” (messenger of information) is a network in the Dhar District of India, which connects rural Internet centres. These centres,70 “Soochanalayas”, operate as information kiosks for retrieving information from the Internet for community members.71 The network is run using a very simple software package, in Hindi language, which requires minimum data entry at the client end. To ensure that the kiosks can provide affordable services, the computers in the kiosks utilize an open-source operating system (Linux). The increased awareness of computers created by the Soochanalayas, has resulted in greater interest in computer training and literacy among youth in rural areas, with positive results for community development.72
Ganokendra Community Learning Centres

In Bangladesh the Dhaka Ahsania Mission has established Community Learning Centres (CLCs) called “Ganokendra” (the people’s centre), with the aim of creating facilities for lifelong learning and community development. The Dhaka Ahsania Mission views literacy as the first step in a journey of lifelong learning, so encourages the development of literacy by making reading materials and other written information available at Ganokendras, and providing classes in literacy, numeracy and subjects relevant to local needs, including vocational training.

Same Language Subtitling on Television

In Same Language Subtitling (SLS), the lyrics of film songs shown on television appear as subtitles on the television screen in the same language as the audio.

Television is increasingly affordable and available and has widespread popularity. Same Language Subtitling, by putting text on the television screen with popular songs, could therefore reach millions of people and contribute to massive gains in literacy in a simple and cost-effective way.

SLS is operational in Gujarat State in India as a result of the efforts of the Indian Institute of Management (Ravi J. Matthai Centre for Educational Innovation or RJMCEI), ISRO (Development and Educational Communication Unit or DECU) and Doordarshan Kendra (Gujarat State Television). In this State, the weekly telecasts of ‘Chitrageet’ - a programme of Gujarati film songs - have been subtitled in Gujarati since May 1999. The subtitled words change colour to match the audio, making it easy for people to follow along. This feature is highly popular. Viewers enjoy SLS because it helps them to sing along with songs and learn the song lyrics. It also enables them to write down song lyrics for later reference.

While SLS increases the entertainment value of popular song programmes, it simultaneously enhances reading abilities and makes reading practice an incidental, automatic and subconscious process. In addition, the complementary effect of audio (songs) and visual cues (subtitles) enhances the reading comprehension of viewers. Research has shown that reading ability improves steadily as a result of viewing film clip content with the addition of SLS. Same-language subtitling has also been shown to strengthen grapheme-phoneme associations and ensures that nascent reading skills are reinforced.
The Kailu ICT-based Training Programme
The Kailu ICT-based Training Programme was an initiative of the Chinese government, in cooperation with social organisations and with the participation of schools and communities.

Kailu county is an under-developed region of China and suffers from a shortage of infrastructural facilities. The programme utilized ICT to train people in rural areas of this county, with the aim of enhancing livelihoods and bringing about improvements in the quality of life.

Various forms of ICT were used including radio, television, video and VCD, in conjunction with print materials, to disseminate information and train people on various topics relating to farming production and agricultural management practices. For example, videos were made available to farmers about adopting modern technology to improve their rice, corn and wheat yields.

Commonwealth of Learning Literacy Project
The Commonwealth of Learning Literacy Project (COLLIT) project was carried out with funding from the UK Department for International Development (DFID) in collaboration with country partners that, in Zambia, included the University of Zambia and the Ministry of Social Services and Community Development, and, in India, included the Indira Gandhi National Open University, CEMCA, the M.S. Swaminathan Foundation and the State Resources Centres in Jaipur and Indore.

Under this project, the usefulness of various ICT applications in the provision of literacy programmes was tested. Data was collected by in-country evaluators in India and Zambia. Some of the key findings of the study were as follows:
>> ICT can be used very creatively to produce locally relevant learning materials;
>> Learning to use the equipment is both easy and highly motivating for learners;
>> The sustainability of ICT access centres is greatly enhanced when local communities are enabled to take responsibility for managing them and when use is shared with other community agencies.

The study findings highlighted the growing awareness that it is not the learning of literacy skills that brings about social and economic benefits but the ability to use literacy skills in real life instances. Literacy learning must encourage the use of skills in real life situations and promote the transfer of literacy skills from the adult classroom into the external world.
In 2001, the Ministry of Science & Technology (MOST) of China, in cooperation with the United Nations Development Programme, initiated a project to establish rural community Internet Information Centres in five provinces of central China.

A network of Internet Information Centres has been created. A national office supports five individual county centres. In turn, these county centres support two Internet centres in towns. Each of these Internet Centres is responsible in turn for two Centres in villages. There are therefore approximately thirty town and village Internet Information Centres per county.

The Centres are intended as information hubs or online libraries. Each Internet Information Centre has computer terminals with Internet access (via dial-up phone lines) as well as a phone and fax machine, and a VCD and video machine for providing information and training on subjects relating to specific community needs, such as improved farming techniques. The Internet Information Centres provide users with basic training in typing, computer operations, and searching for information online. Most centres also have a bulletin board which features useful information retrieved from the Internet. Each centre has a staff of between two and five people. One person manages the centre while the others provide training and assist users to search for information online.79