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Using ICT to Develop Literacy

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UNESCO ICT in Education Programme

United Nations
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Contents

In spite of the vital importance of literacy in terms of its benefits for individuals, communities and nations, a vast number of people remain illiterate. While progress has been made over the past 60 years towards achieving universal literacy, the poorest and most marginalised groups of people have yet to be reached.

Recognizing this situation, in 2002 the United Nations declared the decade between 2003 and 2012 the "United Nations Literacy Decade". The aim of the Decade is to bring literacy to all.

The use of information and communication technologies (ICT) continues to expand exponentially, bringing unprecedented opportunities for achieving greater educational access and success. Given this potential, UNESCO recognizes that attention should be paid to how ICT can contribute to increasing access to literacy and improving the quality of literacy education.

This booklet aims to provide a concise overview of the literacy issue and explain how ICT can be used to enhance literacy education and contribute to achieving the Literacy Decade goals. The booklet will focus on five areas where ICT can be utilized in literacy education: enhancing learning; raising access to literacy education; training of teachers; localizing content; and creating a literacy-conducive environment.

Examples of the use of ICT in literacy education will be provided, including examples drawn from the reports produced as a result of the "Study on Best Practices in ICT-based Education", conducted by UNESCO Islamabad in 2004. The study examined the use of ICT in education in seven of the E-9 countries, Bangladesh, Brazil, Egypt, India, Mexico, Pakistan and the People's Republic of China, and was carried out as part of the UNESCO "ICT for the Promotion of Literacy" project.

This booklet will conclude with a "Memorandum for Policy Makers", which suggests areas in which policy makers should concentrate their efforts to enhance literacy in their countries, and how ICT can assist in those efforts.

Acknowledgements

2 How You Can Use This Booklet

This booklet will enable readers to:

- ❯ Learn about the literacy challenge and the United Nations Literacy Decade Plan of Action.
- ❯ Recognize the potential of ICT as a tool in addressing literacy challenges.

- ❯ Learn from successful literacy projects being implemented in countries in the Asia-Pacific region and other regions of the world.
- ❯ Develop effective strategies for using ICT as a tool in action plans to achieve the Literacy Decade Plan of Action goals.

3 What is Literacy?

While all approaches to literacy are related to the ability to understand and communicate via written text, there is no standard international definition of literacy that captures all its facets. Over the past 60 years our understanding of literacy has expanded and the definition has subsequently evolved. This evolving definition has in turn led to changes in approaches to literacy education.

Definitions of Literacy

In 1958, in an attempt to provide a simple definition that would enable the comparison of international data on literacy levels, the United Nations Educational, Scientific and Cultural Organization (UNESCO) defined a literate person is one who can "read and write, with understanding, a short simple statement about his or her everyday life"[1].

According to this view of literacy, people were divided into two distinct categories: literate and illiterate. Later, recognition of the diversity of needs of learners led to the identification of a range of literacy levels. Following this shift, assessment of literacy focused on determining whether people have a level of literacy adequate for their needs.

It became clear that literacy campaigns must be more than merely about the acquisition of technical skills and need to also take into account the context and motivations of learners.

This new understanding of literacy led to the idea of "functional literacy". A definition for this was suggested in 1978 as follows: "A person is functionally literate who can engage in all those activities in which literacy is required for effective functioning of his (or her) group and community and also for enabling him (or her) to continue to use reading, writing and calculations for his own and the community's development."[2]

With the understanding that literacy is a set of practices which are defined by their cultural context, rather than as merely technical skills, came awareness of the range of uses that literacy skills have in everyday life, from the exercise of political rights to self-instruction. This led to recognition in the 1980s and 1990s of the need for context-sensitive and learner-centred forms of literacy education, as well as the need for creating environments that are conducive to literacy.

Differing needs

Depending on their location and lifestyle, learners have differing needs when it comes to literacy. For example, while in some circumstances, being able to read basic health information may be sufficient in order to function effectively in the local society, in other situations, a person may require advanced skills in understanding and communicating through written text.

While aware of the complexity and diversity of the concept of literacy, UNESCO is also sensitive to the need to have internationally-comparable literacy rates. With these factors in mind, UNESCO's Education for All 2000 Assessment revised the earlier definition of literacy as follows, "The ability to read and write with understanding a simple statement related to one's daily life. It involves a continuum of reading and writing skills, and often also includes basic arithmetic skills (numeracy)". This definition has been adopted and adapted by many countries; however the different methods used by different countries for measuring literacy continue to create difficulties in making cross-country comparisons.

Language

Many of the world's languages are not used as a medium of instruction in formal schooling. Figures on "literacy" therefore represent literacy in the dominant language of a country, not necessarily in the learner's mother tongue.

The standard definition identified in 2000 does not explicitly take into account the diversity of languages in the world. While a person may be able to read and write, this definition of literacy does not specify whether the language they can read and write in is their mother tongue. It is worth noting that when literacy programmes are provided only in a country's "official" language, these programmes can undermine the survival of minority languages. UNESCO recognizes that literacy education in mother tongues can not only foster the survival of minority languages but can also motivate learners to gain literacy skills and, by making literacy more relevant, support the creation of a literacy-conducive environment.

Recognizing that "people acquire and apply literacy for different purposes in different situations"[3], and that literacy is not uniform, but is culturally and linguistically diverse, UNESCO today views the concept of "literacy" as a plural notion. UNESCO recognizes that skills for written expression and comprehension are related to particular contexts and languages, and that the value of these skills lies in the ability to apply them in a beneficial way.[4]

New Uses of the Word "literacy"

The word "literacy" is often used today as a substitute for the word "ability" or "competency". For example, "computer literacy" is the ability to use computers, and access and create information through a computer.

Such uses should not be confused with the term "literacy" as we use it here, i.e. the skills related to reading, writing and communicating in the written form.

"...literacy is not uniform, but is culturally and linguistically diverse..."

© Elizabeth D'Orcy

Examples of other uses of the word "literacy" include:

- Information literacy: The skills required to organize and search for information, while also analyzing that information.
- Critical literacy: the ability to engage in critical thinking, and judge the intention, content and possible effects of written material.
- Mobile literacy: The ability to use mobile technology, such as a mobile phone and its non-voice features.
- Media literacy and research literacy: The ability to be a discerning reader and the ability to find various types of information.
- Cultural literacy: the ability to understand cultural, social and ideological values in a given context.
- Legal literacy: the knowledge of basic legal rights and how to protect those rights.
- Visual literacy: the interpretation of images, signs, pictures and non-verbal (body) language.

While the abilities listed here, such as computer "literacy" and information "literacy", are necessary skills to cultivate in emerging knowledge societies, the ability to read and write is a prerequisite for gaining many of these abilities. Furthermore, studies indicate that although learning to read and write requires significant guidance and a degree of formalized education, learning to use a computer and other modern technologies can be an intuitive process. The "Hole-in-the-Wall" study, for example, which set up computers in public spaces in slum areas of India, found that curious children in these areas became proficient in browsing the Internet and using certain computer programs within days, without any formal teaching. This example demonstrates that, for children at least, it is possible to gain basic computer skills without formalized assistance.[5] This implies that the various forms of "literacy" associated with the rise in use of new forms of ICT, such as "mobile literacy", do not require the same degree of emphasis and investment that learning to read and write requires.

4 Why Literacy Matters

The benefits of literacy are varied, ranging from the individual benefits of raised self-esteem to the socio-economic benefits of greater workforce productivity. Some of the key areas in which literacy brings benefits are outlined below.

Self esteem

Studies on the behavioural changes involved in literacy training indicate that learning to communicate in the written form has a positive impact on self-confidence and self-esteem.[6]

Empowerment

Literacy has the potential to empower learners to have more control over their own learning and knowledge development. In addition, literacy can give learners greater control over everyday-life situations including avoiding being cheated.[7]

Communication

Migration and immigration are taking place on an unprecedented scale. Literacy enables written communication with family and friends, which not only benefits the individuals concerned but contributes to strengthening social bonds.

Education

Literacy constitutes learning how to learn, so it is the core of education. Without literacy, certain subject areas are inaccessible. In addition, literacy skills enable learners to become able to teach themselves, thus opening the way to lifelong learning.

Maternal and Child Health

Literacy can enable people to develop their knowledge and capabilities in a range of areas. In this regard, women have often benefited greatly from non-formal literacy education programmes.

It has been shown that when women gain literacy skills and are able to expand their learning in topics such as nutrition and health care, there are benefits in terms of improved health of both women and their children, and reduced child mortality (and therefore reduced birth rates). In addition, there is increased demand by women for access to education for their children, together with better learning achievements by their children.[8]

Socio-economic development

The links between increased literacy and greater economic returns are not direct, and literacy does not automatically generate socio-economic development,[9] but because literacy can enable individuals to have a wider range of choices in terms of education and skills-development, literacy can lead to greater knowledge and skills, and can

therefore permit individuals to enter into higher-paid forms of employment.

In addition, it has been shown that literacy leads to increased productivity. A country with high literacy rates is likely to have a more productive workforce and is therefore better situated in terms of its potential to bring about improvements in the quality of life of its population.

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Knowledge, Development and Literacy

Material resources and their processing are the basis of economies. However, economies also rely on existing knowledge bases and, therefore, intangible human and social capital are also vital resources. The value of human and social capital lies in the abilities of people to analyze information and engage in critical thinking and innovation. Factors such as these, in combination with cultural elements, act as catalysts for socio-economic development.

While knowledge is not always in the written form, the developments in information and communication technology have meant that knowledge sources are increasingly available in written form, and the transfer of written information has sped up significantly. This has led to the very rapid exchange of knowledge, which fuels socio-economic development, and in turn leads to further innovation and technological development.

To manage the rapid flow of written information and knowledge economies need a continual supply of highly-literate people. Without high rates of literacy, countries cannot keep up with the speed of technological development, and cannot benefit from the advantages technologies bring in terms of fuelling socio-economic development. In such a context, it is vital that all countries strive towards the achievement of Literacy for All as a priority development goal.

Participation

Literacy, by facilitating access to written information about socio-political events and processes, can enable people to participate more fully in such things as community meetings, trade union activities, and national political life.[10] Literacy also enables people to become aware of, and exercise, their rights. For example, after developing literacy skills, a woman in Mexico learned how to search for information on the Internet and accessed information relating to human rights. From this she learned that her father, who was in prison, was being held unjustly. With her new knowledge and with legal advice, she achieved her father's release.[11]

In addition, literacy skills open up opportunities for active participation in the emerging "knowledge societies". In knowledge societies, with new technologies and the growth of the internet as a public network, the work of modern businesses, governments, health systems and institutions is made possible because of the capacity to generate written information and communicate it quickly to others, no matter where they are in the world.[12] Without literacy skills, the scope for participation in such societies and public knowledge fora would be extremely limited.

Cultural identity and diversity

The promotion of literacy, especially in mother tongues, fosters the capacity to express cultural identity and strengthens local knowledge and experience. In addition, by enabling communities to access written records, literacy can enhance awareness and appreciation of heritage and culture, and therefore contribute to safeguarding cultural diversity. For example, by teaching minority groups and indigenous peoples how to read and write in their languages, these groups can learn about their heritage and become empowered to enhance and protect their cultures and rights.[13]

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The task of achieving global literacy is enormous. Using the standard measure by which people report on their own literacy[14], there are 771 million illiterate adults globally, or 18% of the world's adult population, according to the latest estimates.[15]

Although figures vary depending on the region, it has been estimated that on average, two thirds of adults without literacy skills are women.[16] Furthermore, older people, especially those who have never attended school, are generally more likely to lack literacy skills than younger people.[17]

Literacy Facts

771 million people aged 15 and above do not have basic literacy skills

Worldwide, only 88 adult **women** are considered literate for every 100 men

Literacy rates are lowest among linguistic, ethnic, religious and other **minority groups**

Illiteracy tends to prevail in low-income, often heavily indebted countries with widespread **household poverty**

The lowest literacy rates are found in Africa, South and West Asia and the Arab States. In absolute terms, over 75% of all illiterate people live in 12 countries, with 45% of the world's 771 million illiterate adults living in the two most populous countries, India and China (34% and 11% respectively).[18]

Within countries, there are often enormous rural-urban divides, with most illiterate people residing in rural areas. However, geographical disparities in literacy are complex. The rural-urban divide is sometimes not as significant as the intra-urban differences. For example, there are significant differences in the literacy rates within urban areas in China due to the gap in literacy levels between native and migrant

workers in these areas. Intra-rural differences can also be more significant than rural-urban divides. For example, in Egypt some rural areas have significantly higher literacy rates than others.

The rural-urban, intra-urban and intra-rural differences are often related to social and cultural factors; with nomadic populations having lower literacy rates than other rural populations, for example.[19] However, in many cases the gap in literacy rates is a result of certain population groups being excluded from mainstream society. This exclusion often results in reduced access to formal education and literacy programmes for these groups - for example, religious and ethnic minority groups.[20]

In an examination of literacy statistics, one of the strongest correlations is between household poverty and illiteracy.[21] Evidence indicates that people who come from low-income households, and therefore lack adequate nutrition and hygiene, are less likely to acquire and use literacy skills. This implies that when implementing literacy education activities targeting low-income households, it may be necessary to first address the basic nutritional and health needs of the target group.

Towards Better Measurement

Due to differing methods for measuring literacy, data on literacy is not always credible and comparable. In addition, conventional assessment methods for measuring literacy rates are indirect and are overly simplistic.

The UNESCO Institute of Statistics (UIS) has therefore launched the Literacy Assessment and Monitoring Project (LAMP) which aims to define and measure a spectrum of literacy skills in developing countries.

Further information about LAMP can be found at this website: http://www.unescobkk.org/aims/lamp

6 The United Nations Literacy Decade

In 2002, the United Nations declared the decade between 2003 and 2012 the "United Nations Literacy Decade". The aim of the Decade is to bring literacy to all. The overall target for the Literacy Decade is the UNESCO Education for All (EFA) goal of increasing literacy rates by 50% by 2015.

Because of the social and political benefits that literacy brings, the achievement of the Literacy Decade goals is central to the realization of the Millennium Development Goals (MDGs).

Many people are insufficiently literate: they lack the expression and comprehension skills that enable them to learn and thereby to improve their daily lives. Some people lack literacy skills because they have not had the opportunity or the means to attend school; others because their schooling was cut short or of poor quality. As noted earlier, these people are almost all poor, two-thirds are women, most are older, almost all live in low-income households in developing countries, and most belong to linguistic or cultural minority groups. The Decade, under the banner of "*Literacy for All: Voice for All, Learning for All*," will focus on reaching the most marginalized groups of people.

Literacy efforts during the Decade will focus on developing locally sustainable literacy environments which will give people opportunities to:

- Express their ideas and views
- Engage in effective learning
- Participate in communication
- Exchange information and share knowledge with others.

Global Commitment to Literacy

Perhaps the strongest assertion of renewed commitment to literacy has been Resolution 56/116 adopted by the United Nations General Assembly which proclaimed the United Nations Literacy Decade for the period 2003-2012.

Resolution 56/116 recognises that

"Literacy is crucial to the acquisition …of essential life skills that enable (people) to address the challenges they can face in life, and (literacy) represents an essential step in basic education, which is an indispensable means for effective participation in the societies and economies of the twenty-first century."

The resolution also supports the concept of Literacy for All in its reaffirmation that

"Literacy for all is at the heart of basic education for all and … creating literate environments and societies is essential for achieving the goals of eradicating poverty, reducing child mortality, curbing population growth, achieving gender equality and ensuring sustainable development, peace and democracy…"

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The United Nations General Assembly asked UNESCO to take on the coordinating role during the Literacy Decade, bringing partners together for joint action and policy debate. In response to Paragraph 11 of Resolution 56/116, which requested an action-oriented plan of action to be submitted to the General Assembly at its 57th session, UNESCO developed the "International Plan of Action".

6

The UN Literacy Decade International Plan of Action has six key lines of action. These are as follows:

Policy

Programme Modality

Monitoring and Evaluation

Capacity Building

Community Participation

Research

The complete text of the International Plan of Action can be obtained by visiting the Literacy section of the UNESCO portal:
http://portal.unesco.org/education/en/ev.php-URL_ID=12013&URL_DO=DO_TOPIC&URL_SECTION=201.html

Literacy Initiative for Empowerment

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The Literacy Initiative for Empowerment (LIFE) is a global strategic framework and key operational mechanism for achieving the goals and purposes of the UN Literacy Decade.

The LIFE strategy focuses on empowering learners through country-led practice, informed by evidence-based research.

Working globally, UNESCO will raise awareness on the importance of literacy, rally political will and resources, oversee policy development and capacity-building through technical assistance, and develop rigorous monitoring and evaluation mechanisms to measure LIFE's effectiveness.

As a global strategy supported and led by UNESCO, LIFE operations will be country-led, respond to country-specific needs and priorities, and correspond to national capacities.

LIFE will be implemented in 35 countries with a literacy rate of less than fifty percent or population of more than 10 million without literacy competencies.

For further information visit the LIFE section of the UNESCO website:
http://portal.unesco.org/education/en/ev.php-URL_ID=42853&URL_DO=DO_TOPIC&URL_SECTION=201.html

7 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.

8 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[22] and can aid information processing and memory.[23]

Radio Lessons for Adult Literacy Learners
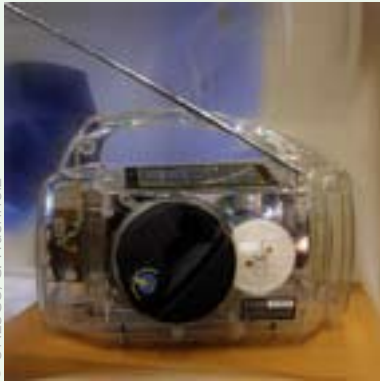
© UNESCO/C. Wachholz

This radio has been designed with a hand-crank, avoiding the need for electricity or batteries.

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.[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.[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.[26]

"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.[27]

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.[28] 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.[29]

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

Students in Thailand using computer software in reading classes.

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.[30] 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.[31]

 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.[32]

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 lean 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 **b**aby playing in a **b**ox that has the letter "**b**" on it, in a room which also has a **b**ell and a **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 "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.[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.[37]

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Young men in a slum area of Delhi, using their literacy skills and computers to submit a proposal for better utilities and other services in their community.

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.[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.

Mexican woman learning how to read and write.

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.[48]

© UNESCO/C. Wachholz

Mobile learning device.

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

© UNESCO/Arthur Gillette

Women in Mongolia participating in a literacy class.

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

Utilizing television and video for literacy classes.

© UNESCO/Ramon Lepage

The "Telecurso 2000" project aims to providing 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 Industrias 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".[52]

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

© UNESCO/Marilyn Jeffrey

Children using a computer and CD-ROMs in reading class.

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.[53]

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

Demonstrating the use of CD-ROMs in literacy class in India.

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 was 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

© UNESCO/Brendan O'Malley

Teachers in Bangladesh learning new teaching methodologies.

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

© UNESCO/M. Soler-Roca

Students in Brazil participating in a literacy class.

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.

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Afghan woman reading an independently published newspaper.

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 access, 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

A woman learning how to write in a literacy class.

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

© UNESCO/Brendan O'Malley

Women learning to read in a Ganokendra in Bangladesh.

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.[73]

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.[74]

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.[75] 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.[76]

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.[77]

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.[78]

Internet Information Centres

Publicly available printed materials reinforce literacy skills.

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]

What has been the experience of countries in the use of ICT for literacy so far?

"...learning materials must be appropriate to the needs and language of learners..."
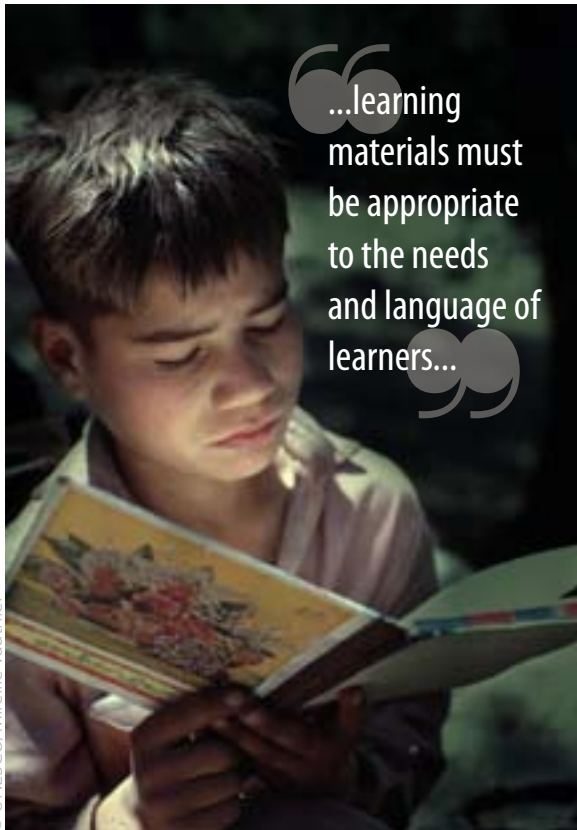
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In order to help answer that question, and in response to the Beijing Declaration, in 2004 UNESCO Islamabad commissioned the "Study on Best Practices in ICT-based Education". Seven of the E9 countries participated in the Study, namely, Bangladesh, Brazil, Egypt, India, Mexico, Pakistan and the People's Republic of China.

The Study examined initiatives that use ICT as a tool in efforts to improve literacy. The reports from each of the seven countries describe the issues faced in literacy education and present the lessons learned in the use of ICT in literacy education in each country. The reports also provide examples of good practice for possible adaptation elsewhere and highlight innovative practices where applicable.

The seven reports show considerable variation in research objectives and methodologies. Without commenting on the adequacy or inadequacy of the research design or approach, an attempt is made below to extract from the reports of the seven countries the common issues and lessons learned. An attempt is then made to cull out lessons that would be of interest to policy makers insofar as the use of ICT in literacy programmes is concerned.

Common Issues

>>   Lack of learner motivation

Literacy education programmes, particularly non-formal education projects, sometimes come up short because they cannot attract students. A major reason for this is that the targeted groups do not see how literacy can benefit them, and are therefore not motivated to learn.

For literacy programmes to be effective it is therefore important that participants understand how literacy can be beneficial to them. As found in the Egypt study, learners who understand the relevance of literacy for their lives tend to be more enthusiastic about investing their time and effort in learning to read and write.[80]

>>   Lack of trained educators

Several country reports highlight the scarcity of teachers trained in the use of ICT for literacy education.[81] Some studies also reveal a negative attitude among educational personnel towards the use of ICT, particularly when the use of technology will involve changes to their work routines.[82]

These findings indicate that for ICT to be utilized successfully in literacy education, it is necessary for teachers to become aware of the potential for ICT to enhance their teaching and reduce their workloads, thereby providing them with motivation to learn how to use computers and software tools and to learn how to integrate ICT into teaching.

>>   Lack of policies for the use of ICT in literacy education

While policy for the use of ICT in education exists in many of the countries studied, there is no clear focus on using ICT for basic (primary) education, particularly literacy. It is therefore evident that a policy for integrating ICT into literacy programmes needs to be formulated in most countries.

>> Limited commitment to adult literacy education

While literacy rates for children are growing steadily in most of the E9 countries, many face a massive problem of adult illiteracy. However, the commitment to, and investment in, adult literacy programmes is not commensurate with the scale of this problem, and adult literacy-education policy has often remained a neglected area for policy makers and planners in these countries.

>> Little attention paid to the quality of literacy education

Since the populations of the E9 countries are so large, many are still struggling to expand primary and secondary education, and achieve EFA goals, so they are yet to address issues surrounding the quality of literacy education.

>> Funding and sustainability issues

In countries such as India and Bangladesh literacy programmes are often initiated by NGOs. However, NGO projects are by and large small-scale pilot projects, which rely on intermittent funding. So while these projects may succeed, they suffer from the problem of sustainability.[83] Well-designed, good quality literacy programmes require secure funding, so it is important that donors are made aware of the importance of literacy and what the financial requirements are for achieving the Literacy Decade goals.

>> Lack of infrastructure

Several of the country reports point out that an obstacle to the use of ICT in literacy education is underdeveloped infrastructure. Problems include: lack of reliable electricity supply, lack of telephone lines and low bandwidth capacity. These factors have severely constrained the use of ICT in literacy education, even in schools. Other associated factors, such as a lack of technical and maintenance personnel also constrain the extent to which ICT can bring benefits to literacy education.

Lessons Learned

All seven country studies agree that ICT is not a panacea for meeting the challenge of achieving Literacy for All. However, the effective utilization of ICT can enhance literacy education initiatives and bring about successful outcomes. On the basis of the practices described in the seven country reports, overall lessons can be drawn. These are listed below.
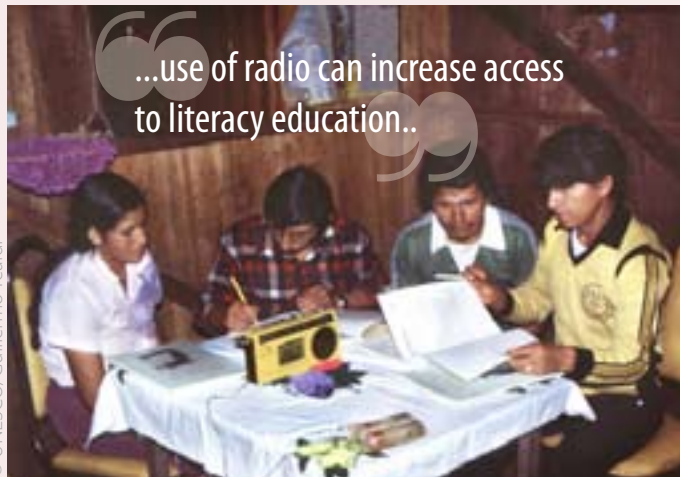
"...use of radio can increase access to literacy education.."

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The successful experiences of many countries using technologies such as television, radio and video, have shown that even "low-tech" devices can be very useful in enhancing literacy education, and in widening access to literacy education, training teachers and creating a literacy-conducive environment.

In India and Pakistan, for example, television has been used effectively in several literacy education initiatives. Likewise, radio has been used successfully in Mongolia to bring literacy education to people in remote areas. In addition, programmes in Brazil have utilized video and VCD technologies to assist in the professional development of teachers.

It is therefore important for policy makers to consider what existing ICT options there are and whether these can be utilized successfully in literacy education initiatives, before exploring more "high-tech" options.

The country reports indicate that there is also great potential for success when conventional technologies such as radio and television are utilized in creative combinations with newer forms of ICT. For example, a combination of radio programmes and computer-aided-instruction could be used to enhance literacy education for people in remote areas.

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...literacy initiatives must consider the cultural context and learners' needs...

Several studies, including the Mexico study, found that when subject matter is determined by the learners themselves this leads to increased interest and motivation to participate and learn.[84] Learners should therefore be given the opportunity to express their views and literacy needs.

In addition, literacy teachers should utilize learner-centred teaching methodologies to ensure that learners remain interested and motivated. This requires that teachers should be trained in learner-centred methodologies as well as in how to integrate the use of ICT into teaching and learning.[85]

Furthermore, the experiences of Mexico and China have highlighted that it is important that the technologies chosen for utilization in literacy education are relevant for the specific target group. Also, ICT should not be imposed on learners, but rather they should want to utilize it.

In order for any literacy education initiative to be successful, the cultural context needs to be considered and the courses planned accordingly. For example, in some cultures men will not accept being taught by women, so will therefore not attend literacy classes taught by a woman. It is therefore necessary to ensure that a sufficient number of male teachers is available. Similarly, in some cultures female participation in literacy education will require the presence of an adequate number of female teachers.

The Pakistan study found that when planning a literacy education course it is important to also consider the factors affecting class attendance. For example, factors such as the work commitments of the targeted learners, and major sporting events and religious occasions need to be taken into account as these may preclude class attendance.[86] In addition, the learners' opportunity costs of attending the literacy classes need to be kept in mind. When the incomes of the targeted group are very low, even the provision of free literacy classes will not motivate them to attend, since they need to utilize all their time in income-generating or survival activities.

The country studies also found that targeted groups must have their basic needs met before they will be motivated to participate in literacy classes. For example, while electricity is necessary for running many forms of ICT, it is also necessary for many survival activities. If electricity is only available at certain times of the day, it may be impossible for learners to attend class while also attending to meeting their basic needs. For example, in a village in India women would not attend class during the times that electricity was available because they needed to take advantage of the electricity supply at those times to run their water pumps.[87]

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...ICT can make it simple and affordable to produce materials in local languages...

Literacy education is often hindered by a lack of appropriate learning materials. As language and literacy are inextricably linked, learning materials should be in the relevant language. They should also contain content and images that are appropriate to the cultural context.

The Brazil and other studies have shown that ICT can be utilized to create relevant literacy learning material efficiently and cost-effectively.

>> Integrated approaches are successful

The country reports indicate that successful literacy projects are those which take an integrated approach. Rather than focusing solely on one area, such as developing software or producing a television programme, for example, successful literacy projects also tackle teacher training needs, provide technical support, produce locally-relevant literacy materials, and initiate other activities where required.

For example, the Bridges to the Future Initiative involves a range of activities, from the development of computer software tools and training of teachers in the use of those tools, to the establishment

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...partnerships and coordination enhance ICT-based literacy programmes...

of community learning and technology centres and the provision of support services.[88] Similarly, the Little Explorer project combines the provision of computer hardware and software with the training of teachers, and also facilitates parental participation in children's literacy education.

A project need not involve all of these activities, but could instead involve establishing partnerships between various stakeholders, or coordination of their respective projects. For example teacher training institutes and software developers could cooperate to develop literacy-learning software in local languages.

>> Encourage community participation

Several country reports highlight the importance of community participation in sustaining literacy projects and in developing a literacy-conducive environment.

For example, when setting up community learning centres, a sense of ownership of the project is fostered in the community when the community provides the physical space and is in charge of maintenance of equipment. Such a sense of ownership provides impetus for the project to continue and succeed.

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...community centres can support a literacy-conducive environment...

>> Monitoring and evaluation is essential

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...literacy statistics need to be credible and comparable...

Policy and planning relating to literacy is constrained by a lack of reliable data. It is important, therefore, to develop good data collection strategies and better literacy indicators.

Such monitoring, and subsequent evaluation of the data, will enable better understanding of the issues and lead to more effective literacy education programmes.

>> Connectivity is vital

As evidenced by the benefits brought to communities by Internet-connected community learning centres, affordable Internet access is a key factor in creating a literacy-conducive environment.[89]

As the Internet becomes more important as a key means of information exchange and knowledge-sharing, it is vital that governments ensure that communities have the opportunity to access this resource. Also, in order to ensure reliable connectivity, computer support and maintenance are essential and must be budgeted for.

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...with the use of the Internet language diversity need not be a barrier to literacy acquisition...

A Memorandum for Policy Makers

Below are a number of recommended strategies for the use of ICT as a tool in achieving Literacy Decade goals.

Providing Infrastructure:

ICT-based literacy programmes have often suffered from inadequate infrastructure and technical support. The United Nations Decade provides an opportunity for policy makers to set up the required infrastructure, for example, phone lines, reliable electricity supply and internet connectivity.

Formulating a Policy for Integrating ICT in Adult Literacy Programmes:

There is a need to formulate policy that enables the integration of appropriate forms of ICT into literacy programmes. In addition it is necessary to facilitate implementation of cross-cutting, integrated literacy programmes.

Developing Literacy Programmes that are Learner-Centred

Literacy programmes need to be tailored to address the specific needs of targeted groups. ICT can play an important role in raising interest and enthusiasm, and engaging learners, and can be a useful tool in developing learning materials that are culturally and linguistically appropriate. In addition, it is important that literacy programmes not simply focus on teaching skills in reading and writing but provide learners with the ability to access relevant information, which they can use to improve their lives.

Enhancing Professional Development

The professional development of administrators, directors, educators and other literacy personnel is critical for improvement of literacy programmes. As the examples in this booklet show, ICT can be used for distance learning, materials creation, enhancing information retention by trainee teachers, networking and knowledge sharing. There is therefore much that ICT can offer in terms of enhancing and supporting professional development.

Ensuring Better Planning and Programme Design

It is vital that literacy projects are carefully planned so that they meet the needs of the target group. Planners need to examine how literacy will benefit the target group, and what the learners' motivations for gaining literacy skills are, i.e. the context in which literacy skills would be used. In addition, factors such as the mother-tongue language and cultural practices must be taken into account when planning the materials and ICT that will be used, and when deciding how the literacy programme will be implemented.

Community participation in this process is vital, as experiences in many countries have shown that literacy projects are more useful and sustainable when communities support and commit to them.

Success of literacy projects also depends on establishing partnerships between stakeholders, so as to draw on the strengths and assets of the various groups. Where appropriate, public-private partnerships can be an effective and affordable way of bringing ICT expertise and experience into educational activities.

Coordination of efforts by the various institutions, ministries and organizations involved will ensure that there is no duplication and wastage of resources. It is important to also ensure that funding is secure and lasts throughout the project.

All literacy projects must have monitoring and evaluation built into the structure so as to determine what works and what does not. Relevant and useful data are vital in order to make decisions regarding improvements to the project.

Supporting the Creation of a Literacy-Conducive Environment

Community Learning Centres are an effective way of making reading material and ICT accessible to all. Centres such as the Ganokendra in Bangladesh and the Soochanalayas in India are good examples as they do not simply encourage literacy for its own sake but support literacy in terms of the benefits literacy brings for individual and community development. By encouraging the development of locally-relevant skills and by facilitating lifelong learning, these community centres are creating a literacy-conducive environment.

Beyond Literacy

Being able to read, write and calculate in today's complex world is often not enough. Developments in technology are changing what it means to be a literate person. As use of ICT grows, it is important for people to also develop the skills required to utilize these technologies effectively and productively. Beyond the traditional skills needed to read and write, information retrieval and management, and critical thinking and problem solving skills are increasingly necessary and must be cultivated by both formal and non-formal education systems.[90]

11 Endnotes

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44   Ibid

45   Ibid

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47   Charterjee, B. 2004, p. 22.

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Resource Websites

UNESCO Literacy portal
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Literacy Initiative for Empowerment
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Asia-Pacific Literacy Database
A database of literacy resources and references
Website: *http://www.accu.or.jp/litdbase*

ICT & Literacy website
This website provides examples of activities that teachers can undertake in the classroom, using ICT to develop literacy skills.
Website: *http://www.hitchams.suffolk.sch.uk/foundation/literacy/index.htm*

UK National Literacy Trust
A compilation of research papers and other material about ICT used in literacy education.
Website: *http://www.literacytrust.org.uk/Research/ICTindex.html*

Literacy Assessment and Monitoring Project (LAMP)
http://www.unescobkk.org/aims/lamp

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(Note: A CD-ROM version of the website can be requested. The CD-ROM was created for those without Internet connection, or with an unreliable connection.)