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ICT Student Textbook

# Preface

Through the course of human history, there have been discoveries and inventions that have changed social processes and structures greatly. The agricultural revolution and industrial revolution created the agrarian and industrial societies respectively. We are now in another such age, brought on by Information Communication Technologies (ICT). With information creation, access, processing and sharing becoming quicker and simpler, society is now being shaped these processes, so much so that to be called the Information Society. Participating in this society equity in society. It is the Responsibility of the education system to respond to this by bringing into school education, time building skills in students that will make then capable of functioning and responsive to a society shaped by ICT.

Approach and intent of the state ICT syllabus

The state ICT syllabus has been based on the aspirations and guidelines set in the National ICT Policy which focuses on building the skills of computing, creating and collaborating through safe, ethical, legal means of using ICT. The syllabus has emphasized the different possibilities of ICT in society, briefly discussed below.

1. Connecting with the world: Technology is providing new ways for us to access information and learn. Along with this, evaluating information and using it appropriately become skills to be developed. This theme will focus on accessing the internet, evaluating resources available and creating meaningful personal digital libraries for self learning. This will also include an introduction to

2. Connecting with each other: A related dimension of connecting through ICT is in possibilities for learning in communities from each other. The focus of this theme will be on how to interact and learn in peer learning settings and through online, virtual forums. Collaborating an learning is a key learning expectation from this curriculum.

3. Interacting with ICT: Building skills and aptitudes in a technology environment is an important expectation of this curriculum. The theme will focus on building a more proactive approach to engaging with technology, evaluating appropriate technology choices, maintaining ICT infrastructure and becoming critical users of technology, being aware of the social and economic implications of technology.

4. Creating with ICT: This is a theme that focuses on building computing and creating skills in students and teachers using various ICT applications. These include data analysis and processing, creating graphics, creating audio visual communications, working with mapping applications, creating resources with specific school subject related applications and programming.

# Ability to handle ICT environment

 creating original content, sharing and learning and focusing on educational and learning processes rather than on specific applications are the key principles of this syllabus design. The syllabus has been designed keeping in mind the various possibilities of creative expression possible through ICT applications and platforms available today and also seeks to build a mindset that will explore and such applications on an ongoing basis. Without taking a conventional approach to building digital literacy on specific applications the syllabus emphasizes a thematic, project based approach to ICT learning. Such an approach will also enable integration of ICT with multiple school subjects. To facilitate such an approach to ICT learning, the technology environment in schools must be free and open. The syllabus has prescribed the use of free and open source technologies wherever available to facilitate such a free and open access. The educational content used in the schools will also be licensed as open content allowing teachers and students to modify and adapt the content to reflect their contexts.

How is the textbook structured

The SCERT has anticipated the attainment of the competencies and objectives outlined in the National ICT curriculum and ICT Policy in two

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stages, covering classes 6-8 and classes 9-10 and has developed a syllabus for 5 years, taking into account the student curriculum set out in the National

ICT curriculum. This will be covered through two books

hich will have three levels to cater to the classes 6-8

2. Book 2 - which will have two levels to cater to the classes 9-10

The following sets of materials have been prepared to support this syllabus:

A textbook for students, that introduces ICT skills and applications in a project based way, integrated with the different school subjects. The core competencies and skills to be covered in the text book will be determined based on the National ICT curriculum and the Telangana state subject text books and academic standards. The text book will take a project based approach to the attainment of these learning competencies.

2. A handbook for teachers and teacher educators to help them implement the syllabus as well as support their own knowledge and learning of the ICT applications based on the NCERT ICT curriculum. This accompanying handbook will facilitate the transaction of the ICT syllabus and also provide meaningful linkages to curricular and co-curricular areas. The teacher handbook will also have a component for teachers to build their own competencies in using ICT.

# Focusing on open content creation

teacher capacity building as well as integrating technology to develop new methods of learning, we hope, can demonstrate an effective model of technology integration in the school system across the country. We also believe such an approach will strengthen the government school system such that the vision of education of ‘equitable quality’ set out by the Indian Right to Education Act is realised. Keeping in line with the spirit of the National ICT Policy, the textbook is released under Creative Commons License CC BY SA NC, allowing teachers and other education departments to reuse, revise and modify, for non-commercial purposes and with attribution. The copyright is held by the Telangana Department of School Education.

Introduction

What is ICT

Have you ever seen anyone in your school or community or home use a phone? Have you ever withdrawn money from an ATM (Automated Teller Machines, also known as 'Any time money'), or seen someone get money from an ATM? You may have s

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een or helped someone book a gas cylinder refill through a phone. You may perhaps have booked a train ticket or booked Tirumala darshan on-line. You may have seen a movie on your computer or chatted with a friend or recorded a video with your phone. Have you ever wondered how these things are done? There is one thing that is common across all these things - the use of Information Communication Technologies, ICT.

We live in an information society

Look at the pictures below and discuss with your friends and teacher. A Bonobo fishing for termites What is this bonobo doing - can you guess? You are correct! It is "fishing" for termites from an ant hill. Did you think only human beings can fish? When it was first discovered in the 1920s that chimpanzees can make tools, all over the scientific community, people were amazed. This was because human beings were defined as the species which makes tools for use. Dr Louis Leakey, a famous primatologist said " We have to define what is a tool, or we have to define what is a human being or we have to accept that chimpanzees are human

What can you expect to learn

ICT can help you create music

write poetry, learn mathematics or make videos. ICT can also help you in communicating with each other and learning together. This textbook has been developed to introduce you to all these possibilities

What is the nature of ICT

What is this unit about

We saw in the previous chapter about how ICT are part of many things we do; and how they have changed the way we are working, learning and even playing. What is it about ICT that allow such changes to happen? Let us consider the following pictures:

# How is the unit organized

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| 58 | 98 | 58 | 98 |

In this unit, there are three levels of activities. The activities will increase in difficulty - based on the ICT skills needed as well as subject knowledge that you will be building. As you work on the various activities for the different ICT areas in the each level, you will also get experienced with more ICT skills and this would help you with the subsequent level. You can imagine this somewhat like a spiral staircase where you learn some topic at a basic level, you move along to the next class and you can come back to discuss the same topic at a more advanced level. At each level you will be exploring new things about ICT; you will also be creating your outputs and building what is called a digital portfolio. This portfolio will include your outputs; they will be such that you will know what you have learnt and you will also know the method of learning. At the end of the year, your teacher will assess your portfolio. You can also make your portfolio such that you can keep adding to it. How is that possible? When you make a model of clay or thermocoal, you cannot change it after you make it. One of the special features of ICT is that you can change (edit) your creation. This means that, in Class 7 you can change what you completed in class 6 or in Class 8 you can change what you completed in class 7. This means you can keep adding to your knowledge and also improve the quality of your output. You will have a cumulative portfolio at the end of class 8.

Science, Technology and Society



Science and technology

Many times you hear the word science and technology together. What is the connection between the two? Do you know? Study of science includes a method of observing things around us, thinking about why those events happen, explaining why the events happen, recording information about the events and also predicting what might happen. Often, scientists imagine what might be the solution and what might be the answer to the puzzles around us. The understanding of phenomena can lead to the development of tools – this is what we call technology. The technology

Information and communication technologies (ICTs)

Information is not new for human beings;

communication has been known since the time human beings lived in caves. Thus ICT are as old as human beings themselves; human beings needed to communicate with one another, beginning with symbolic (non verbal) ways, before language was invented. The language we speak could be seen as first 'ICT', it enabled (oral) communication amongst human beings. Writing and script was the next technological advancement - around 5000 years ago - which enabled information could be created and communicated at different times and in a different place. Oral communication does not have this benefit, Writing also enabled easier recording of human history and thus the invention of script was a landmark in the history of ICTs. Next came printing which made it possible replicate writing. The invention of radio and television was the next advancement in ICT as it became possible for more and more people to access information.

# Telephone

Before the cell phone came, most of the long distance voice communication was through the regular telephone. This was based on the idea of travelling sound waves. They cause the mouthpiece to vibrate and this vibration is carried to the receiver at the other end. When a call came from one number, there will be an operator who sits at an office who will connect the call to another receiving number. Now this is different with automatic switches which connect the calls. The transmission of the signals has also become different now with voice being converted into electrical signals. All these transmissions used to happen through physical cables. These cables were either made of copper or optical fibres. When you make a phone call, the voice signals from your phone get transmitted through these fibres to the nearest telephone exchange and through a series of switches sent to the receiver. Usually the first few numbers in our telephone number indicates the exchange information. In the earlier days, long distance calls (outside of the local exchange) could only be made by booking a trunk call. The users had to 'book' or rent the line through which the call can be made and this used to be done manually by the telephone operators in the exchange. Now-a-days, with automatic switches, long distance calls can be made directly to any number, even outside the country.

The cell phone

The telephone and the radio came together - And we call that the cell phone! We saw how a telephone works. We also saw what radio waves are and we have some idea of what frequencies mean. There are many frequencies available for the users to talk on. Any geographic area is divided into small plots, and in each area a fixed number of frequencies is used. Each of these areas are called cells. The cell phone is called a cell phone because it functions by dividing a geographical area into small plots or cells through which the transmission takes place. It is possible to make and receive calls when there is a cell phone tower near your area for receiving and sending that frequency. Now do you understand what we mean when we say 'my cell phone has no coverage here'? It is because of this also that cell phones sometimes do not work inside buildings when the radio signals are disturbed. Just like an exchange for regular telephone calls, there is a mobile switching that allows you to make calls even when you move from one cell to another!

# What can ICT do

ICT have changed the society Look around you - can you make a list of things that have digital technologies involved in them? Yes, that is right. Starting from the computer in your school, television, movies, videos and other materials for subject learning mobile communication, Aadhar card, land records, bank accounts, pension accounts and so many more things, ICT have become integrated into society in many ways. ICT can create information in so many different ways - maps, audio, video, text, numeric

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data. How we are able to generate information means more and more possibilities of knowledge creation and sharing. ICT have brought together people, made it possible to learn in different ways. How we learn and what is needed to be learnt have become different. For example, we no longer need to learn about a withdrawal slip, we need to know how to use the ATM. Your teacher can now take a video of a class in your school and share it. There is a great convergence of many technologies that is happening, a mobile is approaching the computer, the internet taking over. If so many things are impacted by ICT, it is important to understand how these work, and how they should be used ethically and safely. Technology should be treated like a common resource where everyone can access it, interact with it, benefit from it and contribute to it. It should be used such that more and more people can get access in society should be treated like a public information good.

Data representation and processing

What is this unit about If someone asks you where is data, what would your answer be? When we see, we are gathering data. When we eat, our tongue gather data. When you cook you gather data. Gathering data from the environment, analyzing and understanding and decision making are important for survival. Imagine human beings hunting and roaming in the forests - if they encounter a wolf, they should process the data and quickly run for cover. So, gathering data ad using for decision making is not new. Throughout history, people have observed that animals also gather data - there have been anecdotes of animals behaving differently before an earthquake. Gathering data, analyzing and making decisions is not new to human beings. Can you guess what may be different about this unit? Yes - you are correct! Digital technologies have changed the way we are gathering data and representing data. Discuss with your friends, in groups, all the word that come to your mind when you say data. Now look at the following and classify whether the following are data or not

Communication with graphics

## A digital art creation using

Tux Paint What is this unit about? A picture tells a thousand stories, they say! Have you ever wondered about how a picture can tell a story? When we hear a story, when we read a story, our mind forms an image of what is being described. They make us connect to the story. Similarly, when we see a picture, our mind tries to build the story from the picture. No wonder that picture story books have been favourite reading books for children and adults. In this unit, we will learn how we can use pictures as a method of story telling. Story telling is a traditional method of transmitting information from one person to another; one generation to another. Story telling can also be used to create awareness about social issues and challenges - talk to your teacher about how Burra Katha emerged as an art form in Telangana. Drawing pictures is also not new - human beings have been using pictures to tell stories, describe things throughout our history - from cave paintings to Deccani paintings to the comic strip or to the movie poster. Can you guess what is new about this unit? Yes, it is the use of new, digital methods to create pictures and combining them with text. This field of ICT involves the creation of visual (pictures and text) stories is called graphics and is developing fast as a method of developing communication. In the earlier unit on data processing, you saw how data is represented in multiple formats - through text, numbers, and maps, photos and pictures. In this unit, we will focus on how we can use digital methods to create such graphic representations. You will be creating with ICT, interacting with various ICT applications and devices and developing messages for

Audio visual communication

# What is this unit about

One of the most exciting things about ICT is videos - and this unit is about that. While human beings have been writing text and drawing pictures videos are a relatively recent development. See below for the first video that was developed! START\_WIDGETac369bed9a148aba-6END\_WIDGET Can you make out how this was developed? Discuss with your friends and teachers. See the following video - can you identify the elements in the video? START\_WIDGETac369bed9a148aba-7END\_WIDGET

Audio story telling

# Title of Activity

## Objectives

1. Using multiple devices to record a sound

2. Organizing recordings on folders and playing

3. Ability to create an audio communication

What prior skills are assumed

1. Handling ICT equipment

2. Managing files and folders

Resources needed

1. Computer lab with projection equipment

2. Speakers

Digital skills

1. Using multiple recording devices to record

2. Organizing recordings on folders

3. Using players to listen to the audio

Educational applications for learning your subjects

What is this unit about We have so far learnt the different dimensions in which ICT can help create knowledge - whether graphics or audio visual communication or spreadsheets. You may be having a question how do these things help me in my subject learning? Can a graphic creation help me learn social science or help me with Telugu language or can an animation help me with doing a science experiment? You are correct!! The power of ICT to make content in different ways has led to the development of new applications that cater to specific subjects. These applications can either help you build the skills needed for learning a subject or help you understand the concept better by adding audio visual or graphic content. Some of your classes will even become very different when the teacher starts using these resources. In this unit, you will learn about some educational applications.

The globe on your table with Marble

Marble is a digital atlas. It provides the physical geography of the Earth. It does not provide the political geography (with political borders dividing the continents into countries etc).

# In summary

We hope you have found this journey with technology enjoyable. As you would have experienced, this is an area of knowledge, where rapid changes are taking place. Not only are ICT changing how we learning, they are also defining what learning is to be had. Occupations and vocations are no longer limited to the traditional ones of teaching, engineering or medicine. ICT also have an enormous potential for allowing greater access and opportunities for more people to express and create knowledge, in multiple ways. When the possibilities for knowledge creation change, more knowledge will be produced from areas which would have earlier been left unexplored. However, for this vision to be realised, we need to approach ICT as if it is a public resource - of all, by all and for all. The power of ICT must be guided by the spirit of participation and democracy. We will explore more areas of technology learning in Book 2 of this subject, in classes 9 and 10