Information and CommunicationTechnology
for the School System

Curricula for ICT in Education

Version# 1.02

Central Institute of Educational Technology
National Council of Educational Research and Training
Sri Aurobindo Marg, New Delhi-110016

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ICT Curricula at a Glance

Strands of the Curricula

TEACHERS

- Possibilities in education
- Reaching out and bridging divides
- Connecting with the world
- Connecting with Each Other
- Creating with ICT
- Interacting with ICT

STUDENTS

ICT Course for Teachers

Induction -1
10 days

↓

1st Set of six Refreshers
9 days each

↓

Induction -2
5 days

↓

2nd Set of eight Refreshers
9 days each

↓

Induction -3
5 days

↓

Assessment and Certification
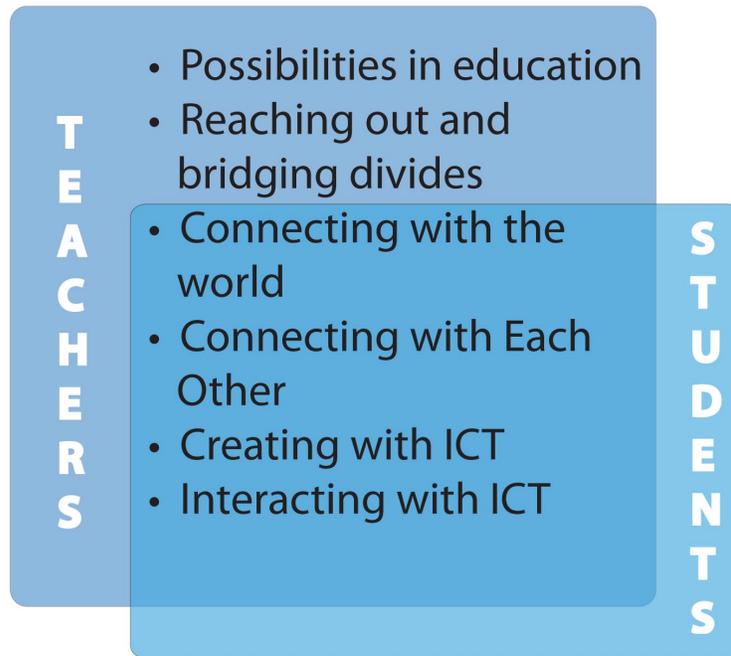
2 YEARS
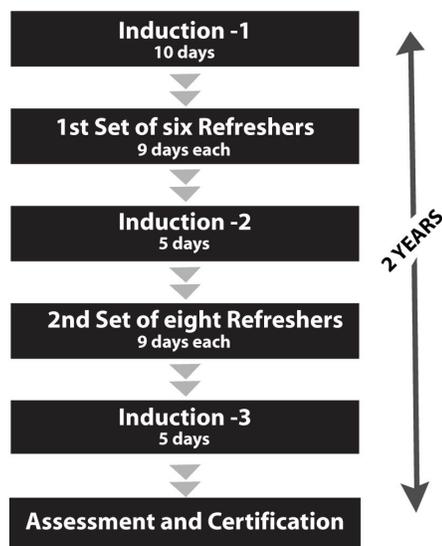
Two Year Diploma in ICT in Education

Induction : Through face to face and online mode
Refresher : Through online mode
Certification : By NCERT

ICT Course for Students (VI -XII class)

First Year

↓

Second Year

↓

Third Year

↓

Assessment and Certification

3 sessions per week

30 weeks per year

90 weeks in three years
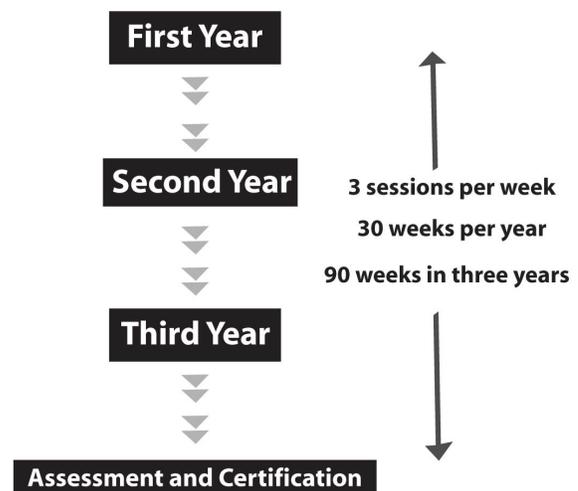
Three Year Course in ICT in Education

Certification : By Boards of Secondary Education

Information and Communication Technology
for the School System

Curricula for ICT in Education

Version #1.01

Foreword

It is well accepted that Information and Communication Technologies (ICT) have an immense potential to impact education – of children, of teachers, of teacher educators and others, and provide newer and more effective ways of mitigating some of the challenges being faced by the educational system of our country.

These technologies distinguish themselves by their rapid evolution, continuously changing the modes of engagement with them. A decade long infusion of computers, and more recently ICT, have demonstrated varying impacts on learning. Besides, ICT are also among the most expensive of investments, causing much confusion regarding practices that have the best returns on investments. Under these circumstances, the recent National Policy on ICT in School Education is a beacon which directs future implementations. Guided by the Policy, and anchoring firmly on the National Curriculum Framework, this document unveils generic curricula for the school system.

The school context is riddled with disparities emerging primarily from socio-economic sources, but manifested as denial of access. At any given instant of time, therefore, one encounters schools at different levels of preparedness for ICT infusion, teachers with varying levels of awareness of and ability to use ICT in education and students with varied levels of exposure. Fitting a curricular prescription into such diversity calls for an openness in approach.

The present document shares the resolve of the National Curriculum Framework to respect the right of every learner to negotiate learning spaces on their own and develop their unique world views. Accordingly it underscores the need for opportunities of exploration, exercising of imagination and creativity and connecting to and being a part of the larger community of learners, thereby influencing and impacting human understanding.

The NCERT appreciates the work done by the ICT Curriculum Group in articulating a response to the emergent need. Several persons have contributed to the development of the curricula; we are grateful to each of them. We hope that the curricula laid out here will not only be found relevant but also help orient technology use towards more meaningful applications in education. As an organisation committed to systemic reform and continuous improvement in the quality of

its interventions, NCERT welcomes comments and suggestions which will inform further revision and refinement.

Director

New Delhi, August, 2013

National Council of Educational
Research and Training

Contents

1. Overview

The National Policy on ICT in school education has set the goal of preparing youth to participate creatively in the establishment, sustenance and growth of a knowledge society leading to all round socio-economic development of the nation and to be geared for global competitiveness.

The National Curriculum Framework which guides the teaching-learning effort in schools cautions that technology used as a mere medium to disseminate information tends to bypass the teacher. It expresses a firm belief that teachers and children must be treated not merely as consumers but also as active producers. It is the two-way interactivity rather than one-way reception that would make the technology educational.

The present curricula for ICT in education is a step towards realizing the goals of both the National Policy and the National Curriculum Framework. It has factored in the rapid evolution of technologies and the ground realities of Indian school systems. For the teacher, it is an initiation into exploring educational possibilities of technology, learning to make the right choices of hardware, software and ICT interactions, and more importantly, growing to become a critical user of ICT. For the student, it is an initiation into creativity, problem solving, and an introduction to the world of information and technologies which could also shape career pursuits.

ICT distinguish themselves from other technologies by their rapid evolution, defeating attempts to define a curriculum which can serve the schools for a while. Keeping up with the changes require constant upgradation and at times, unavoidable replacements, which makes it an expensive proposition. Given the dynamic nature of the field, the curricula, emphasising the core educational purposes, are generic by design and focus on a broad exposure to technologies aimed at enhancing the creativity and imagination of the learners.

Recognising that teachers as a group represent varying levels of exposure to ICT, the curriculum for teachers attempts to fast track them into becoming proficient users of ICT by defining milestones and an evaluation system that allows for teachers to assess their readiness and decide their pace through the course.

Based on the size of the school, the infrastructure available and other related

issues like availability of electricity, students may have varying access to the ICT facilities and resources. The student's curriculum, therefore, is designed as a three year course spanning 90 weeks with three sessions per week. Schools may opt to begin the curricular programme as early as sixth grade (beginning of the upper primary stage), in any case completing the programme before the student leaves school. The ICT curriculum is a common programme for all students in school. As such it is distinct from any optional subject at the plus two stage and distinct from any vocational education programme under the NVEQF.

The curricula are built around a set of guiding principles, enabling any school system to provide the right exposure to emerging technologies to build capabilities in teachers and students, not only to use technology comfortably, but also employ them judiciously to enhance their learning.

The requirements of the curricula are not to be hardware or software specific. Undoing the general trend of limiting software to office applications, which are not only ill suited for educational purposes but also tend to narrow down the view of what computers and ICT can achieve, a wide range of software applications specifically designed for education are introduced. Use of proprietary software would become very expensive and make the implementation unviable. Therefore, Free and Open Source software have been suggested throughout the curricula. The use of FOSS applications will also obviate software piracy and enable customisation to suit local needs.

The curricula underscore the need for internet connectivity of adequate bandwidth, particularly for teachers as access to the internet is no more a matter of choice. The educational potential of internet resources and interactions are immense. It also serves the essential purpose of connecting teachers and schools to each other and contributing to bridging of divides.

Responding to the National Curriculum Framework's observation that treating e-content as yet another teaching aid trivialises the potential of this medium and has detrimental effects on teaching-learning practices and the role of the teacher, the teachers' curriculum emphasises the involvement of teachers in the creation of e-content, its sharing with peers and its critical evaluation. Taking cognizance of parallel efforts like the National Repository of Open Education Resources, the curriculum encourages the participation of teachers in its collaborative platform to share such evaluated creations.

2. Guiding Principles

1. The curricula shall be generic, drawing upon the features of a wide range of technological applications and focussing on educational purposes.

2. The focus of the curricula shall be on learning to compute, which includes learning to create using a variety of hardware and software tools. ICT literacy, defined as the knowledge and ability to wield tools and devices, shall be an incidental outcome of this learning.

3. The curricula shall provide adequate opportunity for hands on learning and open ended exploration of ICT applications. Sharing of learning and critical evaluation of the learning shall be integral to the strategy.

4. A healthy ICT environment requires heightened awareness of the social, ethical and legal aspects of its use. Software piracy and plagiarism shall be explicitly denounced and discouraged. Creation of original content, taking pride in the creation and duly recognising others' contributions shall be promoted. Safe and secure use of ICT shall also be promoted.

5. The curricula shall promote the full utilisation of infrastructure and resources, integrating it with the school's programme. Universal access and fostering of a sense of ownership shall be encouraged to ensure maximum impact. Innovative ways of reaching the unreached shall be promoted.

3. Part 1: ICT Curriculum for Teachers

The teachers' curriculum is considered a significant vehicle for the realisation of the goals of the National Curriculum Framework and consequently is designed to provide an enhanced exposure to information and resources for ongoing professional support, improved teaching-learning-evaluation-tracking, and increased productivity.

The National Policy on ICT in School Education organises the competencies for ICT Literacy into three broad levels, basic, intermediate and advanced, and the curriculum subsumes them.

3.1 Competencies defined in the National Policy on ICT in School Education

Stage 1: Basic
Basics of computers and basic use of tools and techniques – operate a computer, store, retrieve and manage data, use a computer to achieve basic word and data processing tasks; connect, disconnect and troubleshoot basic storage, input and output devices.

Connect to the internet, use e-mail and web surfing, use search engines; keep the computer updated and secure; operate and manage content from external devices (sound recorders, digital cameras, scanners etc.); connect, disconnect, operate and troubleshoot digital devices.

Stage 2: Intermediate
Create and manage content using a variety of software applications and digital devices; using web sites and search engines to locate, retrieve and manage content, tools and resources; install, uninstall and troubleshoot simple software applications.

Stage 3: Advanced
Use different software applications to enhance one's own learning – database applications, analysis of data and problem solving, computing, design, graphical and audio-visual communication; undertake research and carry out projects using web resources; use ICT for documentation and presentation; create and participate in web based networks for cooperative and collaborative learning; become aware of issues of cyber security, copyright and safe use of ICT and take necessary steps to protect oneself and ICT resources.

The content of the curriculum involves activities which simultaneously draw upon competencies from different levels, such that a completion of all levels is ensured.

3.2 The Learning Strands

The learning strands seek to build capacities to handling today's and tomorrow's technologies appropriate for use in education, capitalizing on technology to master technology, managing the ICT infrastructure, using technology to surmount barriers and to acquiring insights to lead technology educationally. The six strands are:

1. Connecting with the world
2. Connecting with each other
3. Creating with ICT
4. Interacting with ICT
5. Possibilities in education
6. Reaching out and bridging divides

3.2.1 Connecting with the World

ICT tools enable anytime, anywhere access to information and resources. Given the proliferation of internet connectivity, the curriculum recognises the fact that being connected to the internet offers tremendous benefits to teachers in terms of capabilities to access information and resources of various kinds and to utilize them in their teaching-learning. Not only will these add to the range of techniques that teachers use, but also make a difference to their students learning. The ability to critically review and use the resources will be an essential input to teachers professional development.

Becoming aware of the range of materials the web offers for the teachers' own learning as well resources for their teaching; critical appraisal of the information and resources; safe, productive, ethical and legal use of these resources; and protecting oneself and others from the harmful effects of the virtual medium is fundamental to every teacher's learning.

Therefore, the strand introduces teachers to the internet and its resources; using browsers and search engines; choosing appropriate sites; search and retrieval of information and resources; different kinds of websites and interactivity; navigating the web, bookmarks, subscriptions to services and products; downloading information and resources; awareness of formats and techniques; copyright and safety issues; uploading and sharing information; and transactions through internet.

3.2.2   Connecting with Each Other

ICT tools also enable a variety of ways to keep people connected. Synchronous and asynchronous modes increase the degree of interactivity and help create communities, which can then collaborate to form interest groups for a common cause. While at the bare minimum, it enables a very rapid way of communicating with a friend, it can be leveraged to break teachers' isolation and promote professional growth.

Becoming aware of various communication possibilities, becoming interested in and participating in professional communities and keeping abreast with newer ways of communicating are essential to keep the teachers in sync with developments of technology and updated about developments in her own discipline and in educational practice.

Learning to create an email ID; send and receive emails; store and manage communication; handle attachments; maintain address books; form or join email forums; participate in discussion forums, wikis, video and audio conferencing, social networks, blogging and microblogging; become aware of cyber bullying and other social issues are essential parts of teachers' cyber kit.

3.2.3   Creating with ICT

ICT tools are not seen as an end in themselves but as an opportunity to create and express. Modern ICT employ a variety of media forms – text, graphics, animation, audio and video, enabling a rich communication. Easy, friendly ways have been discovered to interact with ICT. Together they expand enormously the range of learning that can accrue.

Software applications and hardware devices have become increasingly versatile and cater to a variety of learning needs. The wider the range of tools, devices, software applications and techniques that teachers are aware of and can productively

use, the wider will be the opportunities for developing their imagination and expression. Treating a computer as a mere information delivery device will lead to a gross underutilisation of its capabilities and diminish its use for teaching-learning. With access to a range of tools and devices, the repertoire of communication skills will also increase. The teachers' ability to leverage the interactive features into teaching-learning will also extend the range of activities students can be involved in and learn from.

Creating, curating, managing images and documents; repurposing them into communications; gathering and processing data and presenting them; working with audio and video tools to create media rich communications; learning to program and control devices and processes, become important to teachers.

3.2.4 Interacting with ICT

ICT are evolving at a very rapid pace. The type of device, its operating processes, the purpose for which the tool is to be deployed – the range of essential learning in ICT is ever increasing. While the computer has evolved to take on more and more complex tasks, the interface itself has become simpler by the day. From the days of a command line interface to an app based touch interface, computers have become extremely productive, finding uses in more and more applications, particularly in the daily routine of every common man.

Understanding how ICT systems operate and an appreciation of the range of ICT tools available today can help identify opportunities for teaching-learning. Extensive use also helps make informed decisions in selecting the most appropriate tools for education.

A computer today is not just a large calculator but an integrated communication medium. Expectedly, the more the functions, the more the complexity. The free participatory ways in which this technology has grown has also brought in diverse ways in which different hardware and software achieve similar tasks. Keeping abreast of the technology becomes a challenge. At the same time, trying to learn every new tool in a rote manner would not be fruitful either. A broad conceptual understanding of how ICT devices and tools work, along with an operational knowledge of safe and efficient use of ICT is the aim, together with learning basic ways to troubleshoot and working around problems.

Connecting input and output devices – printers, scanners, webcam, digital camera, sound recorder, projector, headphone; using storage devices and optical disks; mounting and dismounting devices; connecting to the internet – modem, data card, Wi-Fi, LAN; bandwidth and connection speeds; software installation; using different operating systems; file management; settings and configurations; enabling regional language support; troubleshooting and basic repair; virus protection and safety of equipment and user form the strand's focus.

3.2.5   Possibilities in Education

ICT capabilities have led to a wide variety of educational applications. Software applications which extend learning, immerse students in experimentation and problem solving, make available data sets to process and retrieve information from are commonly used in education. Online resources – books, courses, media materials have become common. Interactive possibilities, individual users interacting with packaged material or groups of people interacting with each other have opened up ways in which teaching-learning is transacted.

While the glamour and novelty of the medium attracts everyone, becoming a discerning, critical user of ICT is very essential. Sugar coating of information cannot constitute enriching of experience. Learning to acquire insights into how ICT operate and impact teaching-learning, what forms of media and information can be appropriate to learning, how educational goals can become the arbiter of choices made in ICT, assessment and evaluation of ICT tools, devices, information and resources are very important, if cost effective and meaningful ICT has to be promoted. This strand therefore forms the bridge between the aspirations of the education system and the run away developments in ICT.

The strand involves exploration and experimentation with open education resources (OER)– access, use and evaluation, creation and contribution of educational resources; research and critical appraisal of the utility and effectiveness of ICT devices and tools; familiarity with virtual environments for self-learning and teaching-learning; familiarity with the web and its range of resources; productivity tools and their meaningful use; tools and forums for planning, organising, teaching-learning, assessment and evaluation; tools and forums for professional growth.

3.2.6   Reaching Out and Bridging Divides

ICT has become available widely, overcoming geographical and social boundaries. But this has not naturally ensured access to its benefits to all. ICT itself has evolved techniques – a DVD or a music player as examples of portability, forums as examples of public helplines and support, public sharing and open educational resources; a wide range of free and open source software - auguring well for improved access.

Language barriers and professional isolation can deny students and teachers access to the wide range of digital information and resources. Becoming aware of, experimenting with, participation in and creation of resources and support aimed at those denied access will help reach out and bridge the divides. Physically challenged, particularly the visually impaired and the auditorily impaired cannot access information as easily.

The theme will involve an exposure to building digital communities; understanding the need for and evolving a shared agenda; creating, sharing, and curating resources for teacher and student communities; community radio; local language tools and local content, translators and translations; subtitling video; disability and assistive technologies – screen readers for the visually impaired; audio books; talking books; collaborative possibilities – wikis, open maps, data repositories and forums.

3.3 Syllabus

The ICT curriculum broadly attempts to equip teachers with ICT competencies to strengthen their own professional capabilities and to effectively use ICT tools and devices in their teaching-learning. Teachers will also be trained to manage the ICT environment in the school and function as a local coordinator for organising capacity building programmes.

The curriculum therefore is rolled out as a series of short courses, spanning the six strands and ensuring together the basic, intermediate and advanced levels of competence. Three induction courses and fourteen refresher courses leading to a diploma in ICT in education is proposed. The first set of six refresher courses will be organized in between the first and second induction courses and a second set of eight refresher courses will be organized between second and third induction courses. Refresher ten to thirteen will include optional courses; a number of subject specific and interest based courses will be offered under these refresher courses so that a teacher may choose any four courses from them.

3.3.1 Objectives

After undergoing this course the teacher will be able to:

1. Effectively use ICT tools, software applications and digital resources

2. Integrate ICT into teaching-learning and its evaluation

3. Acquire, organize and create her own digital resources

4. Participate in the activities of teachers' networks

5. Participate in the evaluation and selection of ICT resources

6. Practice safe, ethical and legal ways of using ICT

7. Use ICT for making classroom processes more inclusive and to address multiple learning abilities

3.3.2   Organising Learning

The session wise break up of topics to be covered during the induction and refresher courses:

3.3.2.1   Induction 01

Objectives

1. Deconstructing the ICT environment
2. Interacting with the ICT environment
3. Interacting with the internet and the web
4. Getting familiar with educational applications of ICT

Session Breakup
Session 01: Accessing the web I – introduction to the browser and browsing
Session 02: Accessing the web II – introduction to the web
Session 03: Familiarity with the ICT environment – connections and connectors
Session 04: Inputting in Indian languages – fonts and keyboard
Session 05: Creating with ICT – handling text
Session 06: Creating with ICT – handling data
Session 07: Creating with ICT – handling media
Session 08: Operating systems and its requirements
Session 09: Bringing together hardware and software
Session 10: Internet to access information I – exploring web resources
Session 11: Internet to access information II – exploring web resources
Session 12: ICT in the classroom – hardware and software
Session 13: Assistive technologies
Session 14: Working with data I – exploring spreadsheets
Session 15: Working with data II – exploring spreadsheets
Session 16: Email and web based forums
Session 17: Transacting through the web – exploring e-commerce applications
Session 18: MIS systems for educational management
Session 19: Exhibition and peer evaluation
Session 20: Evaluation and portfolio submission

3.3.2.2 Refresher 01 – Digital Story Telling

Objectives

1. Capturing information in non-textual ways; appropriate media choices for a given communication need

2. Combining text, graphic and audio visuals to create a communication

3. Developing a story and scripting by combining multiple digital methods

4. Developing digital stories for communication in classrooms

5. Evaluating digital stories

6. Exploring possibilities for inclusion using digital story telling

Session Breakup
Session 01: Deconstructing digital stories
Session 02: Image and video-recording and editing
Special Lecture: Demonstration of photo editing
Session 03: Combining media to tell a story – scripting
Session 04: Evaluating digital stories
Special Lecture: Creating photo essays and video documentation as a source of information and a learning process
Session 05: Projects to be completed during day 3 - 8
Session 06: Digital stories for communicating and learning - possibilities of inclusion
Session 07: Exhibition and peer evaluation of project lessons; portfolio submission and evaluation

3.3.2.3 Refresher 02 – Data Analysis

Objectives

1. Looking at data, reading data and making meaning (using a variety of data sets)

2. Plotting the data set and reading the graph

3. Querying data sets and plots for analysis, including multiple data sets

4. Using data visualization

5. Exploring data collection, data capture and analysis formats

6. Evaluating data, data sources and visualizations

7. Using data tables and graphs for communicating

Session Breakup
Session 01: Look at data, read and make meaning
Session 02: Plots and graphs

Special Lecture: What questions to ask? When to use which methods of data representation and visualization? Limitations of data sources, data representation and data analysis

Session 03: Querying data sets and plots

Session 04: Exploring sources of data, Evaluation of data

Special Lecture: Excerpts from the video "The most important video you will ever see" - on the power of data

Session 05: Projects to be completed during day 3 - 8

Session 06: Communicating data and data analysis

Session 07: Exhibition and peer evaluation of project lessons; portfolio submission and evaluation

3.3.2.4   Refresher 03 – Internet as a Learning Resource

Objectives

1. Exploring the internet for personal enrichment and professional learning, for teaching-learning ideas and creation of multiple learning spaces

2. Identifying appropriate resources for specific learning needs in the areas above

3. Organizing the identified resources

4. Evaluating resources for use in specific contexts

Session Breakup

Session 01: Demonstrating different types of websites to show the possibilities for personal learning

Session 02: Web-based learning objects, simulations and tutorials

Special Lecture: A grand tour of the internet

Session 03: Participating in forums for identifying learning resources, teaching-learning ideas

Session 04: Software applications and tools as and for using teaching-learning resources

Special Lecture: Exploring MOOCs as a space for continuous learning

Session 05: Projects to be completed during day 3 - 8

Session 06: Evaluating internet resources in terms of relevance, ease of use and context

Session 07: Exhibition and peer evaluation of project lessons; portfolio submission and evaluation

3.3.2.5   Refresher 04 – ICT for teaching-learning - 1

Objectives

1. Deconstructing ICT in teaching-learning (ICT – availability of – changing the way one can access learning)

2. Organising learning (for self) and designing learning environments for classrooms

3. Analysing curriculum to identify areas for ICT infusion (analysing and abstracting, evaluating and problem solving)

4. Mapping of content and skills to be built

5. Identifying applications, media and materials to achieve (3) above

6. Building personal libraries of classroom ideas

Session Breakup

Session 01: Curriculum analysis to determine content (what do I need to teach and what do I need to know)

Session 02: Determine the resources for teaching-learning

Special Lecture: ICT infusion and going beyond the textbook (Presentation of a case study of how the availability of ICT resources can actually result in a different learning experience)

Session 03: Determine appropriate ICT infusion and design a learning plan for a given topic; Identify and add metadata for ICT resources that can be used

Session 04: Exploration of the world of ICT resources for teaching-learning

Special Lecture: ICT Showcase – Educational applications of ICT

Session 05: Projects to be completed during day 3 – 8 (Transacting lessons using given ICT resources and evaluating it)

Session 06: Evaluation of resources – Framework for assessing and evaluating ICT resources - educational tools and applications for integrating ICT into lessons

Session 07: Exhibition and peer evaluation of project lessons; portfolio submission and evaluation

3.3.2.6 Refresher 05 – ICT for teaching-learning - 2

Objectives

1. Deconstructing ICT for teaching-learning (Using ICT in the classroom, technologies and methods)

2. Organizing learning and designing learning environments (classroom organisation and adaptation for ICT)

3. Interacting with hardware and software

4. Building personal libraries of classroom resources

Session Breakup

Session 01: Exploring ICT for teaching-learning, curriculum analysis to determine methods of transacting (how do I teach it)

Session 02: Using appropriate hardware (CD/DVD, projectors, interactive boards...)

Special Lecture: ICT showcase, relevant technologies for the classroom

Session 03: Using appropriate software (single and multiple media, animations and simulations)

Session 04: Classroom organisation for ICT infused lessons (teacher led instruction, self-learning and group activities)

Special Lecture: Focussing on enhancing learning – appropriate technologies

Session 05: Projects to be completed during day 3 – 8 (Transacting lessons using given ICT resources and evaluating it)

Session 06: Evaluation of technologies and ICT infused classrooms – criteria for effective technology use and effectiveness of technology in classrooms

Session 07: Exhibition and peer evaluation of project lessons; portfolio submission and evaluation

3.3.2.7   Refresher 06 – ICT for Evaluation

Objectives

1. Deconstructing evaluation and ICT for evaluation

2. Exploring tools and techniques for ICT for evaluation

3. Interacting with appropriate software

4. Building personal libraries of evaluation resources

Session Breakup

Session 01: Evaluation and ICT for Evaluation – purposes and techniques of evaluation, scope of ICT for evaluation

Session 02: Exploring software tools for evaluation

Special Lecture: What can data reveal – exploring data analytics

Session 03: Using appropriate software 01 (for constructing tests / quizzes)

Session 04: Using appropriate software 02 (managing data, analysis of results, tracking student achievement)

Special Lecture: Focussing on enhancing learning – tracking and managing student achievement

Session 05: Projects to be completed during day 3 – 8 (Constructing and implementing tests / quizzes using given ICT resources)

Session 06: Evaluation of the evaluation process – criteria for technology choice

Session 07: Exhibition and peer evaluation of project lessons; portfolio submission and evaluation

3.3.2.8   Induction 02

Objectives

1. Deconstructing the ICT environment

2. Interacting with the ICT environment

3. Interacting with the internet and the web

4. Getting familiar with educational applications of ICT

Session Breakup
Session 01: Troubleshooting and seeking help
Session 02: Installing hardware and software
Session 03: Synchronous communication on the web
Session 04: Uploading to the web
Session 05: Advanced text processing 01
Session 06: Advanced graphics 01
Session 07: Advanced spreadsheets 01
Session 08: Storage and backup
Session 09: Exhibition and peer evaluation
Session 10: Evaluation and portfolio submission

3.3.2.9 Refresher 07 – ICT for Documentation and Communication

Objectives

1. Deconstructing documentation, communication and media

2. Exploring tools and techniques for documentation and communication

3. Interacting with appropriate software

4. Building personal libraries of documentation and communication resources

Session Breakup
Session 01: Appropriate media for documentation – features and scope
Session 02: Appropriate media for communication – features and scope
Special Lecture: Communication showcase – what media combination and when
Session 03: Layout, format, and structuring communication
Session 04: Packaging and presenting communication in print, media and the web
Special Lecture: Innovative, interactive presentations – using the features of the web
Session 05: Projects to be completed during day 3 – 8 (creating communication using multiple media and its evaluation)
Session 06: Evaluating media choice and techniques for documentation and communication
Session 07: Exhibition and peer evaluation of project lessons; portfolio submission and evaluation

3.3.2.10   Refresher 08 – Games

Objectives

1. Deconstructing educational games and ICT games

2. Exploring educational games and game sources

3. Creating games infused learning environments

4. Building personal libraries of gaming resources

Session Breakup
Session 01: Gaming environments for education – range and scope
Session 02: Exploring offline and online games 01
Special Lecture: The psychology of games – immersive gaming environments
Session 03: Exploring offline and online games 02
Session 04: Infusing games into teaching-learning; creating appropriate classroom environments
Special Lecture: Gaming showcase – games for different ages
Session 05: Projects to be completed during day 3 – 8 (exploring educational games with students, documenting its effects)
Session 06: Evaluating games and gaming environments
Session 07: Exhibition and peer evaluation of project lessons; portfolio submission and evaluation

3.3.2.11   Refresher 09 – Building Communities and Collectivising

Objectives

1. Deconstructing online communities and collectivising

2. Exploring online communities and participating in them

3. Integrating communities into teaching-learning

4. Participating in online communities and collectives

Session Breakup
Session 01: Online Communities – analysing interactions
Session 02: Sharing thoughts and ideas – blogs, forums and mailing lists
Special Lecture: Virtual communities and virtual identities
Session 03: Collaborative creations 01 – online documents
Session 04: Collaborative creations 02 – wiki as a collective
Special Lecture: Communities' showcase – developing common cause
Session 05: Projects to be completed during day 3 – 8 (participating in an online community and documenting the experience)

Session 06: Evaluating online communities and participation
Session 07: Exhibition and peer evaluation of project lessons; portfolio submission and evaluation

3.3.2.12 Refresher 10 to 13 – Subject Specific ICT Tools

Objectives

1. Deconstructing the software application, its scope for teaching-learning

2. Exploring the software application

3. Creating content for teaching-learning

4. Building personal libraries of content resources

Session Breakup
Session 01: Understanding the application, its scope for teaching-learning
Session 02: Exploring the software application
Special Lecture: Application showcase – what can you do with it?
Session 03: Exploring the software application
Session 04: Creating content resources
Special Lecture: Extending learning – using the application for activities and projects
Session 05: Projects to be completed during day 3 – 8 (Constructing and implementing a lesson incorporating the software application or content resources made with it)
Session 06: Evaluating content resources made with the software application
Session 07: Exhibition and peer evaluation of project lessons; portfolio submission and evaluation

3.3.2.13 Refresher 14 – ICT for Educational Administration and Management

Objectives

1. Deconstructing ICT for educational administration and management

2. Exploring tools and techniques for administration and management

3. Interacting with appropriate applications and data sources

4. Participate in ICT based educational administration and management

Session Breakup
Session 01: Role of ICT in educational administration and management – role of information management, process and tools
Session 02: Analysing sources, nature and collection of data
Special Lecture: Databases for educational management – application showcase
Session 03: Creating databases for educational administration

Session 04: Populating data, managing the database, querying and retrieving data

Special Lecture: Visualisation and data analytics in educational management

Session 05: Projects to be completed during day 3 – 8 (constructing a database for a school administration activity and implementing it)

Session 06: Participating in MIS applications for educational management

Session 07: Exhibition and peer evaluation of project lessons; portfolio submission and evaluation

3.3.2.14 Induction 03

Objectives

1. Deconstructing the ICT environment

2. Interacting with the ICT environment

3. Interacting with the internet and the web

4. Getting familiar with educational applications of ICT

Session Breakup

Session 01: Safe and clean ICT environments

Session 02: Updating and upgrading software

Session 03: Exploring educator communities

Session 04: Exploring social networks

Session 05: Advanced text processing 02

Session 06: Advanced graphics 02

Session 07: Advanced spreadsheets 02

Session 08: Creating a web communication (blog site)

Session 09: Exhibition and peer evaluation

Session 10: Evaluation and portfolio submission

3.3.3 Assessment

Each session of the induction and refresher courses involves an instructor led session followed by a hands on session, during which teachers undertake a number of activities. Each activity has an associated deliverable to be recorded in a portfolio (an e-portfolio). Teachers also have to submit various assignments as part of the courses. The cumulative record in the portfolio, representing their achievements during the courses serve to provide a comprehensive and continuous assessment. Provision for improving upon one's performance is also built in. Each of the induction and refresher courses also have a summative evaluation. The portfolio attempts to capture all learning and complements the periodic summative assessment through the course.

Certification

Together, the courses constitute thirty credits for a Diploma. Any teacher completing the three induction and the fourteen refresher courses becomes eligible to take an examination leading to a Diploma in ICT in Education. This Diploma would be awarded by the NCERT.

Fast tracking

A large number of teachers are likely to have been trained or have acquired qualifications making them advanced users of ICT. Such teachers will be permitted to complete all activities and assignments, populating their e-portfolio at their own pace. On completion, they would become eligible for the examination leading to the Diploma.

4. Part 2: ICT Curriculum for Students

Guided by the National Policy on ICT in School Education (see §3.1), the curriculum for students is designed to promote creativity, problem solving, and introduce students to the world of information and communication technologies with the specific purpose of widening their horizons and better informing them of choices in their career pursuits. In particular, the curriculum focusses on training the student to working with a variety of resources; learning to critically appraise information and resources; and making safe, productive, ethical and legal use of these resources a habit.

Students are also introduced to ICT outside the classroom context. Their curiosity and desire to learn will prompt them to more intensely participate in ICT activities. While introduction to social networks and blogging would become inevitable, making them aware of cyber bullying or other means of violating their rights should become an essential part of the training. While experimenting with hard and software the range of learning is very high. Channelising these tendencies and co-opting them into the teaching-learning process can help teachers create able support to the ICT system in the school.

The impact of ICT on the overall development of the personality can be extremely significant. In particular its effect on the improvement of communication skills is treated as a central goal of the ICT curriculum.

Language barriers and isolation can deny students access to the wide range of digital information and resources. Physically challenged, particularly the visually impaired and the auditorily impaired need additional support. Heightened awareness on the part of the system will help address these students' problems of access.

Based on the availability of ICT infrastructure and the provisioning of an ICT class in the timetable, different schools or Boards of School Education can exercise the choice to begin the ICT programme with any appropriate class, but ensure that every student completes the advanced stage outlined in the National Policy on ICT in School Education before completing schooling.

This curriculum is recommended for use with students of classes 6-12. It should not be used at the primary stage (classes 1 to 5). A structured ICT programme at the primary stage is not desirable and can be counter productive.

The curriculum expects an allocation of three sessions per week and thirty weeks per year for the course work. The course spans three years.

4.1   The Learning Strands

The ICT curriculum for students is also conceived as an important vehicle for the realisation of the goals of the National Curriculum Framework. It attempts to introduce students to a dynamic, immensely popular field, exposing them to a wide range of information and resources, motivating them to explore and participate in. It can not only support learning, but also introduce them to diverse activities which challenge their intellect and imagination.

To this end, the curriculum is organised into four strands:

1. Connecting with the world
2. Connecting with each other
3. Creating with ICT
4. Interacting with ICT

The scope of these strands remain the same as that for teachers. In terms of activities however, the syllabus articulates content differently, taking into consideration the age profile of students, their unique needs and the objective of preparing them for their future.

4.2   Syllabus

The ICT curriculum broadly attempts to equip students with an ability to negotiate a range of devices, tools, application, information and resources. The course is offered in chunks of three periods a week, which include one teacher led session and two hands on sessions. The teacher led session aims to demonstrate techniques and processes and present a context to the learning. Following this, students engage themselves with activities, which are designed to provide adequate hands on experience.

4.2.1   Objectives

After undergoing the course, the students will be able to:

1. Develop digital literacy skills that will enable them to function as discerning students in an increasingly digital society

2. Access various tools and applications for learning and skill development

3. Operate a variety of hardware and software independently and troubleshoot common problems

4. Use the ICT facility with care, ensuring the safety of themselves, others and the equipment

5. Create a variety of digital products using appropriate tools and applications and saving, storing and managing digital resources

6. Practice safe, legal and ethical means of using ICT

4.2.2   Organising Learning

The session wise break up of topics to be covered in the three year course:

4.2.2.1   Year 01

Breakup

Week 01 – 03: Programming 01 (working with programming environments like Logo, TurtleGraphics, or Scratch)

Week 04 – 05 Graphics 01 (digital art tools like Flowpaint, MyPaint)

Week 06 – 07· Internet and the ICT environment 01 (hardware and software, browsing)

Week 08 – 12 : Data representation and processing 01 (spreadsheets)

Week 13 - 14 : Audio visual communication 01

Week 15 - 18 : Programming 02 (working with programming environments)

Week 19 - 21 : Graphics 02 (digital art tools)

Week 22 - 26 : Data processing 02 (text, images, layout and output)

Week 27 - 29: Audio visual communication 02

Week 30: Exhibition of portfolios and evaluation

4.2.2.2 Year 02

Breakup
Week 01 – 03: Programming 03 (working with programming environments)
Week 04 – 05: Software applications 01 (maps and globe)
Week 06 – 07: Internet and the ICT environment 02 (web resources, e-mail)
Week 08 – 10: Data representation and processing 04 (spreadsheets)
Week 11 – 12: Audio visual communication 03
Week 13 – 14: Programming 04 (working with programming environments)
Week 15 – 16: Software applications 02 (Geogebra)
Week 17 – 20: Graphics and animation 03
Week 21 – 24: Data processing 05 (text and images)
Week 25 – 26: Data processing 06 (layout and output)
Week 27 – 29: Audio visual communication 04
Week 30: Exhibition of portfolios and evaluation

4.2.2.3 Year 03

Breakup
Week 01 – 02: Software applications 03
Week 03 – 04: Software applications 04
Week 05 – 06: Software applications 05
Week 07 – 08: Software applications 06
Week 09 – 10: Software applications 07
Week 11 – 12: Internet and the ICT environment 03
Week 13 – 16: Project 01 (web resources)
Week 17 – 20: Project 02 (programming)
Week 21 – 24: Project 03 (audio visual communication / graphics and animation)
Week 25 – 28: Project 04 (web development / app development)
Week 29: Internet and the ICT environment 04
Week 30: Exhibition of portfolios and evaluation

4.2.3 Assessment

Each session of the course involves a teacher led session followed by a hands on session, during which the student undertakes a number of activities. Each activity has an associated deliverable to be recorded. The student also has to submit various assignments as part of the courses. This should facilitate a comprehensive and continuous assessment. Provision for improving upon one's performance is also built in. A summative evaluation is designed at the end of each year. This evaluation also includes an exhibition and peer review of the work done through

the year. An e-portfolio attempts to capture all learning and complements the periodic summative assessment through the course.

Certification

As the course may not be immediately available across all schools, owing to the ICT infrastructure not being in place, the State Board of Secondary Education may evolve a mechanism of a separate examination, following which a Certificate can be awarded. Once all schools are equipped, this could form a part of the School Leaving Certificate.

5. ICT Curriculum Group

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The Curricula is organised into six strands:

Connecting with the World

Connecting with Each other

Possibilities in Education

Interacting with ICT

Reaching out and Bridging divides

Creating with ICT
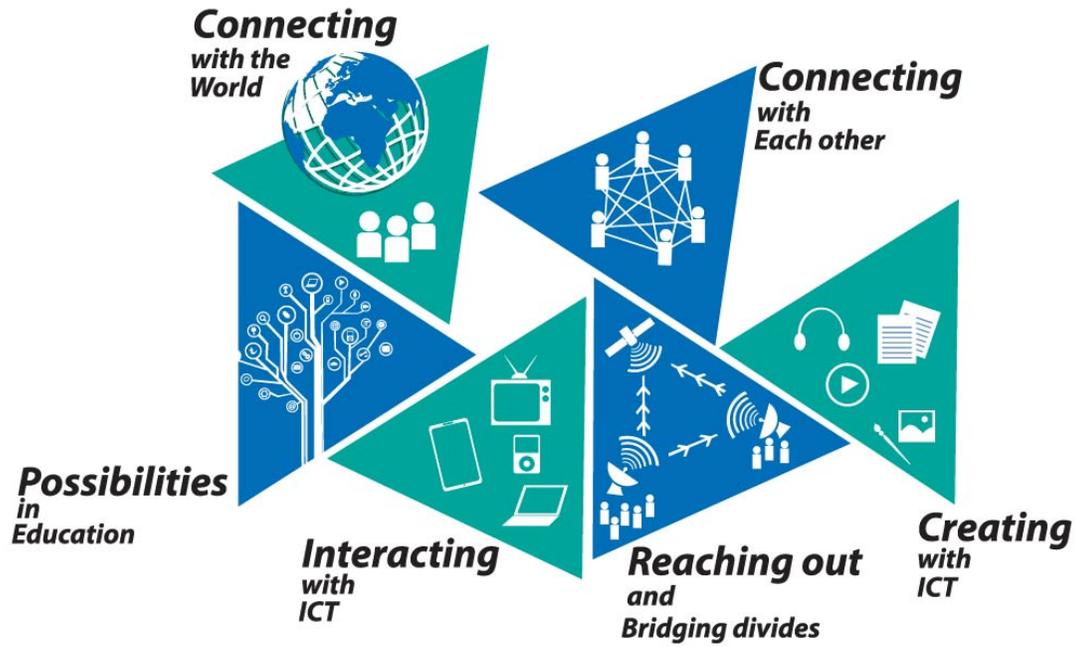
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