INTRODUCTION

The *National Policy on Education* 1986, as modified in 1992, stressed the need to employ educational technology to improve the quality of education. The policy statement led to two major centrally sponsored schemes, namely, Educational Technology (ET*)* and Computer Literacy and Studies in Schools (CLASS*)* paving the way for a more comprehensive centrally sponsored scheme – Information and Communication Technology @ Schools in 2004. Educational technology also found a significant place in another scheme on up-gradation of science education. The significant role of ICT in school education has also been highlighted in the **National Curriculum Framework 2005 (NCF 2005).**

With the convergence of technologies, it has become imperative to take a comprehensive look at all possible information and communication technologies for improving school education in the country. The comprehensive choice of ICT for holistic development of education can be built only on a sound policy. The initiative of *ICT Policy in School Education* is inspired by the tremendous potential of ICT for enhancing outreach and improving quality of education. This policy endeavors to provide guidelines to assist the States in optimizing the use of ICT in school education within a national policy framework.

What is ICT?

Information and Communication Technologies are defined as all devices, tools, content, resources, forums, and services, digital and those that can be converted into or delivered through digital forms, which can be deployed for realizing the goals of teaching learning, enhancing access to and reach of resources, building of capacities, as well as management of the educational system.

These will not only include hardware devices connected to computers, and software applications, but also interactive digital content, internet and other satellite communication

devices, radio and television services, web based content repositories, interactive forums, learning management systems, and management information systems.

These will also include processes for digitization, deployment and management of content, development and deployment of platforms and processes for capacity development, and creation of forums for interaction and exchange.

Competencies defined in the National Policy on ICT in School Education
I.   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.

II.   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.

III.   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.

IT@Schools in Karnataka

Background

ICT education in the schools has been practiced for many years. The major short comings observed in the previous approaches were

a. The projects were implemented by instructors hired from the market and hence ownership of the teachers was minimal.

b. Many times the schemes ended up with procurement of the hardware which was not properly used due to the lack of ownership in the school.

Considering these factors, Karnataka has restructured the ICT programme and integrated all technology based programmes under the umbrella of Technology Assisted Learning Programme (TALP). TALP comprises of EDUSAT, Computer Assisted Learning Centres under SSA, Tele-Education, Radio programmes and IT@Schools in Karnataka. (Annexure 1 to 5)

The IT@Schools in Karnataka project is modeled after the IT@Schools in Kerala. This project aims at paradigm shift in the approach towards ICT education in three ways.

a. It emphasizes on ownership of the ICT education by the teachers.

b. The implementation sequence is put as content development, teachers training and hardware procurement.

c. Using Free and Open Source Softwares (FOSS) – Operating System and Software Applications in order to expand the range of learning, creation and sharing.

The programme was conceived and implemented during 2016-17 in 1000 Government Secondary Schools of the State.

PROGRESS DURING 2016-17

I.   Selection of Schools

As the first phase, the programme was proposed to be implemented in 1000 schools which were selected based on the availability of a motivated and willing teacher, space for establishing a computer lab and feasibility of broadband internet connection.

The following table shows number of selected schools in each Educational Districts.

Sl. No.	Educational Districts	No. of Schools Selected
1	Bagalakote	34
2	Ballari	22
3	Belagavi	24
4	Bengaluru North	29
5	Bengaluru Rural	26
6	Bengaluru South	24
7	Bidar	19
8	Chamarajanagara	9
9	Chikkaballapura	35
10	Chikkamagaluru	58
11	Chikkodi	35
12	Chitradurga	20
13	Dakshina Kannada	22
14	Davanagere	25
15	Dharawada	48
16	Gadaga	27
17	Hasana	54
18	Haveri	30
19	Kalburgi	13
20	Kodagu	27
21	Kolara	16
22	Koppala	12
23	Madhugiri	31
24	Mandya	48
25	Mysuru	43
26	Raichuru	29
27	Ramanagara	23

Sl. No.	Educational Districts	No. of Schools Selected
28	Shivamogga	55
29	Sirsi	10
30	Tumkuru	43
31	Udupi	49
32	Uttara Kannada	6
33	Vijayapura	44
34	Yadgiri	10
TOTAL		**1000**

II. Development of the Content

ICT Curriculum for Teachers developed by CIET of NCERT was analyzed and adopted by the State. The ICT curriculum has been developed for three levels, which is scheduled to be completed in 105 days. The training programmes for teachers are being scheduled accordingly. Teachers who complete Induction-1 and Refresher courses will function as a trained IT teacher at level-1. Teachers completing Induction-2 course will function as a school IT coordinators and teachers completing Induction-3 and Refresher courses will function as designated District IT coordinator.

The Level-1 content for teacher training was developed by the Department in partnership with Azim Premji Foundation. 11 Selected teachers were part of the development team (Annexure 6). The team divided the curriculum into granular components and designed teacher training materials. Following tables shows the same.

NCERT-CIET Developed ICT Curriculum for Teachers – Induction - 1

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	

DSERT in collaboration with APF developed ICT Curriculum for Teachers – Induction – 1

1	Browser and Browsing
2	Connections and Connectors – Bringing together hardware and Software
3	Handling Text – Writer, Draw and math
4	Handling Data – Calc
5	Handling Media – Audacity, Open shot
6	Handling Media – Impress
7	OS and Requirements
8	Exploring web resources
9	Assistive Technology
10	Email and forums
11	Inputting in Indian languages
12	E-Commerce

There are two types of materials. The textual (in pdf formats) which are called Task Guides and also in audio-video format. More than 140 training videos have been prepared for the purpose of teachers training. These videos are also available in the public domain through YouTube under the channel TALP ItatKarnataka. All Videos are under the licence Commomn licence By attribution, non-commertial and share alike. The link for videos is, https://www.youtube.com/channel/UCFouGpmi6EMbLl-D1osZJLw. The content is emphasizing on the practical aspects of the computer education.

III.   Training of Teachers

Teachers training is the most crucial part of the implementation as they are owners of the programme. A batch of DIET ET Nodal Officers of all 34 DIETs were oriented in RIE, Mysuru for 3 days in the month of September 2016. Then in the month of November and December 2016 selected 136 Master Resource Persons (MRPs) were trained in 4 batches at DTI, Banashankari, Bengaluru, DIET, Bengaluru Urban, DIET Bengaluru Rural and DIET, Musuru. These 136 MRPs were included 1 Lecturer from each DIET and 3 active science and maths high school teachers from each Educational District.

MRP Training Venue	DTI, Banashankari, Bengaluru	DIET, Bengaluru Urban	DIET, Bengaluru Rural	DIET, Mysuru
Education Districts from which participants got training.	Bengaluru Rural, Bengaluru North, Bengaluru South, Chamarajanagar, Chikkaballapura, Dharwad, Gadag, Kolar, Mysuru, Ramanagara, Shivamogga & Vijayapura	Bagalakote, Ballari, Belagavi, Bidar, Chikkodi, Kalburgi, Koppala & Yadgir	Chitradurga, Davanagere, Haveri, Madhugiri, Raichuru, Sirsi & Tumakuru	Chikkamagaluru, Dakshina Kannada, Hasana, Kodagu, Mandya, Udupi & Uttara Kannada

These 136 MRPs inturn gave Level-1 of training to Science and Maths teachers of selected schools in their respective districts for 10 days in residential mode. The schedule of the training is enclosed as annexure 7. Also same training was given to Head Master/Head Mistress of the selected 1000 schools for 5 days in residential mode. So now 2000 teachers and 1000 HMs together 3000 teachers have been trained all over the State.

Training in all districts was conducted in a well equiped computer labs with high speed internet facility and multimedia projectors. It was very much necessary to provide one desktop computer to each teacher. Some teachers were encouraged to use their own or school's laptop in the training. Each teacher was provided with 2 DVDs which contain the softcopy of the Level -1 of the training materials prepared by selected State Resourse

Teachers team with the guidence of DSERT and APF. One DVD containing all task guides and 'Calc' videos and another DVD containing all the other videos. There are totally 114 Videos and 43 Task Guides with Facilitators Guides, Excercises, Projects, Self-Observation Feedback forms and many additional materials. And Operating System Linux Mint 18.0 was provided also in a bootable DVD or in 8GB pendrive. This will enable teachers to install Linux Mint 18.0 OS onto their computers in the School.

The ICT was utilised in the begining of the training itself for registration of the participants, pre-test before training sessions and a post-test after training sessions on 10th day. A session wise feedback form and overall feedback form were also used to capture the participants involvement in the training. All these were done using Google Forms which is a free Web-based application in which one can plan events, make a survey or poll, give students a quiz or collect other information in an easy, streamline way. (sample registration form, Pre-test, Post-test, Day-wise feedback form and Overall feedback form are in google forms in Annexure 8 to 12).
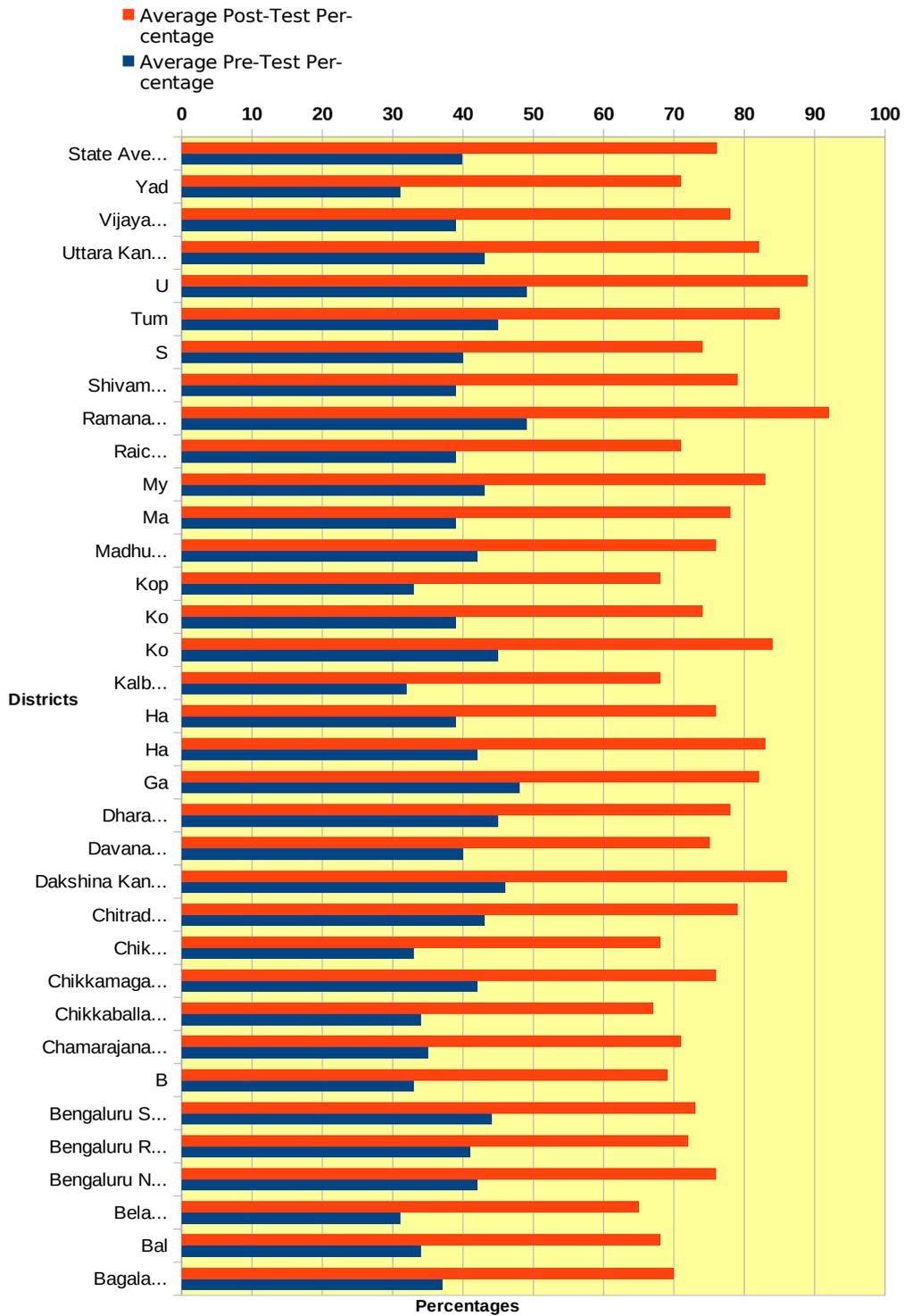
In addition to this written feedback were also taken to know the actual effectiveness of the training. (annexure 13)

By analysing these google forms of all districts follwing data has been taken to analyse the effectiveness of the training. The comparion of average of pre-test and post-test scores in percentages is as follows.

Sl. No.	Educational Districts	Average Pre-Test Percentage	Average Post-Test Percentage	Difference
1	Bagalakote	37	70	33
2	Ballari	34	68	34
3	Belagavi	31	65	34
4	Bengaluru North	42	76	34
5	Bengaluru Rural	41	72	31
6	Bengaluru South	44	73	29
7	Bidar	33	69	36
8	Chamarajanagara	35	71	36
9	Chikkaballapura	34	67	33
10	Chikkamagaluru	42	76	34
11	Chikkodi	33	68	35
12	Chitradurga	43	79	36
13	Dakshina Kannada	46	86	40
14	Davanagere	40	75	35
15	Dharawada	45	78	33
16	Gadaga	48	82	34
17	Hasana	42	83	41
18	Haveri	39	76	37
19	Kalburgi	32	68	36
20	Kodagu	45	84	39
21	Kolara	39	74	35
22	Koppala	33	68	35
23	Madhugiri	42	76	34
24	Mandya	39	78	39
25	Mysuru	43	83	40
26	Raichuru	39	71	32
27	Ramanagara	49	92	43
28	Shivamogga	39	79	40
29	Sirsi	40	74	34
30	Tumkuru	45	85	40
31	Udupi	49	89	40
32	Uttara Kannada	43	82	39
33	Vijayapura	39	78	39
34	Yadgiri	31	71	40

Sl. No.	Educational Districts	Average Pre-Test Percentage	Average Post-Test Percentage	Difference
State Average Percentage		39.88	76.06	36.18

District-wise Comparison of Average Pre-Test and Post-Test Percentages

Legend:
- ■ Average Post-Test Percentage
- ■ Average Pre-Test Percentage

Y-axis (Districts, top to bottom): State Ave..., Yad, Vijaya..., Uttara Kan..., U, Tum, S, Shivam..., Ramana..., Raic..., My, Ma, Madhu..., Kop, Ko, Ko, Kalb..., Ha, Ha, Ga, Dhara..., Davana..., Dakshina Kan..., Chitrad..., Chik..., Chikkamaga..., Chikkaballa..., Chamarajana..., B, Bengaluru S..., Bengaluru R..., Bengaluru N..., Bela..., Bal, Bagala...

X-axis: Percentages (0 to 100)

As these training started in various districts, each member of the content development team was assigned 3 to 4 districts to visit and report the ground reality of the training sessions and also to provide any necessary assistance to the Training Co-ordinator and MRPs. These visits of SRPs brought a on going coordination between DSERT and DIETs in terms of improvements in the sessions of the training. One google form was created and which each visiting SRP has to fill during his/her visit (annexure 14). According to responses recorded in this google form following data can be seen.

✓ 23 out 34 DIETs were visited by atleast one SRP during the training programme.

✓ Visiting SRP stayed there for 2 to 3 days to extend help in training sessions and to report to DSERT.

✓ The duration of the visit was from 14/12/2016 to 04/02/2017

✓ SRPs visited during teachers training as well as HMs training.

✓ According to visitors response 46% of the participants were Male teachers and 54% of the participants were Female teachers.

Gender-wise Comparision
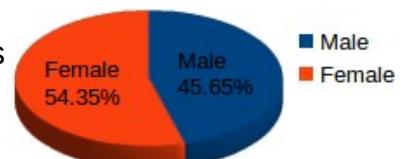
✓ According to visitors response 23.40% of the labs were Excellent, 55.32% labs were Good and 21.28% labs were Satisfactory condition.

Lab Status in view of Observers

✓ According to visitors response the internet connectivity in the labs were like this.

✓ 66% of labs were had Wi-Fi facility where as remaining 34% were having LAN connectivity.

Internet Facitlity in the view of Observers

IV. Mapping and developing Digital Learning Resources / e-contents

The state envisages e-content for computer / digital device related competencies and for subject related competences largely through appropriate adaptation of the content already developed by NCERT, other state Government and not-for-profit organizations using free and open source software. Fresh content development will be mostly in the form of recording of teaching lessons/lectures delivered by expert subject teachers/lecturers. The state will be hosting such content at State Data Center and make extend the facility to schools for download in asynchronous mode and repeated use.

There had been an exercised to identify already available e-content across various states and NCERT. Indexing of contents of Science and Mathematics of Class VIII to Class X with concepts and sub-concepts has been completed along with the completion of hyper linking of the relevant contents. These contents will be pre-loaded to the laptops being supplied to all schools covered under the project during this year.

V. Student ICT content:

ICT syllabus of year-1 of NCERT/CIET has been translated to Kannada and is ready for printing for the implementation during 2017-18 after. Teaches will be trained on this for teaching basics of computer with basic programme with key focus on open source software.

VI. Supply of IT equipments

Tenders have been issued to invite proposals for the supply of Laptops and LCD projectors to the schools. Integration of IT into classroom processes is promoted through use of these equipments which would be pre-loaded with e-contents.

PLAN FOR 2017-18

TALP will be extended to 1000 additional schools during 2017-18 along with the 1000 schools covered during 2016-17.

Teachers training

Induction-1: Training of teachers in Induction-1 will be given to 2000 teachers of the newly selected 1000 schools, for mathematics and science teacher from each school, along with head teachers training to 1000 HMs. As mathematics and science teachers were trained for the schools selected 2016-17, Social Science and a Language teacher will be trained during this year and hence a total of 4000 teachers will be trained for 10 days and 1000 HMs will be trained for 5 days under Induction-1 training.

Refresher training of Induction-1: Four MRPs from each district will be trained 2 days on refresher module of Induction-1 training who in turn will train 6000 teachers and 2000 HMs of 2000 schools covered so far. Under refresher training, the state is encouraging a mix of offline and face to face training which is delivered in accordance with NCERT prescribed curriculum.

Induction-2: It is proposed to have school IT Co-ordinator in each schools who is empowered to co-ordinate the implementation of the project. These Co-ordinators will be given training upto Induction-2 as prescribed in ICT curriculum of NCERT. Hence each school will have a teacher trained upto level-2 under Induction-2 training programme among the teachers who had completed Induction-1 training programme. 2000 school teachers will receive training of 5 days through 136 MRPs who also receive 5 days training at the state level.

Refresher training of Induction-2: 136 MRPs will be trained for 2 days to train 2000 school co-ordinators again for 5 days under refresher of Induction-2 training.

Inducation-3: It is proposed to have tow District IT Co-ordinator in each district in order to co-ordinate the implementation of the IT@Schools in Karnataka programme in their respective districts. These IT Co-ordinators will be empowered to deliver IT training to all teachers whenever necessary and conduct programme under the project as designed at the state level. 70 teachers who have already undergone Induction-1 and Induction-2 will be selected to undergo 5 days training under Induction-3 course.

Training of teachers to train students on ICT curriculum: The state is identifying the available digital resource materials and mapping it to the contents of the syllabus to facilitate teachers to use them in their classroom processes as ready resources. These will be pre-loaded to the laptops being supplied to schools and also will be uploaded to the centrally located server where schools can download whenever necessary. Training to access these contents and use them effectively is necessary. 136 MRPs will be trained for 2 days on this who in turn will train 2000 HMs and 6000 teachers during this year along with 782 Implementation Officers who need to support and guide teacher to use these materials.

Student Content and e-Content:

Year-2 content of ICT curriculum prescribed by NCERT/CIET will be translated to Kannada during 2017-18 which will be implemented during 2018-19. Year-1 printing will be taken up during 2017-18 to be implemented in class VIII in 1000 schools.

Curation of available Digital Learning Resources will be carried in all six subjects of class VIII to X of the state. Mapping of available resources will be made along with indexing along with voice over of materials available in other languages.

Creation of e-contents will be focused for the gap after exhausting the available resources. Selected Resource Persons/Expert Teachers will be trained for 10 days at the state level for creation of e-content. Schools teachers are involved even in creating content by empowering them through training programmes. These teachers will be creating contents in 5 workshops with each 5 days.

Expert committee will be constituted to review student content, curated e-content and created e-content to validate and vet all of them. This will be done in every quarter with 3 days each workshop.

Purchase and supply of IT equipment's for setting up of Computer Labs:

An arrangement has been made to support teachers in their subject teaching with supply of laptops and projector to each school along with access to e-content. Schools selected during 2016-17 and 2017-18, i.e, 2000 schools will be given a projector and a laptop each with pre-loaded content and access to content loaded at central server.

Computer lab with 15 computers/Minin PCs with a server to act as a local Cache will be setup in each school along with necessary UPS and Batteries for uninterrupted power supply.

Since some of the old labs need verification of rooms to check the status of equipments, cost is proposed for the this activity. Further site preparation cost is proposed for new schools and for the repair and replacement of the networking and other items provided under previous projects.

A lab at DSERT state office is necessary to conduct state level workshops, development activities and training of teachers. Rs.60 lakhs has been proposed for establishing computer lab at DSERT with 40 computers and peripherals.

Maintenance cost for each schools including electric charges, internet expenses, stationery etc has been proposed as Rs.30,000/- per school for 2000 schools.

IT @ School in Karnataka SRP Training Details

DSERT conducted 'ICT Teachers - SRP Training', 10 day residential training from 14/11/2016 to 23/11/2016, at DTI Bengaluru.

Training Report

1. Four resource persons identified by DIETs from each of the twelve districts were invited for the program.

2. A total of 45 participants have registered in the program.

3. Smt. Bhanumathi, SADPI, DSERT , was the Course Co-ordinator

4. Smt Anita V. Nazare, DDPI, ET section, DSERT spoke about the objectives of the training program. The participants were oriented to ICT initiatives in Karnataka from Mahithi Sindhu to IT@Schools in Karnataka program till date.

5. The emphasis was on ownership and involvement and commitment of teachers in making ICT programme a success.

6. About 1242 schools have been shortlisted based on their willingness to be a part of the programme and also feasibility of internet

7. The Mathematics and Science teachers will be trained on ICT Induction 1 module. The schools heads have also been included as their role is critical to success of the project.

8. The inaugural session was followed by online registration of the participants. A 'Pre-Test' to capture the entry behaviour of participants was administered online.

9. The expectations of the participants from the training programme were elicited. The asking is more for hands on experience during the 10 day programme.

10. All participants were provided with a Desktop PC / Laptop each and participant – facilitator ratio of 4:1.

11. 45 participants out of 48 registered and attended the training out of which 9 are Sr.Lecturers/ Lecturers of DIETS, 11 PCM teachers and 23 CBZ teachers and 2 BRPs.

12. Amongst the participants 5 belong to SC, 1 ST, 1 Category-1, 24 OBC, 3 Minority and 11 represent GM.

13. On the whole 45 participants represented 40 MLA constituencies.

14. Out of the 45 participants about 20 teachers have been using ICT in the classroom teaching learning process.

15. The group is of a mixed nature with almost 12 participants being conversant both in training and content, most of them have stated that only their memory needs to be refurbished on the use of Ubuntu as they did not have infrastructure facilities for classroom teaching.

16. There are about seven participants who are being introduced to Ubuntu for the first time.

17. The 11 members of the content development team were assigned 4 participants each for handholding throughout till the completion of the Level 1 training programme including refreshers.

18. Each day of the training started with the reflection on previous day's sessions by the districts taking turns. Each presentation was innovative and unique.

19. All the facilitators presented their sessions in interactive mode. There was much scope for hands on practise for the participants.

20. Participants became familiar with use and installation of UBUNTU OS, Libre Office applications – Writer, Calc and Impress, connectors and connections, image and video editing using Open Shot, Email forums and Google Forms, Browsers and

browsing, exploring relevant web resources, Assistive technology, Virtual reality and augmented reality.

21. Training was a success with the cooperation and support of all RPs, participants and organizers.

Feedback from participants: The participants opined that the training was useful except for the duration which is too long and they had enough hands on practise as they expressed on day-1. Many are of the view that the training module comprising of Taskguides, Practise exercises and self-evaluation forms if given in hard copies rather than given in soft form in DVDs would have been more beneficial.

Rolling out the project: With this the first batch of SRPs training is complete where the MRPs from12 districts are trained and will cascade the training for teachers of schools selected for the implementation of the project in 2016-17 in their respective districts from 28th of November 2016.

The MRPs of remaining 22 districts will be trained in 3 batches at 3 training centers- computer labs of DIET, Bengaluru Urban, DIET Bengaluru Rural and DIET Mysuru- simultaneously from 28/11/2016 to 07/12/2016. Steps are taken in this regard and the Key resource persons and training venues are ready.

22 districts will cascade the district level trainings starting from 12/12/2016 Training of PCM and CBZ teachers of all the selected for the project will be complete by 31st of December 2016. Plan for 5 day training for the Head Teachers of these schools on monitoring and supervision of the implementation of the project and using ICT in

classroom process is being made and will be complete after the completion of the teachers training.

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