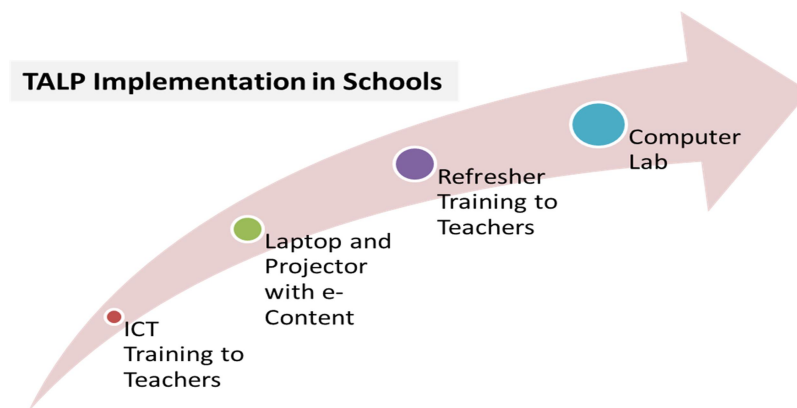# ICT and Digital Initiatives:

ICT education in the schools has been practiced for many years in the state of Karnataka. The state implemented Mahithi Sindhu, ICT programme in 1000 government secondary schools between 2000 and 2005, ICT phase-1 was implemented in 480 schools between 2007 and 2012 ICT Phase-2 was implemented in 1571 schools between 2008 and 2013 and ICT Phase-3 approved for 4396 schools during 2009 was not implemented due to administrative reasons.   The major short comings observed in the previous approaches were

    a. The project was 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, Radio programmes and IT@Schools in Karnataka.

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 teacher training, content development and hardware procurement.

    c. Using Open Source software and content

TALP Implementation in Schools

- ICT Training to Teachers
- Laptop and Projector with e-Content
- Refresher Training to Teachers
- Computer Lab

The major components required for achieving the ICT in education are (1) ICT Training to Teachers (2) Digital resources (3) IT Infrastructure (4) Connectivity (5) Learning and Content Management System. In addition to above, Policies, Guidelines, SOPs and tools for Monitoring and evaluation of such large program is essential component.

The programme was conceived and implemented during 2016-17 in 1000 government secondary schools of the state and in 750 government secondary schools and 250 Government Pre-University Colleges during 2017-18. Further it was implemented in 750 Government Secondary Schools during 2018-19

Year	No. of Schools Selected
2016-17	1000
2017-18	750
2018-19	750
2019-20	1231 (proposed) + 718 schools sponsored by HKRDB

PROGRESS DURING 2018-19

1. Teachers Training on ICT Curriculum:

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.

In this regard, the state is training teachers on ICT curriculum designed and promoted by CIET, New Delhi. Karnataka being a pilot state for implementing the National ICT Curriculum for

teachers, the state is being supported with the content, hands on training for state resource persons and platform for online training system. NCERT-CIET has been in constant collaboration with DSERT, Karnataka, in implementing and testing the course processes during the piloting stage. The following phases of training have been finalized under Level-1, the Diploma in ICT in Education.

   a. Induction 01 – 10 days (Face to face)
   b. Refresher 01 (Digital Storytelling) – 5 days (Face to face)
   c. Refresher 02 (ICT in teaching learning -1) – 5 days (Face to face)
   d. Refresher 03 (Social, ethical, legal and technical use of ICT – 5 days (Online) to
      be conducted by CIET

In 2016-17, Govt of Karnataka in collaboration with Ajim Premji Foundation developed teachers ICT content in accordance with CIET/ NCERT Syllabus. 2910 teachers (Science, Mathematics and HM from selected 999 schools were trained at DIET level under Induction-1 training programme. 413 DIET faculties were also trained in selected DIETs to empower the implementing and monitoring agencies to bring in effectiveness.

The overall progress in training of teachers is given in the following table.

Year	Particulars	Schools	No. of teachers	
			Induction-1	Refresher Course
2016-17	MRPs	-	136	-
	Teachers & HMs	999	2910	-
	DIET Lecturers	-	413	-
	2016-17 Total	**999**	**3,459**	**0**
2017-18	PU MRPs	-	97	-
	Teachers & HMs	750	5116	-
	2017-18 Total	**750**	**5,213**	**0**
2018-19	MRPs	-	-	136
	Teachers	1195*	4261	-
	Induction-1 Trained Teachers	-	-	5912
	DIET Lecturers	-	143	-
	2018-19 Total	1,195	4,404	6,048
Grand Total (as on March 2019)		**2,944**	**13,076**	**6,048**

97 MRPs of Department of Pre-University Education were trained by DSERT who in turn trained 937 lecturers of 250 pre-university colleges during 2017-18.

NCERT-CIET conducts State Resource Persons training who in turn trains Master Resource Persons of the district. During 2018-19, 15 SRPs were trained in level-2 Refreshers Course by CIET at RIE Bhopal. The SRPs in turn training 136 MRPs who have given training to 5912 teachers across the state under refresher course along with the training of 4404 teachers in Induction-1 course. In all 10452 teachers have been given training during 2018-19 under ICT training for teachers.

2. Impact of the training programme:

As part of the Monitoring and Evaluation , various reports are being collected and analyzed during the implementation of the Program.

The teachers trained in Induction-1 training have been oriented through interactive sessions at DIETs. An online format to obtain feedback on the implementation of ICT in classroom teaching has been developed for DIET officers and other officers, who visit the schools. A QR-code has been developed and circulated, which guides towards the online format. The analysis of such reports generated is used for improvement of training programmes.

Responses were obtained and recorded during the school visits from teachers trained under Induction-1 training for the year 2017-18; and from teachers trained under Induction-01 and Refresher courses for the year 2018-19.
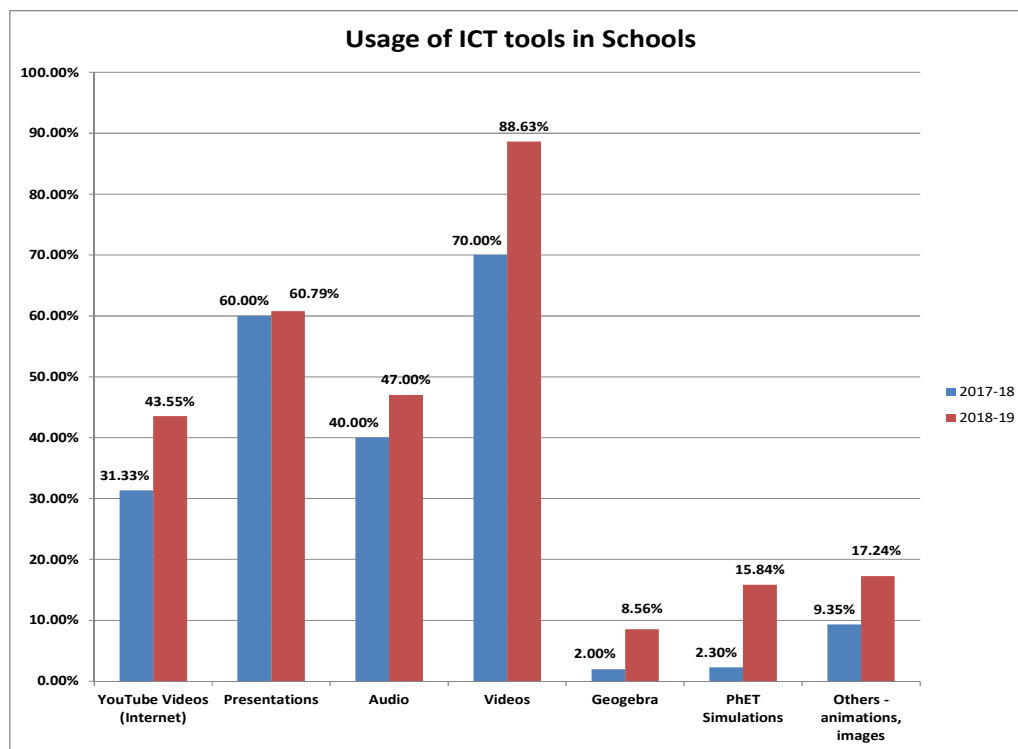
Responses in 2017-18 – **797**
Responses in 2018-19– **783**

Following is the data, reflecting the effectiveness and impact of the teacher training programme in the schools for the years 2017-18 and 2018-19. It may be noted that this exercise is still in progress for the year 2018-19):
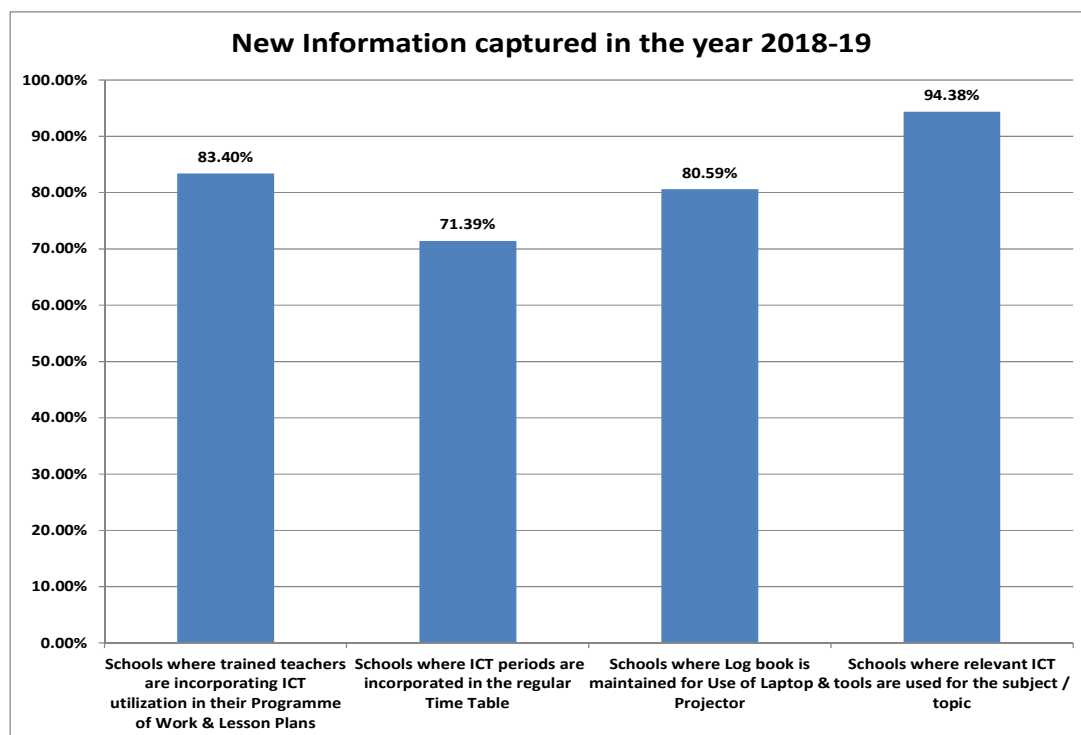
a)   No. of teachers using ICT in regular classes
b)   Teachers using ICT Applications / Tools used for ICT based teaching
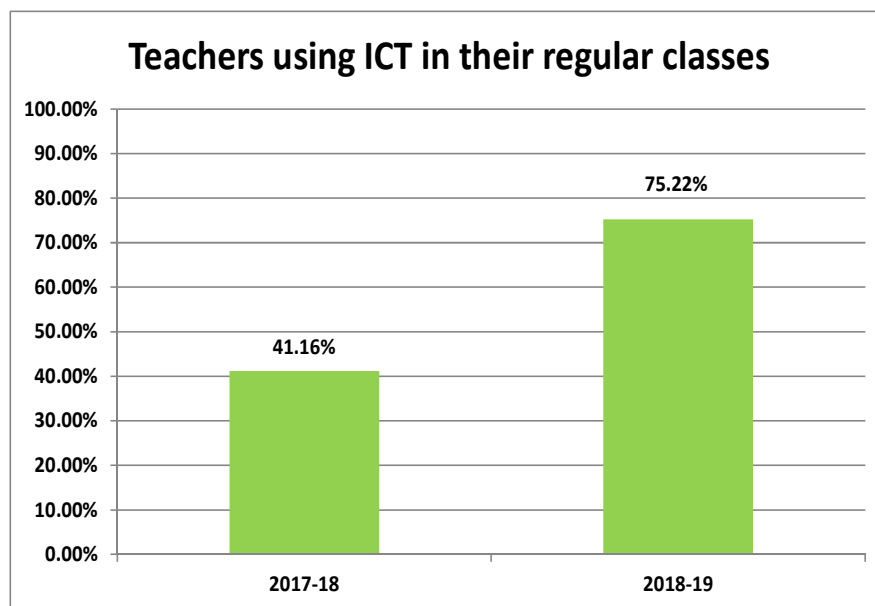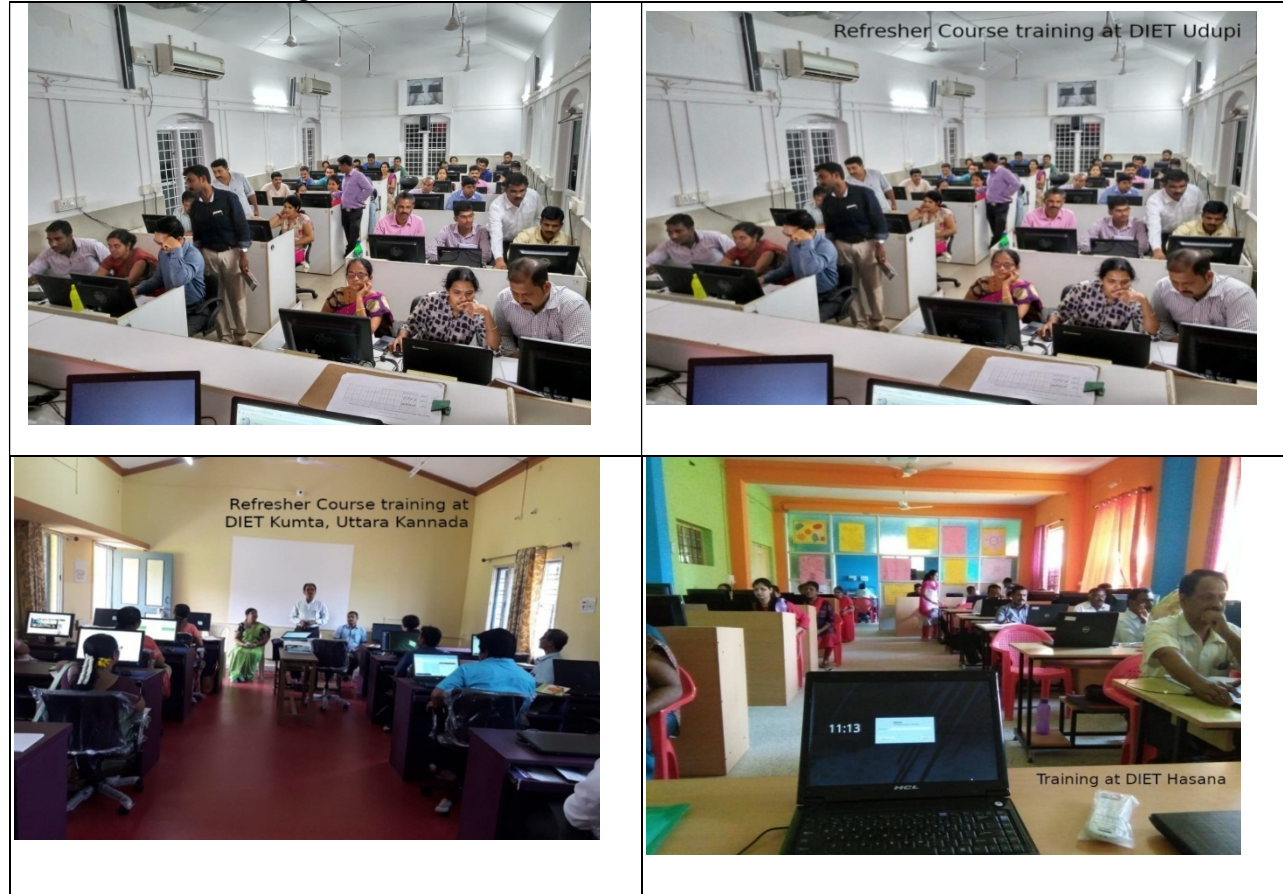

After the Refresher-01 course was conducted, the template for capturing information from the schools has been revised, adding important information about including ICT utilization in lesson plans, timetable, log-book maintenance at the school etc.

Usage of ICT tools in Schools

ICT Tool	2017-18	2018-19
YouTube Videos (Internet)	31.33%	43.55%
Presentations	60.00%	60.79%
Audio	40.00%	47.00%
Videos	70.00%	88.63%
Geogebra	2.00%	8.56%
PhET Simulations	2.30%	15.84%
Others - animations, images	9.35%	17.24%

c) New information captured in 2018-19:

New Information captured in the year 2018-19

Category	Percentage
Schools where trained teachers are incorporating ICT utilization in their Programme of Work & Lesson Plans	83.40%
Schools where ICT periods are incorporated in the regular Time Table	71.39%
Schools where Log book is maintained for Use of Laptop & Projector	80.59%
Schools where relevant ICT tools are used for the subject / topic	94.38%

Photos of ICT training for teachers

Refresher Course training at DIET Udupi

Refresher Course training at DIET Kumta, Uttara Kannada

Training at DIET Hasana

Case Study 1:
Harsha.S, Assistant Master, Government High School, Hedathale from Mysore district syas that after his TALP training, he was competent enough to prepare e-resources and stronger enough to create an effective learning environment. He is now creating e-resources using Scratch, Free mind, Phet, Active presenter, Video Convertor, Movie Maker, Geogebra, Kalzium, Stellarium, etc. He has his own blog where he shares all the resources and many videos are shared through youtube. "Science Pole' a mobile app is also developed by him and his friends. He has also set up a small computer lab using Raspberry Pi devices donated by his friends.

Case Study 2:
Mrs. Lakshmi, Asst Mistress, teaching Mathematics in GHS Lokkanahalli from Chamarajanagar District, writes after Induction-1 and Refresher courses, took interest in working on Kahoot as an extended ICT tool to make the students interested in Mathematics. example: She says she was able to analyze the participation of each student, and their performance as well, there by identify the difficult areas.

3. IT Infrastructure:

As the TALP is structured framework for implementation of ICT in Schools, the following are the Infrastructure being considered. While the teachers from the TALP selected Schools are being trained on ICT, these are being supplied with One Laptop and One Project. The Laptop is pre-loaded with all the Digital resources. The selected Schools are provided support for site readiness for establishing the Computer LAB. The Site readiness activity includes availability of Furniture, curtains, fans, UPS & Batteries, LAN and other necessary components. Once, the site readiness is confirmed by the School, Supply of Computers (All-in-One Computers along with One system as Server) is being done. Along with Broadband Connectivity along with Wifi router has been considered for these schools.
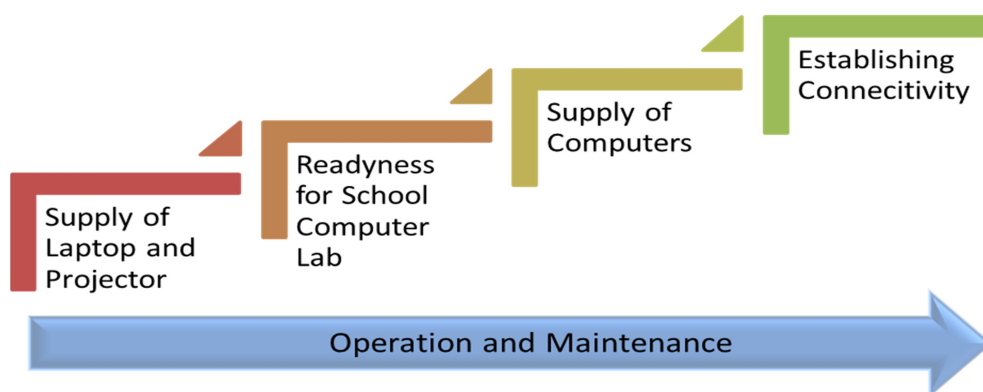
Operation and Maintenance of IT Assets is the most critical component for sustainable and successful implementation of the program. The Government of Karnataka is implementing the "Asset Management and e-Waste Management" guidelines recommended by National Institute for Smart Government (NISG) for effective and optimal utilization of IT Assets. The entire IT

Infrastructure has been procured along with 5 Years of Comprehensive Warranty and Preventive Maintenance Services.

	Laptop & Projector	Site readiness	Computer Lab	Connectivity
2016-17	1000	1000	1000	1000
2017-18	750+250(PU colleges)	750		
2018-19	750			
2019-20	**1231+718**	**1981+718**	**1500+718**	**1500+718**

4. Digital Resources

Government of Karnataka is pioneered in creation and utilization of Digital resources in teaching learning process. There are various initiations done on preparation of Digital resources with the support of teachers – Various initiations like KOER, EDUSAT, Tele-Education, Agastya Foundation, Azim PremijiFoundation has generated voluminous digital content. In addition to that, the Teacher groups are also hosting the content on various topics on Youtube channels.

Digital Resources created and provided by	
NGO's / Vendors	**Teachers**
• Obtain the CC by SA Confirmation • Content Mapping • Review and Approval • Localization (Content / Language) • Hosting	• Content Mapping • Review and Approval • Hosting

Government of Karnataka has standardized and compressed the Digital resources. And also, for all the reviewed and approved content, an Unique Icon has been used to discriminate the authenticity. Creation of Digital Resources is a continuous process and requires effective platform to identify the utilization, feedback and reviews.

- Standardized formats – MP4 for videos and MP3 for audios, to ensure that the resources are device-agnostic and operating system-agnostic.
- File size compressed without any major loss of quality to ensure the resources occupy less space in the devices.
- As part of Content Mapping activity, all the digital resources were classified according to Class-wise, Subject-wise for easy access.
- Source files provided allowing teachers to edit and customize resources as per their requirement.
-

The digital resources, which are being shared as Pre-Loaded along with the Laptops and also in Computer Labs as on April 2019 are

Sr No	Class	Subjects						Class Total
		EVS	Maths	Science	Social Science	Kannada Language I	English Language II	
1	**5**	32	112					**144**
2	**6**		287	28	28			**343**
3	**7**		144	42	8			**194**
4	**8**		99	176	61		9	**345**
5	**9**		270	166	59		2	**497**
6	**10**		397	270	161	26	6	**860**
	TOTAL	**32**	**1309**	**682**	**317**	**26**	**17**	**2383**

5. Khan Academy

The Department of State Educational Research and Training (DSERT) made a MoU with Khan Academy to localize and recreate Mathematics and Science videos of Class 5 to 10 available in English to Kannada. Necessary IT Infrastructure has been provided and also resource persons were deployed to localize the content as per the requirements of the Department. Around 1200 digital resources were localized and being put to use. The localized videos of Mathematics from Class 5 to 10 are made readily available on the youtube channel "Khan Academy Kannada".

6. DIKSHA

Karnataka was onboarded DIKSHA, recommended by MHRD during April 2018. Since then, 200+ teachers across 3 subjects - Mathematics, Science, and English are trained on creating content on DIKSHA portal. More than 2500 resources will be available for students on DIKSHA portal from the academic year 2019-20. These include both general and subject-specific resources from Class 1 to 10.

7. QR Codes in Text Books (Energized Text Books)

Government of Karnataka has adopted the Energized Text Books from the Academic Year 2019-20. A systematic approach has been followed with support of Diksha PMU in implementation of the same. For the current academic year, 33 titles covering Mathematics, Science and English for 6th to 10th Classes in Kannada and English medium are provided with QR codes. Already 1.58 Crore copies of text books with QR codes were printed and being distributed to the schools.

Subject wise Workshops are being conducted and existing digital resources are reviewed and mapped as learning content and also for assessments. Gap analysis sessions were conducted to identify the need for additional digital resources. Around 200+ teachers were selected and provided the necessary training on Diksha in creation of the digital resources. Around 20+ teachers were trained on reviewing the content created in the Diksha. Already 1800+ digital resources were linked to the 361 QR codes thus used in 33 titles.

Photos of resource team at work preparing e-content videos

8. Connectivity

1. Video Conference

For effective communication and dissemination of the information with District Level Offices, DSERT has also established the State of Art Video Conferencing facilities in all districts at the DIET offices including CPI office, PU Board and DSERT office with the support of Centre for e-Governance (CeG). All the initiatives of being discussed with the District level officers for effective monitoring of the same.

2. Teleconference

DSERT has equipped with Teleconference facility with satellite based communication where all the 204 Blocks and 34 Districts are connected. Teleconference is being used by the department effectively to disseminate the information on various initiatives / programs to the staff / teachers.

3. Broadband Connectivity to Schools

Based on the feasibility of Connectivity by BSNL, the selected 1000 schools are being provided with Broadband connectivity to the Computer Labs to access the Digital resources through internet. Along with BSNL, other ISPs are also being considered for better connectivity and reach.

9. Learning & Content Management System

As the state level Platform is not readily available for hosting the digital resources, Dikshahas been being used for uploading the digital resources. Regular reviews are being conducted with Diksha PMU for better utilization of the platform. Already, around 2500 digital resources were uploaded which are being reviewed by the Department.

ILMS (Moodle Platform) :

Also, Government of Karnataka intends to bring all activities related to training conducted and managed by different divisions of the department under one umbrella. In this regard, Department will deploy and customize a Moodle-based Integrated Learning Management System (ILMS) across the state. This will be a simple, yet comprehensive solution addressing the challenges in the existing system and catering to the department's future needs. Necessary functional requirements have been prepared.

10. EDUSAT

DSERT owns an EDUSAT Hub established by ISRO during 2004-05 with a band width of 7Mbps. Three studios were established at DSERT for telecasting programmes which were used by various other departments and for other programmes. VTU and Collegiate Education department had till now used these studios and Teleeducation programme of IIMB was also beamed using these studios and EDUSAT bandwidth. Further, 2600 schools of 5 districts of the state are provided with facilities to watch documentaries and programmes under EDUSAT programme for class 4 to 8 in various subjects. The studios which were established a decade ago have been upgraded under the technical guidance of ISRO for the department to use them for programmes like teleconferences to interact with the teachers or persons at the block level.

Further, DSERT has also established the State of Art Video Conferencing facilities in all districts at the DIET offices including CPI office, PU Board and DSERT office. Centre for e-Governance was given funds from the department for implementing this project and VCs started from Jan, 2019 and are being effective in real time review and discussion of key issues with the entire state without loss of time and money in travelling all the way to head office.

For establishing a DTH TV channel in the state exclusively for educational purpose, the letter of NCERT, New Delhi has been considered positively by the state government. An organisation Broadcasting Engineering Consultant India Limited (BECIL) will be asked to provide a Detail Project Report in this regard for the department to take further decision on establishing an education channel exclusively for students of this state.

11. Radio Programme:

SSLC passing package and Phone-in programees were planned for 2018-19 to be transmitted through AIR. 54 programmes were produced and broadcasted from AIR with the co-ordination of DSERT during February and March, 2019 along with a live phone-in Programmes.

12. Expansion of coverage of School in partnership with the state fund:

Hyderabad Karnataka Region Development Board(HKRDB) is established at Kalburgi, the northern part of Karnataka for the development of 6 districts located in the region. HKRDB is sponsoring for ICT education in this region. 1131 Government Secondary Schools are located in this region in which 413 schools have already been covered. HKRDB has released Rs.28 crores to implement ICT in the remaining 718 schools. Through this the entire set of schools in the region will be covered that makes a provision for ICT intervention for the students of the most backward region of the state. The infrastructure including Supply of computers, laptops, projectors, connectivity, room preparation, UPS and Batteries, etc is covered under the sponsored budget. The training of teachers will be covered under the training component.

13. Monitoring and Evaluation

Project Monitoring and Consultancy Unit which is functional in DSERT with the resource support of National Institute of Smart Governance (NISG) and has been established with 3 resource experts to technically support the implementation of TALP activities. NISG, Hyderabad is providing the required support for constituting this unit by deputing required qualified personnel.

MoU has been signed with NISG in this regard. PMCU constitutes a Project Manager, Functional Consultant and E-Content consultant.

PLAN FOR 2019-2020

Teachers training:

Training of teachers is a very important component for implementing ICT programme. The empowerment promotes efficient use of technology in teaching and learning process. The training in ICT curriculum of NCERT for teachers is being implemented since 2016-17. 2500 government secondary schools have been covered so far with 4 teachers in each school. There are other two subject teachers in these schools who need to be trained for use of technology in second and third language classes. Also the remaining Government Secondary Schools need to be oriented on the available technology facility through the training programme. Hence all the remaining Government Secondary Schools will be considered this year with a total of 20970 teachers to be trained in Induction-1 and Refresher 1&2 blended training of 10 days. This also includes training of 6 workshops of 5 days each at the state level for 240 mentors with 40 in each batch for evaluating and grading of e-portfolio assignments of 10452 teachers submitted in the previous year which is pending for evaluation. A joint certificate of DSERT and CIET will be issued to the teachers who successfully clear the course.

4 teachers in each school from 2944 Government Secondary Schools were trained during 2016-17 and 2018-19 and 2 more teachers (Kannada and Hindi language teachers) from these schools will be trained during 2019-20. All 6 teachers of the remaining 1717 schools needs to be trained during 2019-20 with a total of 16190 teachers to be trained under Induction-1 and 4780 teachers under blended Refresher course. It is proposed to train 20970 teachers for 10 days each in a residential training programme at the rate of Rs.500 per teacher per day with a total budget of Rs.10480.50 lakhs.

Sl. No	PROGRAMME	Target		Appraisers Remarks
		Physical	Financial (In Lakhs)	
01	Induction -1& Refreshers 1&2 course in Blended mode	20970	1048.50	

Further, the state funds will be utilized for training of PU lecturers. The details of training is as follows:

a) 70 Lecturers (2 or 3 from each district) will be trained for 2 days as district master resource persons (district co-ordinators) in two batches for English, Economics , Business Studies & Accountancy Subjects.
District co-ordinators of English, Economics , Business Studies & Accountancy Subjects will undergo Induction-1 of 10 days followed by Basic refresher course 1-10 in two batches (each refresher for 4 days, totally 40 days).

b) 70 district co-ordinators inturn will train subject 2000 lecturers in four subjects (English, Economics, Business Studies & Accountancy) from the selected 750 colleges for TALP at

district level (7 to 8 colleges from each district) and will undergo Induction-1 (2days orientation+10 days training. Totally 12days).

c) 70 district co-ordinators will also train principals (college co-ordinators) of the selected 750 Government P U colleges district wise for 5 days in ICT management.

d) Induction-2 (5days): 70 MRP'S,500 college co-ordinators and 5000 lecturers will be trained district wise at DIET's.

e) Advanced Refresher course (40days): 70 MRP'S, 750 college co-ordinators and 5000 lecturers.

f) Advanced Induction-3 (5days): State level IT coordinators 70.

Digital Learning Resources and e-Content

Under Khan Academy content localization initiative, the hosting of an exclusive website with a provision to view videos and take up practice session is being priority particularly to bring out Mathematics online for Kannada medium students. Further the localization of Science content and translation of strings and exercises along with early mathematics localization is the other agendas. The publicity among schools and teachers through consultative meetings and video conferences as well as teleconferences will be taken up to reach the stakeholders for wider use of content for better learning experience. The budget of Rs. 24.68 lakhs has been proposed under DIKSHA initiative which is budgeted under Teacher Education plan.

Further the DIKSHA initiative budget also includes Rs.152.26 lakhs for preparing e-contents, implementation of outreach plan, audio book preparation and LMS platform development.

Purchase and supply of IT equipments 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., 1750 schools have been given a projector and a laptop each with the pre-loaded content and access to content loaded at central server under state's fund. GoI funds utilized for the supply of laptops and projectors to 750 schools selected during 2018-19 which is over and above the schools approved in the PAB i.e, 615 Secondary Schools. Computer labs with 10 computers/15 computers/20 computers in each school are being setup in each school.

Hyderabad Karnataka Region Development Board is sponsoring for setting up to the computer labs and implementation of ICT programme in all the schools located in 6 districts of the region covering 718 schools under the Board's budget. 1231 Government Schools are left out so far from the coverage under ICT scheme of GoI. The same is proposed for coverage under ICT and digital Initiative programme during 2019-20. The proposed budget for 1231 schools is 10096.60 lakhs. This includes the non-recurring cost of Rs.7878.40 lakhs for hardware and software to 1231 schools and recurring cost of Rs.2215.20 lakhs for 1846 schools including 615 schools approved in 2018-19 with a total proposed budget of Rs.10093.60 lakhs.

Further the state funds will be utilized for establishing labs in Pre-University Colleges. 500 Colleges will be given laptops and projectors and 250 colleges selected in the first year, 2017-18, will be supplied with computers for setting up of computer labs to impart Student ICT curriculum.

Costing for ICT infrastructure 2018-19

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Sub Component			Activity Master	Norms	Allocation for 2018-10		Expendiure as on March, 2019		Spill Over		Unit Cost for 2019-20	Proposal 2019-20	
					Phy	Fin	Phy	Fin	Phy	Fin		Phy	Fin
ICT and Digital Initiatives	20		**BOOT Model (Secondary)**										0.00
		20.01	Hardware & Software Support - BOO Model	Rs. 6.40 lacs per school	615	3336.3996	615	3336.4	0	0	6.4	1231	7878.40
	21		**Project- IT/e-governance (Secondary)**										0.00
		21.01	Shaala Darpan								0.005		0.00
	22		**Salary of Computer Teacher (up to Highest Class X or XII)**										0.00
		22.01	Outright Purchase (Recurring)	Rs. 10000/- p.m. per school							0.1		0.00
		22.02	Boot Model (Recurring)	Rs. 10000/- p.m. per school							0.1		0.00
	23		**Other Recurring Components (Secondary)**										0.00
		23.01	Electricity Charges	Rs. 1000 per month per school	615	73.8	615	73.8			0.12	1846	221.52
		23.02	Computer, Stationery (Printer Cartridges, CD-ROMs, DVD, paper etc.)	Rs. 80000/- per year per school	615	492	615	492			0.8	1846	1476.80
		23.03	Internet / Broad band Charges	Rs. 10000/- per year per school	615	61.5	615	61.5			0.1	1846	184.60
		23.04	Telephone Charges	Rs. 500 /- p.m. per school	615	6.15	615	6.15			0.06	1846	110.76
		23.05	Expenses on Diesel/Kerosene for Generator	Rs. 12000/- per year per school							0.12	1846	221.52
	27		**ICT and Digital Initiatives (up to Highest Class VIII)**										0.00
		27.01	No. of Schools	Tabs to school							0.12		0.00
				Total		**3969.8496**		**3969.85**					**10093.60**