Chapter 12

ICT AND DIGITAL INITIATIVES

12.1 Major Goals

- Appropriate use of technology in all levels of education – to improve student learning outcomes, teaching learning and evaluation processes at scale;
- Enhancing educational access to disadvantaged groups
- Increasing availability of data to enhance understanding of how children learn and streamline educational planning, administration and management

12.2 Introduction

Information and Communication Technology (ICT) has become one of the basic building blocks of modern society. The three cardinal principles of access, equity and quality could be served well by harnessing the immense potential of ICT. Anytime anywhere delivery of quality education employing ICT is one such implication of Technology in Education. For teachers, ICT can be the raison d'etre for not only building ICT skills but more broadly to improve teaching and learning. ICT solutions have shown promise in building foundational skills, paving the way for developing important 21st century skills (Communication, Collaboration, Creativity, Critical Thinking and Problem Solving).

The Digital India Campaign (2015) strives to transform India into a digitally empowered society and knowledge economy by focusing on the three vision areas:

- Digital Infrastructure as Core Utility to Every Citizen
- e-Governance and Services on Demand
- Digital literacy and empowerment of citizens.

The Government of India seeks to strengthen the use of ICT in almost every sphere. To promote the use of ICT in school education, the Government of India had introduced ICT@ Schools scheme in the year 2004 {by merging the scheme of Educational Technology -1972 and Computer Literacy and Studies in Secondary Schools (CLASS)-1984}. The scheme was revised in the year 2010 and 2011 and a component to develop quality digital contents and incentives for teachers (National ICT Award for School Teachers) was introduced.

Education system in any country aims at preparing youth to participate creatively in the establishment, sustenance and the growth of a knowledge society leading to all round Socio-Economic Development of the nation and global competitiveness. Therefore, this integrated ICT guideline for schools and Teacher Education Institutions subsumes all previous guidelines.

12.3 Major Interventions

ICT in any system and situation includes ICT infrastructure, creation, storage and retrieval of digital resources, use of inter-operable software, technical support, and networking using

telecommunication and/or satellite-based communication to enhance learning. The schools and TEIs require a robust, reliable ICT infrastructure in order to effectively integrate ICT into all aspects of school life and TEIs including teaching, learning and evaluation. ***(NEP para24.2)***

This component covers the following major interventions:

- ICT Labs/tablets/software in Upper Primary, Secondary and Hr. Secondary schools
- Smart classrooms in Upper Primary, Secondary and Hr. Secondary schools
- DIKSHA
- ICT labs/software in TEIs

These interventions promote the following six thrust areas:

12.3.1 National Digital Infrastructure for State and UTs

- **Technology as a tool:**
  It is important that States/UTs view technology in education as a means to an end rather than an end itself. It is also important to tailor the ICT infrastructure at the school/class to the requirement, desired outcomes or results in different contexts. ICT infrastructure and solutions have to constantly evolve to be effective in constantly changing circumstances in order to deliver desired results. ***[NEP Para 24.4.(b),]***
- **One Nation, One Digital Platform:**
  DIKSHA (Digital Infrastructure for Knowledge Sharing) platform is envisaged as **One Nation, One Digital Platform** for school education. This platform offers teachers, students, parents, and community engaging learning activities/courses (with credentials) relevant to the prescribed school curriculum. DIKSHA platform infrastructure allows for a wide range of solutions that enable various applications ranging from registry to manage and govern, tools for learning and teaching and assessments.

  While DIKSHA unifies the country under *one nation, one digital platform*, States/UTs and Teacher Education Institutions have the autonomy and the choice to repurpose DIKSHA platform and its solutions to suit their own curriculum needs and purposes. It avoids the cost/efforts of duplication by State and UTs and helps to collectively evolve faster.

  The Department is formulating a scheme for new digital. Till the now the new scheme comes into force funding for NDEAR, DIKSHA and other digital interventions will continue under Samagra Shiksha.

12.3.2 ICT for Quality Education and Achieving Learning Outcomes

- **Anytime anywhere delivery of quality education**:
  While the teaching environment offered at school and teacher teaching by far remains the most important factor determining the learning for students, ICT learning environments allow learners to carry on learning beyond the school. ICT solutions enable teacher learning and professional development to go beyond the training center.

- **Improving Learning Outcomes:**
  ICT infrastructure has great potential to enhance learning outcomes. By universalizing the access to high quality teaching, learning resources, providing tools and training necessary for teachers to teach efficiently and effectively, - ICT infrastructure at school and centralized platforms hold good potential to improve learning outcomes.

- **Using ICT for assessment/measurement of Learning Outcomes:**
  Using the extended schooling infrastructure, teachers can assign and keep track of learning and completion of the assigned work of their classes digitally. All technology interventions should subscribe to and tag content and assessments to learning outcomes already codified by the center and States.

- **Unique solutions for each state/UT:**
  "One size fits all" will neither work in software nor in hardware. Thrust should be to unify the systems by interconnecting them as opposed to insisting on uniform solutions. States and Union Territories must focus on reuse of content (translate and contextualize) as much as possible instead of resorting to creation every time, avoiding duplication of effort. Eventually, States with higher technology capacity could even extend the central infrastructure's capabilities by building needed solutions on central infrastructure***. (NEP para23.6)***

12.3.3 Equity through Technology

- **Bridging the divide:**
  Appropriate ICT interventions will be adopted to bridge the digital divide with regard to education of girls, other disadvantaged social groups, including SCs/STs, minorities, CWSN, and other marginalized communities. It is important to develop solutions, content specifically meant for CWSN and promote it among teaching communities. Specific guidelines have been prepared and released by the Ministry on creation of e-content for CWSN on 8th June, 2021.
  (https://dsel.education.gov.in/sites/default/files/2021-06/CWSN_E-Content_guidelines.pdf).

- Local, localized, vernacular and quality digital contents should be developed in regional languages to enable students, teachers and teacher educators to partner in the development and critical use of shared digital resources in DIKSHA.

12.3.4 ICT for Teacher Empowerment

- **Teacher capability for use of ICT in teaching and learning:**
  Online Training using ICT has the potential to transform teacher skilling. States should utilize skilled and experienced teachers to impart knowledge to teacher communities in the state by engaging in online course development and dissemination. Online training modules when made available in byte sized modules makes it convenient for teachers to take these anytime, anywhere in their available time. ***[NEP Para 24.3]***

12.3.5 ICT for Data Capture, Analysis and Management

- **Integration of data/information:**
  Integration is to be done in a manner which ensures ease of access and availability of holistic information on a particular topic to all the stakeholders. ICT systems, when operated in a connected manner, have the potential to evolve optimal strategies in the

areas of learning, teaching, assessments, teacher skilling, and school leadership development as well as towards efficient school operations. Once ICT systems are interconnected with each other, force multiplier benefits can be realized.

- **Leveraging ICT for data capture and analysis:**
  ICT enables analysis and representation of data/information, deeper insights for guiding decision making for academicians as well as administrators based on advanced analytics systems. ICT can be used to emit data to decision making systems for better orchestration, progress reporting, performance monitoring, faster decision making and resource allocation across the various processes and stakeholders.

- **Integrating UDISE+:**
  Optimally utilizing and integrating UDISE data capabilities and central platform infrastructures, ICT at schools can be effective in bringing efficiency of operations for schools, thus freeing teachers from non-teaching related tasks to spend more time for schooling, teaching and learning. Effective monitoring ensures effective and efficient utilization of available resources. The Ministry of Education will soon come out with a Digital Education Readiness Index, the data of which shall be drawn from the UDISE+, to indicate the States/UTs readiness for use of ICT for advancement of teaching, learning and schooling.

12.3.6 ICT for Multifarious Interventions for Improving Quality of Education

- **Sharing of best practices:**
  States/UTs and Autonomous bodies of the center are urged to share their best practices in implementation of ICT for education and school management, with each other at every opportunity of correspondence or interaction and on Shagun portal for continuously learning from one another. These shared learning help collective evolution at a much faster pace.

- **ICT for improving all around efficiency:**
  Development of professional networks of teachers, teacher educators, resource persons in schools to catalyze and support resource sharing, up-gradation and continuing education of teachers and educators; guidance, counselling, academic support of students, resource sharing, management and networking of school managers/administrators, creation of online courses in their areas of expertise for teaching and learning, making videos that helps to demystify complex topics etc., resulting in improved efficiencies in the schooling process

- **Promote research, evaluation and experimentation:**
  Using ICT tools and ICT enabled practices, research, evaluation and experimentation will be promoted, in order to inform, guide and utilize the potentials of ICT in school and teacher education. A critical understanding of ICT is core to its success, hence, its benefits, risks and limitations- safe, secure and ethical use of ICT needs to be infused in schools and teacher education curriculum.

- **Sharing of ICT Infrastructure:**
  ICT infrastructure implemented in schools may be shared after the school hours for

the benefit of the community. It may be used for improving digital literacy of the community and for the learning through Adult Education Program. ***[NEP Para 21.6]***

- **ICT and sustainable development:**
  Sensitization of all the stakeholders on the disposal of e-waste and contribution to sustainable development is important.

12.4 Implementation of ICT Interventions

ICT implementation has essentially the following core areas:

ICT enabled education

- Partnership between Central Government, Central Institutions, State Governments and Union Territory Administrations for providing ICT enabled education to Government Schools and TEIs (SCERTs/ SIEs, DIETs and BITEs) through a national shared digital infrastructure, DIKSHA.

Developing digital content/courses

- Development of digital contents, mainly through Central Institute of Educational Technology (CIET), National Institute of Education (NIE), NCERT, State Institutes of Educational Technology (SIETs), SCERTs/State Institutes of Education (SIEs) and Regional Institutes of Education (RIEs).
- Content quality is critical to the effectiveness of ICT interventions. Continuous investments need to be made in infrastructure and human capacity for developing quality content. By analysing user feedback (data) and best practices, quality of content could be maintained at a steady high level benefiting students and teachers alike. Content has to be continuously upgraded every year with improvement in subject matter as well as quality of presentation.
- Content can preferably be prepared by utilizing the in-house talent of skilled teachers whose experience in teaching complex topics in simple manner can be the basis for making pedagogically effective videos and interactive tools in their local language. Effective content translation tools to translate highly rated content from one language to another should be used. Further. NGO/ community contributions are invited through VIDYANJALI program.
- Robust curation process is key to present the chosen content to the audience. Hence, utilizing the services of subject matter experts and tech savvy teachers, central institutions, State and UTs to set up dedicated creation/curation cells for effective creation/curation processes.
- A variety of digital learning resources including audios, videos, interactive, multi-media digital charts, maps, timelines, digital books, on-line labs activities, **virtual and augmented learning resources** need to be developed compliant to DIKSHA content specifications and uploaded to DIKSHA against state taxonomy and tagged to learning outcomes. This would be used to enhanced teaching learning processes in schools and TEIs, improving learning outcomes among students, and enhancing understanding among teachers and teacher educators. ***[NEP Para 24.4(f)]***
- These resources available on DIKSHA platform would need to be disseminated through multiple modes (transmission and non-transmission) in a **coherent manner**- DIKSHA web-portal, DIKSHA mobile apps, DIKSHA Chatbots and related solutions, DTH TV channels, radio, podcasts, etc. Further DIKSHA's offline solutions need to be designed and used for

delivery of digital contents through Local Area Networking (**LAN)/Mobile/ Satellite** connectivity. ***(NEP para 23.6)***

- Digital content should be seen to augment the physical processes like classroom instructions and assets like textbooks already being used, and not as a replacement. To augment the teaching learning process, continuous professional development of teachers, skill training and promoting lifelong learning among all stakeholders in schools and TEIs, the classroom training as well as virtual training and certification infrastructure in DIKSHA can be utilized.
- **DTH TV** channels should be used through designing **virtual learning materials** including lectures by best available teachers from the locality***. [NEP Para 24.4(e)]***

Teacher related ICT interventions

- Teacher related interventions, such as, continuous capacity enhancement of all teachers in ICT, and recognition of teachers and teacher educators for innovative use of ICT in education and learning, as a means of motivation.
- Every teacher is expected to innovatively use ICT in teaching learning process by selecting and integrating a wide variety of ICT tools and Free and open-source software (FOSS) (including subject specific tools like GeoGebra for Math; Stellarium, PhETs imulations, Kalzium etc. for Science; Open street map and Marble for Geography; concept mapping tools like Free Mind etc.). ***[NEP Para 24.4(g)]***

Creating MIS at various levels

- Creation of Management Information System (MIS) of the schools and TEIs ecosystem to enable cumulative assessments, evaluation, monitoring, regular feedback and enhanced learning at various levels. [***NEP Para 24.4.(g)]***
- Integrating the centralized platform's assessment and monitoring capabilities with the UDISE+ information system is important for creating state school command centers. These will provide for advanced analytics and insights to improve teaching, learning and school management practices.
- MIS should provide 'the ability to see' for appropriate stakeholders, including those at the school level, so that the data can be used for coordinated actions across multiple projects and programs.

12.5 Deployment of ICT Enabled Education

Hardware and accessories:

A variety of hardware, devices and tools are available for school education for States/UTs to choose from based on their needs. The scheme suggests that each State/UT as per their requirement **may choose to opt for any of the following:**

- Laptops/Notebooks/PCs with Integrated Teaching Learning Devices, FOSS, Operating System (OS) and/or Servers with minimum 16 GB RAM, One TB Hard Disk, One Printer, One Scanner, One Web Camera, One Modem,
- Digital Boards/Projector/LCD/LED/Plasma Screen/Tablets with pre-loaded contents in Smart classrooms
- Virtual classrooms

Connectivity:

- It is suggested that the school/TEIs should have a broadband internet connection of at least 2 MBPS bandwidth with a plan to upgrade in future.
- The school and TEIs should also explore the Wireless links option to ensure sustainability.
- Using DIKSHA offline solution is the key to load content to parent's phones and PCs at home thus saving the cost of connectivity to parents and extending the learning from schools to homes on home devices.
- Efforts should be made to bring all the schools and TEIs under the ambit of National Knowledge Network (NKN), Bharatnet WAN or any other partners.

Power Supply:

- Wherever the uninterrupted power supply is not available during school hours, it is suggested to explore for solar power panels in convergence with Ministry of Renewable Energy and wherever they are not feasible a generator may be used on a temporary basis.

ICT Infrastructure:

- The Tablets/ Laptops/ Notebooks would be installed in a charging rack(s) (portable) which can be kept in any of the classrooms/ Principal/Head Teacher room/office room as per the availability in the school and TEIs.
- If any school has existing ICT labs, the same may be used for keeping charging racks.

12.6 Models of Implementation

- It is suggested to the States, UTs and TEIs, that in-order to implement the program they may opt for any of the following models (uni/multi model) as per their requirement which includes outright purchase through **Government e-Market (GeM)**/BOOT/BOO Model. However, it should be ensured that all purchases from central fund should be made through GEM to ensure effective prices and standardized equipment. However, the specifications should be generic and should not be specific/mention any brand names/proprietary products either at systemic or component level.
- For all the above-mentioned models, the Service Providers/Original Equipment Manufacturer (OEM) would make available the ICT infrastructure and learning services based on a signed agreement with the State/UT. The payments upfront and periodic to the service providers and OEMs will be subject to satisfactory deployment, maintenance and implementation of ICT Infrastructure & Services.
- The NCTE and NCERT shall be associated with the scheme in the context of teacher professional development through technology-enabled learning. NCERT shall also be part of the scheme for creating learner-facing resources based on Learning Outcomes.

Inclusive Education

- Assistive technologies such as JAWS and SAFTA, Audio Books etc. and other assistive technology-based solutions will be provided to students with special needs from classes VI to XII and to TEIs.
- The Rehabilitation Council of India (RCI) would play an important role in this area involving introduction and use of technology for the education of Divyang/ Children with Special Needs and addressing the concerns related to Universal Design of Learning (UDL).
- Given that students who need special attention are likely to be in resource constrained

environments, efforts should be made to provide inclusive coherent experiences on DIKSHA.

12.7 Financial Parameters

- The Government of India recognizes that significant investment is required for successful delivery of ICT for School Education. Key components of a successful roll-out include: quality hardware and software, internet connectivity, contextualised content, effective teacher training as well as government capabilities including effective governance, monitoring and evaluation systems.
- The component will cover classes VI to XII. Flexibility to procure hardware such as tablets with preloaded contents /laptops / notebooks / integrated teaching learning devices and open source operating system as well as Hardware, Software, training and resource support. This would include support for digital boards, smart classrooms, virtual classrooms and DTH channels on pro-rata basis for number of schools approved, within the overall ceiling for recurring and non-recurring costs. Priority will be given to projects which have an element of community participation.
- The scheme will have Admissibility for Government Schools only. Prioritization of schools for ICT implementation is provided in **Annexure-VII-E.**
- The non-recurring/recurring grant under 'ICT and Digital Initiatives' for schools will be available to the State and UTs for following two options:

    (i) Option I: Under this option schools which have not availed the ICT facility earlier can either opt for ICT or smart classrooms as per their requirement and need. In case of more than 700 enrolment, an additional ICT lab can also be considered. Flexibility to procure hardware such as tablets/ laptops/notebooks/ integrated teaching learning devices and open source operating system as well as Hardware, Software, training and resource support. This would include support for digital boards, smart classrooms, virtual classrooms and DTH channels on pro-rata basis for number of schools approved.

    (ii) Option II: Under this option schools which have already availed the ICT facility earlier can avail smart classrooms/tablets as per the norms of the scheme.

- For ensuring equity in educational technology, it will be ensured that the same e-contents are available across all digital modes (portals, Apps, TV, radio) for the same topic/s under the Coherence policy of DoSEL **(NEP Para 24.2 and 24.4 e)**
- Schools in the Special Education Zones and Aspirational districts will be integrated with digital devices on priority**(NEP Para 24.2 and 24.4 e)**
- Priority will be given to projects which have an element of community participation.
- While guidance on approximately how much States may spend on each line item is provided below, States can choose to allocate funds flexibly within each of the Capital Expenditure (Non-Recurring) and Recurring Expenditure categories, up to the overall limits indicated against each category:

i) ICT Lab

A	**Capital Expenditure (Non-recurring)** **(These are only indicative, States/UTs may decide to spend with overall upper limit)**	**(Rs.in lakhs)**
1	● Laptops/Notebooks/PCs with Integrated Teaching Learning Devices/Tablets with pre-loaded e-contents for digital library or a combination of these, ● Digital Boards/Projector/LCD/LED/Plasma Screen. ● Open Source Software and OS and/or Servers with minimum 16 GB RAM, one TB Hard Disk, one Printer, one Scanner, one Web Camera, one Modem, Broadband/DTH-TV Antenna/ ROT/ SIT, Router, Generator, UPS, Video Camera, Charging Racks, etc.	6.00
2	Operating System & Application Software, Open Source Video Conferencing Software (FOSS) complying to DIKSHA and software tools compliance requirements.	0.20
3	Furniture	0.20
	Total	**6.40**

B	**Recurring Expenditure** **(These are only indicative, States/UTs may decide to spend with overall upper limit)**	**(Rs.in lakhs)**
1	E Content and Digital Resources	0.14
2	Charges for Electricity/Diesel/Kerosene @ Rs.2000/- p.m. The state may also use Solar Power-Hybrid solar instead, to ensure Sustainability	0.24
3	Internet connectivity (Tele communications/ satellite communication/ OFC)@ 1000 PM	0.12
4	Instructional expenses	1.80
5	Training of teachers, school heads and administrators on use of ICT in subject teaching.***[NEP Para 24.3]***	0.05
6	Monitoring and supervision expenses for tracking usage of hardware and software/content.	0.05
	Total	**2.40**

Note: The non- recurring cost includes Annual Maintenance Contract for a minimum period of 5 years.

ii) Smart classroom

Smart Class rooms under ODB:

A	**Capital Expenditure (Non-recurring)**	**(Rs.in lakhs)**
1.	• Interactive Digital Board/display unit (2 units), FOSS, Operating System (OS), LCD/LED/Plasma Screen, 1 Printer, 1 Scanner, 1 Web Camera. • Digital Library (Pre-loaded Tablets)	2.4
2.	Laptops/tablets/desktops as per assessed requirement	
3.	UPS with adequate (2 hrs) backup	
4.	Modem, Broadband/DTH-TV Antenna/Router, Receive only Terminal (RoT), Satellite Interactive Terminal (SIT) as per State/UT specific	

A	Capital Expenditure (Non-recurring)	(Rs.in lakhs)
	requirement.,	

B	Recurring Expenditure	(Rs.in lakhs)
1.	Charges for Electricity. The state may also use Solar Power-Hybrid solar instead, to ensure Sustainability, E Content and Digital Resources, maintenance etc.	0.26
2.	Internet connectivity (Tele communications/ satellite communication/ OFC)	0.12
Total		**0.38**

Note: *The non- recurring cost includes Annual Maintenance Contract for a minimum period of 5 years*.

Note:

- Recurring grant may be given for the 6th year to smoothen transition, subject to state giving a plan and commitment of funds for taking over the project and continuing the facility in the school.
- If a State/UT wishes to aggregate a cluster of schools for the purpose of Virtual classrooms/digital content etc., then common activities and infrastructure for transmission, internet connectivity, networking, AMC, O&M work etc, besides the school level infrastructure can also be undertaken within the overall aggregated ceiling each under Recurring and Non–recurring components.
- In order to enhance the learning capacities of the students, the schools, TEIs in States/ UTs should optimize/maximize the numbers of Tablets/Laptops/PCs/Notebooks in the classroom situation.
- State and UTs commitment for Annual Maintenance Contract: The cost includes Annual Maintenance Contract (AMC) for a minimum period of 5 years. The State and UTs need to commit to take ownership of the project after completion of five years. States can spread the Capital Expenditure over the 5-year period (e.g., in a service model).
- State and UTs to encourage teachers to use ICT lab extensively and integrate ICT pedagogy in classroom transaction through school time-tables.
- The State and UTs may explore the possibility of setting up of Digital Library in Secondary and Hr. Secondary schools which can be used where in- person modes of education are not possible. ***(NEP para24.1)***
- State and UTs are encouraged to conduct research studies to assess the impact of technology enabled learning. Financial provisions under MMER may be utilized for this purpose. ***(NEP para24.4a)***
- Explore convergence of other resources: States are encouraged to explore alternative budget heads/schemes to pay for the above noted key components or additional components. These could include: CSR, MPLADS and District Development Funds. However, there should be no overlap of funds for same purpose and these should be separately accounted for.
- Access Control & Cyber Security Features: Rule based Access Control mechanism as well as Firewall/ Rule based access to e- resources may be inbuilt in the eco system to prevent

unauthorized use of system and prevent access to undesirable sites and contents. Due care should be taken specially to ensure that sites relating to pornography, radicalization, lethal/addictive games etc. are kept totally out of bounds. The State and UTs shall also refer to the online guidelines on Cyber Security on the web portal of Ministry of Home Affairs.

https://www.mha.gov.in/division_of_mha/cyber-and-information-security-cis-division/Details-about-CCPWC-CybercrimePrevention-against-Women-and-Children-Scheme

12.8 Financing Models

Improving efficiency of investment allocation: Historically, funds have been allocated on a per-school basis, agnostic of school size. While some of the costs are fixed per school (like server, internet, instructional cost), much of the Capital costs vary depending on the size of the school. Therefore, some larger schools could not get adequate funding while some smaller schools did not require the full funding. The revised scheme addresses the issue to account for this variation and improve efficiency of investment allocation.

The current Capital Expenditure funding envelope of Rs 6.4 lakh should adequately serve ~700 students in classes 6 to 12 (assuming provisions for 9 classrooms). Hence, the scheme offers step-wise funding based on school enrolment:

Enrolment sections	Capex (in lakh)
< 100	**2.5**
100 – 250	**4.5**
250 – 700	**6.4**

Recurring Expenditure remains at Rs 2.4 lakh per school for school sizes of 700 students and below. For schools with more than 700 students, the scheme will consider allocation of additional funds. Incremental funding can be allocated by treating 700 students as 1 unit of funding for both Capital Expenditure and Recurring Expenditure. For example, schools with enrolment of 1,400 could receive 2 units of fund allocation for both types of expenditures to account for their larger student population.

Given the rapid evolution of available ICT solutions for school education, the Government of India recommends that States undergo a discovery process to understand the available options and assess an optimal solution on dimensions such as mobile vs. fixed units. States can consider: product lifetime costs (including life-extending peripherals such as keyboards for laptops), need for consistent electricity supply, quality of school civil infrastructure, user-friendliness and teacher familiarity with technology.

12.9 Programme Management

In funding proposals to the PAB, the States/UTs must include the following:

- Sufficient rationale for their choice of solution package and implementation approach.
- The budget requirement over the 5-year period, including both the scheduled Capital Expenditure (Non-Recurring) and Recurring Expenditure.

- The details of the infrastructure put in place in the previous year as well as utilisation in imparting more effective classroom teaching.
- The States should share the POCs (Proof of Concepts) and Best practices and innovations for sharing with other States.
- The Recurring Grant will also be provided to the State/UTs for the period of 5 years only from the year of implementation. The recurring cost will be given to the State/UT only when the sanctioned schools are reported functional in PRABANDH Portal.
- However, the release of the recurring grant in the second and subsequent years would be based on receipt of utilization certificate along with the progress report in respect of grants released for the preceding year; the utilization certificate should indicate that the utilization is in line with the State's original proposal.
- The recurring grant, for the schools which have already been approved and implemented, will be provided on the basis of the old ICT scheme. The recurring grant for the schools approved but yet to be implemented by the State, will be provided on the basis of revised guidelines.
- The schools sanctioned under ICT which are not yet implemented, will be implemented as per revised guidelines.
- Details of internal mechanism for overseeing the implementation of the programme through a monitoring committee constituted for the purpose.

12.10 DEVELOPING DIGITAL CONTENT: Appropriate digital content needs to be developed/accessed and curated to account for different scenarios given below.

Methods for Enhancing Learning

For enhancing learning in classrooms:

- **One to many model:** Digital classroom is an instructional modality and can be implemented through various models such as showing videos in classrooms to complement the curriculum, including by using smart boards.
- **One to one model:** Personalized Adaptive Learning involves tailoring instruction to the learning levels of each child and leading the child to master one learning outcome at a time, and thereby climbing up on his or her unique learning trajectory. **This is more effectively possible in classrooms with highly trained and experienced teachers and fewer students per teacher.**
- **In-classroom teacher support:** This can address shortfalls in teacher preparedness by providing digital training, and support materials that are tied directly to **lesson** content.

For **enhancing learning outside the classroom** (particularly relevant in the Covid context, and to create a resilient schooling system):

- **Mobile based Apps and tools:** Using mobile phones based Apps, social media and other mobile tools for - developing literacy, promoting student motivation, enhancing access to teacher development opportunities, and improving communication between parents, teachers and principals.
- **Equitable and Open access to knowledge:** Provision of Massive Open Online Courses

(MOOCs). In fact, teachers can also access free and open resources, as well as participate in MOOCs for their own professional development and practice. They can also contribute to DIKSHA, Repository of Open Educational Resources (NROER and SROER) by creating and sharing their own material.

- **Virtual technologies:** for reaching students and teachers for two-way interactive communication in real-time wherein local facilitators in the remote classroom lead and moderate discussions.

Developing contextualized digital content

- Development of appropriate and pedagogically correct digital content and its persistent and effective use constitutes the core of this scheme. Content creation/ acquisition being the critical factor for the success of the scheme, the Central Institute of Educational Technology (CIET), NCERT shall work towards utilizing the full range of capabilities of the Indian ICT sector.
- National level and State level committees should also be set up to assess the nature of digital contents to be developed to enhance the learning capabilities of the students, teachers, pupil teachers and teacher educators of schools and TEIs.
- Digital contents developed by any of the stakeholders in the country are to be linked with the dissemination platforms. The digital content should be platform agnostic/neutral.
- Areas to focus on for developing the content include:
    - A variety of digital learning resources including audios, videos, interactive, multi-media digital charts, maps, timelines, digital books, on-line labs activities, **virtual and augmented learning resources** need to be developed and will be used to enhance teaching learning process in schools and TEIs and learning outcomes among students, teachers, pupil- teachers and teacher educators. The content should cover the hard-spots for all the grades, and should be tagged to the relevant Learning Goals and Learning Outcomes.
    - The content should be essentially mapped to NCERT, SCERTs/SIEs and other state board curriculum on DIKSHA platform.
    - Effort should be made to design these in medium of instruction/regional languages.
    - It should contain 3D/2D immersive Videos that can also be consumed in low bandwidth scenarios.
    - The modules are to be created in a way that it supports both - a Teacher-led delivery which requires continual teacher intervention to keep the focus on students learning, and a learner-led delivery that allows learners to track their own progress.
    - The modules are to be created in a way that the topics covered are creatively and pedagogically designed.
    - The content developed for various subjects by other States/UTs, if found appropriate, should be translated into other languages and adapted to a regional context so as to avoid de novo efforts for each language. Video and content translations tools available on DIKSHA could be utilized for this purpose.
    - Virtual labs for science and maths experiments ***[NEP Para 24.4(d)]***

Enhancing learning through DIKSHA: One nation, one digital education platform
[NEP Para 24.4(c)]

- As per Programmatic norms under Samagra Shiksha, funds for DIKSHA platform can be sought by the State and UTs for software development/maintenance, setting up of project teams, creation, curation and translation of digital content, capacity building, awareness and communication drive etc.
- DIKSHA or Digital Infrastructure for Knowledge Sharing was launched on 5th September, 2017, initially to accelerate and amplify solutions, experiments and innovations that were underway and/or were being undertaken in the areas of teacher training and professional development. However, looking at the urgent need for providing a digital infrastructure to States for both teaching and learning for students and teachers alike, in 2018, DIKSHA was transformed as a digital platform for States and Union territories for leveraging 'multiple verticals like student learning, teacher training, assessments, best practices sharing etc. for their needs in ways that suited their state programs.
- At present, DIKSHA offers solutions for teaching, learning, and professional development for students, teachers and is adopted by States/UTs, CBSE and NCERT in 18 different languages. Aside from Energized Text Books, DIKSHA can also be accessed through mobile App and portal on PC and laptops.
- It provides open, modular and scalable platform infrastructure capable of developing different types of solutions that state governments and other organizations can seamlessly integrate with their respective teacher and learner-centric initiatives.
- DIKSHA has following nine major components amongst many:
    - **QR coded textbooks for students and teachers (Energized Textbooks or ETBs):** All States that have on boarded DIKSHA, have QR coded many of their textbooks at relevant places, and tagged e-content to the code, which is available on DIKSHA. States/UTs are encouraged to develop all their textbooks in this manner by either utilizing available content from DIKSHA or other sources or by creating relevant content abinitio.
    - **Teacher Toolkit:** This consists of Learning Outcomes, Learning Outcomes mapped to curriculum, Pedagogies suggested by NCERT/SCERT, Hard spots identification and remediation, Teacher Energized Textbooks, manuals, etc.
    - **Teacher Professional Development:** This consists of teacher training modules contributed by the Centre, States and other partners authorized by DIKSHA.
    - **Resources for Learners:** This consists of language wise, class wise, subject wise and topic wise content such as textbook chapter wise, explanation video by teacher for the given topic, videos on hard spots, slides, concept maps, additional resources for extra learning, test items, worksheets, etc.
    - **Specialized resources for teachers and learners:** This includes resources related to PISA, items related to Creativity and Critical thinking, etc.
    - **Multiple use cases of DIKSHA:** DIKSHA is also being used innovatively by different States; such as, for assessment by Andhra Pradesh, for parental engagement by Tamil Nadu, for national quiz programmes by CBSE and NCERT,

for data capture and analytics for planning by Gujarat, for training of corona warriors by iGOT and Ministry of Health and Family Welfare, teacher training with certification in States like UP and MP, learn at home in Maharashtra etc. States/UTs are encouraged to use DIKSHA platform innovatively through their PMUs.

- **Chat Bot:** The TARA (Technology Aided Responses and Answers) Chat Bot can be used by States/UTs for a smooth navigation, interesting user experience and for ease of discovery of content.
- **Vidyanjali/Vidyadaan:** Vidyanjali is conceived as the common national platform and national program for individuals & organizations to contribute e-learning resources across the education domain, to ensure that quality learning continues for learners across India.
- **Vidya Amrit:** Micro-improvements cater to the objective of making the improvement process easy, simple, and achievable for every teacher and leader in the education system. The approach uses the 'learning by doing' concept.

  Micro Improvements are enabled through Digital Projects and are available to leaders at all levels through the National Infrastructure for Education - DIKSHA. This is aligned to the 'Learn - Do- Practice' of NDEAR (Building Block 9 under the Manage Learn scenario for Administrator Persona).

- To ensure effective implementation and usage of DIKSHA, the SCERTs/SIE would be the nodal agency under the overall leadership of the Secretary of School Education which will also curate the content to be uploaded on DIKSHA for its quality, relevance and proper taxonomy.
- For the purpose of creating content, the States/UTs Govt. and Autonomous bodies may partner with expert organizations/bodies or they may integrate the process of content creation with other similar schemes for implementation of the 'ICT in schools'.
- **Innovative method for developing content by engaging with community through VidyaDaan/Vidyanjali**
  - The entire world is facing a completely unprecedented crisis due to the spread of Covid-19, and school education is impacted everywhere. This is the appropriate time to integrate technology with education to ensure that both students and teachers benefit.
  - Teachers, public & social organizations, individuals and other experts across State and UTs have been developing educational content, but in silos, with minimal opportunity to share with the larger community or receive the required recognition.
  - VidyaDaan is a program to bring together these well-meaning experts and resourceful individuals and organizations in a common platform to develop and contribute content in alignment with the needs of school education and be recognized nationally VidyaDaan creates a structured digital warehouse of crowd sourced content that can be leveraged by Centre and States for school education.
  - There is a standardized template on the VidyaDaan portal on DIKSHA for contributing resources, which will facilitate different States/UTs to immediately get

on board and develop their own program on VidyaDaan. Moreover, the content so developed across States will follow a uniform structure ensuring easy accessibility by students as well as teachers.

- Resources can be prepared by the contributors and donated by dropping in the relevant part of the template.
- High quality content in the context of textbooks and courses as per the school curriculum, including presentations, explanation videos, assessments, lesson plans, concept maps, puzzles, games, items based on learning outcomes, etc.
- Contributions will also include cutting edge technology like AI, AR/VR to make the process of teaching-learning fun, engaging, to bring the content to life.
- Knowledge of how to teach difficult topics, wisdom on how children best learn – will also be part of the contributions.
- Each contribution shall be peer reviewed/expert reviewed and will be available to any school board/state/UT to pick up and use in their own vertical on DIKSHA.
- Each contribution that is curated and finally goes into the Vidyadaan will be acknowledged, and data on its use and impact can be made visible, appropriately balancing privacy with purpose.
- Contributors can include among others - Teachers, principals, academics, individuals, Corporates, CSR, Not for profits, NGOs, Institutions, Universities, central government institutions and ministries, International agencies, NRIs, PIOs and School Boards (State & Central), etc.
- States/UTs can in fact reach out to individuals and organisations, including aspiring teachers for development and contribution of digital resources in the local language.

- **Programmatic and Financial Interventions under DIKSHA**
  - **National level:** Funds will be provided to NCERT (CIET, PSSCIVE, RIEs) for Development of student facing and teacher facing educational e-content and Project Management Unit, Workshops, Meetings, etc. related to the seven components as mentioned above. The norms for development of digital contents shall be developed by CIET and disseminated among all the above-mentioned institutes for its adherence.
  - **State level:** Financial assistance of Rs. 5 lakh to Rs. 50 lakh per State/UT per annum to be given to SCERT based on the progress of previous year for software development/ maintenance for DIKSHA, setting-up of project team, creation, curation and translation of digital content, capacity building, awareness and communication drive etc.

12.11 ICT INTERVENTIONS FOR TEACHERS

- ICT solutions often fail when they are poorly integrated with existing in-classroom activities and existing human resources and their practices. To encourage uptake and usage of ICT, States should support schools and teachers to proactively incorporate any new solution into existing curricula, timetables, lesson plans and pedagogy. This approach is a core

tenet of quality vendors who seamlessly integrate their technology solutions into the existing school system to encourage behaviour change amongst teachers and school administrators.

- Under the scheme, all Government schools and TEIs (SCERTs, DIETs and BITEs) will have a minimum level of ICT infrastructure. It should be the endeavour to make all students, teachers and teacher educators of these schools and TEIs, ICT literate. This would involve formulation and transaction of curriculum and syllabus on ICT for each of the classes from VI to XII and for TEIs at pre-service and in-service level.
- All Examination Boards in the country would be encouraged to offer ICT related subjects in an integrated way up to class X and as electives at the higher secondary stage. This scheme would encourage individual schools to offer such electives, so that a large number of human resources with ICT skills/competencies can be built up in the country.
- Similarly, all the SCERTs/SIEs/DIETs/BITEs would design and integrate ICT in Education and Learning components in the Pre-Service and In-Service professional development courses.

Teachers' Training: Integrating ICT in pedagogy *(NEP para 24.4 g)*

- Teacher/administrator training is a critical part of all ICT initiatives and sufficient budget provision should be set aside accordingly. Teacher training modules should provide sufficient time on how to incorporate ICT into the existing pedagogy. Training delivery could be done by state institutions, outsourced to existing ICT suppliers, or contracted to a suitable external teacher training provider.
- The approach to teacher training could combine in-person learning, peer to peer interaction, and technology to optimize investment in terms of quality, cost and scalability. There is separate provisioning of budget for teacher training in integrating ICT in teaching and learning.

Pre-Service Training:

- It will be necessary for all the TEIs to integrate ICT in teaching-learning in the pre-service training courses meant for pupil/student teachers.
- Energized textbooks related to teacher education curriculum along with high quality content should be introduced in States/UTs.
- Topics can be developed as modular courses for student teachers to engage with curriculum anywhere and anytime.
- The ICT curriculum prescribed by the National Council for Teacher Education needs to be implemented.

In-Service Training:

ICT in Education curriculum should be linked with induction course developed by NCERT - http://ictcurriculum.gov.in

- **Details of Induction training:** First time induction training in ICT should be provided to all teachers in the sanctioned schools for a period of 10 days (8 hours per day). The details of training, curriculum and duration (80 hours- 40 hours face to face and 40 hours online through MOOCs platform) to be provided are as follows:

Sl. No	Topics of Induction training	Hours
1.	Introduction Session	0.30
2.	Introduction to ICT and ICT in Education Initiative taken up at National level, including Diksha	8.00
3.	Exploring Educational Resources and DIKSHA through Internet	9.00
4.	Communicating and collaborating with ICT	12.00
5.	Safe, Secure and ethical use of ICT	6.00
6.	Creating Educational Resources with ICT for DIKSHA	24.00
7.	Introduction to Assistive technology	4.00
8.	Assessment and Evaluation using ICT - including DIKSHA tools	6.00
9.	e-MIS	4.00
10.	ICT - Pedagogy - Content Integration	6.00
11.	Feedback	0.30
	Total hours	80.00

- **Details of Refresher Training:** Refresher training in use of ICT in teaching learning should be provided to all teachers of the sanctioned schools. Refresher training is proposed to be provided for 5 days (8 hours per day). The details of training and duration (40 hours- Face to Face/Online mode- through MOOCs platform) to be provided are as follows:-

S. No	Topics of Refresher Training
1.	Internet and DIKSHA as a learning resource
2.	Development of Digital Contents for online education and DIKSHA
3.	ICT and DIKSHA for Teaching, Learning and Evaluation
4.	Safe, Secure and Ethical use of ICTs
5.	Building Communities and Collectivising

- The trainings (induction and refresher) would be organized by the respective State Governments/UTs in convenient batches at the SCERTs, SIEs, DIETs, BITEs, CTEs, IASEs, etc. or such other training institutions as the State Governments/UTs find suitable.
- CIET-NCERT would create a State Resource Group (SRG) in State and UTs selecting faculty from TEIs and schools on ICT in Education and Learning comprising of at least 2 to 5 Master Resource Persons/Key Resource Persons who will be providing their support for scaling the teacher training in the respective States/UTs as Mentors.

Teacher training: Empowerment of Teachers and Teacher Educators

- DIKSHA also envisages solutions, experiments and innovations in the areas of teacher training and professional development.
- DIKSHA brings together the benefits of open-source software and provides States with the freedom to easily plug-in and create contextually relevant solutions that include the ability to create courses and credential completion and merit with digital certificates. It also provides teachers with convenient, personalized, need-based materials and tools, which enables them to take ownership of their own professional development and build networks with other educators. Therefore, States should make best use of this enormous potential resource.

- Existing course contents of various teacher training programmes and curriculum based digital contents offered across the country have little component of Educational Multimedia, virtual realities etc. It is proposed to fill this gap by developing and deploying the interactive multimedia, digital books, virtual labs etc.

National Award for the Teachers using ICT for Innovations in Education

- In order to motivate teachers and teacher educators to use ICT in school and teacher education in a big way, National Awards for the Teachers using ICT would be given to upto90 teachers every year. An amount of Rs 1 crore would be kept aside for instituting National Award for the Teachers using ICT for innovations in education. A selection process will be followed for short-listing and recommendation of required number of awardees to MoE-GoI. ***[NEP Para 24.4.(g)]***

12.12 MIS for Management, Monitoring and Evaluation

- The respective States would have an internal mechanism for overseeing the implementation of the Programme through a monitoring committee constituted for the purpose. The main parameters for monitoring would include timely installation of requisite hardware, including power supply, suitable software, engagement of teaching and administrative staff, teacher training and extent of use of e-content developed at the multi- media labs by the teachers. The State/UT Govt. shall undertake a monitoring mapping at each level i.e. school, district, and State level.
- For effective monitoring and evaluation, a module will be developed in UDISE+/PRABANDH to enable real time monitoring of the implementation of the project at various levels. The management at State/National level could view the status of implementation and also provide timely mid-course interventions. Successful innovations, experiences shall also be uploaded on the portal so that all the stake holders can make use of the best practices or innovations.
- The Project Approval Board at MoE would also function as the monitoring committee. In addition, the SIETs, CIET, RIEs and State/UT submitting the proposal would be required to submit progress report every quarter.

12.13 PRIORITIES FOR COVERAGE OF SCHOOLS

Preference for various interventions will be given to Educationally Backward Blocks, Special Focus Districts and areas with concentration of SCs, STs, minorities and weaker sections. Further fifty percent of the physical targets for strengthening ICT in schools have to be identified from North Eastern States, LWE Districts, Island territories and to schools in Special Education Zone or Aspirational Districts. ***(NEP para 6.2,6.6 &6.9 and para 14.4.1(d))***

12.14 PGI INDICATORS(State level)

- 1.3.1 Percentage of schools having CAL in Upper Primary Level
  - Percentage of secondary schools having lab facility
    1.3.2 a. Integrated Science Lab
    1.3.3 b. Computer Lab

PGI INDICATORS(District level)

Category 5 - Digital Learning

- 5.1 % of Schools with internet facility for pedagogical purposes
- 5.2 % of schools with computer/ laptop used for pedagogical purposes
- 5.3 % of schools having computer-assisted teaching learning facility (e.g. smart classrooms)
- 5.4 Student-to-Computer Ratio (computers used for pedagogical purposes will only be considered here)
- 5.5 % of teachers trained in use of computer and teaching through computer

12.15 MONITORING MECHANISM

- The physical and financial progress of sanctioned schools will be monitored through PRABANDH
- The IT infrastructure and its usage will be monitored for all school through UDISE+ on real time basis.

12.16 EXPECTED OUTCOMES

- Closing of the digital learning gap through focus on priority areas as evidenced by usage and universal improvement in learning Outcomes.
- Increased student engagement with the learning process as evidenced by usage time.
- Improving Learning Outcomes through interesting, interactive content where learners are able to visualize the topics being taught as evidenced from formative/self/peer assessments.
- Improved capacity of teachers to focus on learning outcome approach, as demonstrated by better teacher preparation and their skillful use of e-content.
- Extended learning beyond school hours as evidenced by learner-led interventions for improvement in Learning Outcomes through real-time feedback made available through e-assessment formats.
- Improved learning of CWSN.
- Schools and teachers ready for effective blended mode of teaching

Annexure –12 A

For Smart Classroom
Interactive Display Board- Minimum Specifications and Features

1. Mode of operation - Projector and whiteboard Mode both
2. Surface material of Boards - ceramic Steel Surface
3. Active area of the board in mm (Width x height) –min1641X1148
4. Aspect Ratio – 4:3 /16:9
5. Touch Technology - infrared/Capacitive/optical
6. Touch interface - Touch Sensitive and Pen Driven Both
7. Display Resolution – 32767pixels
8. Source of power Supply - Through USB Ports
9. USB Connectivity
10. Electronic pen /stylus to be supplied with the board
11. Operating system Comparability
12. Interactive Software
13. Number of touch points
14. Simultaneous Touches enabled
15. Response time – 1milliseconds
16. Teaching tools – Pen, Draw, Annotate, Erase, Create Shades, Text, Edit, Different fonts, lines, graphics and various polynomial drawings, Move, Screen Shot, Picture
17. Should have Direct Printing Facility from Board
18. Should have the facility for A/V play back and recording with speakers
19. Resistant to Scratch, Harsh Climate, Fire, Dust etc.
20. Should support the cloud based content storage facility and has to be DIKSHA compliant.