

Maharashtra Digital Schools Survey: Presentation of plan in progress

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Executive Summary

Since 2018, the Center for Sustainable Development has been engaged with the Maharashtra State Council of Educational Research and (MSCERT) and education-focused NGO Leadership for Equity (LFE) in Maharashtra, conducting action research to support the state's efforts to strengthen strategies for increasing quality of education through integration of ICT in schools. This research is part of the "Towards a New Indian Model of ICT-Led Growth and Development" project led by Professor Jeffrey Sachs and Dr. Nirupam Bajpai looking at the role of ICT in various sectors in India, including education, health and agriculture to better understand the role of ICT in India's future economic growth and to make recommendations for India's continued global leadership in ICT-based development.

Maharashtra State has prioritized the integration of technology in teaching practice as a key area for helping to raise learning outcomes for students across the state. In order to guide their investments, the state is interested in identifying the most effective tools and approaches for various types of learning environments within the state that can be scaled up.

This paper presents the plans and next steps for the Digital Schools Survey which is currently underway in Maharashtra, India, with data being collected from 2,000 government schools representing the state's urban/rural/tribal make-up. The Digital Schools Survey was identified as an important step in understanding the current levels of digital infrastructure, support, resources and skills that schools across Maharashtra are equipped with to help inform how the state can best direct resources to support schools in filling gaps and optimizing use of digital technology and resources.

Data analysis from the schools will seek to identify common school scenarios with regard to their capacity for effectively integrating ICT into teaching and learning. Based on these common scenarios, an action research protocol will be designed to look at a sampling of approaches to pedagogical training for integration of ICT that are intended to meet the specific needs of various school contexts as identified in the Digital Schools Survey. The models for teacher training will be selected among existing innovative approaches being led by NGOs and/or DIECPDs, as well as at least one model to be designed by the research team in collaboration with Leadership for Equity and DIECPDs. The research questions that this action research seeks to answer include:

- What are the different kinds of teacher training initiatives focused on pedagogy for ICT integration that are being conducted by DIECPDs and other education stakeholders (e.g. NGOs), and how do their approaches align/differ?

- Which training approaches (in terms of format, frequency, follow-up, etc) lead to most effective/sustained teacher uptake and changes in student participation?

This paper will be updated once the findings are available and the analysis has been conducted in October 2019.

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Introduction

India is using Information and Communication Technologies (ICT) to leapfrog economic development in key sectors: health, education, infrastructure, finance, agriculture, manufacturing, and governance. ICT is being used to deliver critical goods and services to hundreds of millions of Indian people. While many sectors have already seen huge improvements through innovative use of ICT, such as infrastructure and communications, the education sector has struggled to optimize the potential of ICT for improving teaching and learning. ICT holds an important promise for education especially in rural areas, if it is optimized and tailored to local needs. In principle, schools ought to have highly educated and specialized staff, appropriate infrastructure with laboratories, and a considerable stock of teaching and learning materials. However, such support is often missing.

The “Towards a New Indian Model of ICT-Led Growth and Development” project led by Professor Jeffrey Sachs and Dr. Nirupam Bajpai is looking at the role of ICT in various sectors in India, including education, health and agriculture to better understand the role of ICT in India’s future economic growth and to make recommendations for India’s continued global leadership in ICT-based development. One of the research strands in the education sector is to better understand what components need to be in place to support effective uptake of ICT among teachers in various educational contexts in Maharashtra.

ICT in Education Research in Maharashtra

Since 2018, the Center for Sustainable Development has been engaged with the Maharashtra State Council of Educational Research and (MSCERT) and education-focused NGO Leadership for Equity (LFE) in Maharashtra, conducting action research to support the state’s efforts to strengthen strategies for increasing quality of education through integration of ICT in schools. Maharashtra State has prioritized the integration of technology in teaching practice as a key area for helping to raise learning outcomes for students across the state. In order to guide their investments, the state is interested in identifying the most effective tools and approaches for various types of learning environments within the state that can be scaled up. The research focus initially looked specifically at the rollout of DIKSHA (Digital Infrastructure for Knowledge Sharing platform), and finding that some of the barriers to effective uptake of the platform were similar to those hindering teachers from adopting ICT more broadly, the research team expanded the scope to look more holistically at how support and training for teachers and content creators can help facilitate development and use of more locally relevant content both on the DIKSHA platform and beyond for teachers across Maharashtra.

This education research requires looking at different models of conducting teacher training in integration of ICT for more interactive, learner-centered classroom practice to understand what approaches work best for the various diverse contexts within Maharashtra, in alignment with the state's strong commitment to identifying effective, scalable solutions for equipping Maharashtra's massive population of teachers with these skills. A major focus going forward in the 2019-20 academic year will be conducting action research to identify what methods and models of pedagogical training and support for integrating ICT effectively in classrooms lead to sustained uptake among teachers in different settings.

Digital Schools Survey

As a first step in informing design of training approaches for various contexts and school needs in Maharashtra, the research team is carrying out a Digital Schools Survey at the start of the 2019-20 academic year with the goal of understanding the current levels of digital infrastructure, support, resources and skills that schools across Maharashtra are equipped with to help inform how the state can best direct resources to support schools in filling gaps and optimizing use of digital technology and resources. The survey looks at six components:

1. General School Characteristics
2. School Support
3. Digital Infrastructure
4. Teacher ICT Integration
5. Digital Content Availability
6. Digital Community Engagement

Data from the survey will be cross-referenced with school data available from the Unified District Information System for Education (U-DISE) to create a holistic picture of schools' capacity to fully leverage digital technology to improve teaching and learning.

Data analysis from the schools will seek to identify common school scenarios with regard to their capacity for effectively integrating ICT into teaching and learning. Based on these common scenarios, pedagogical training frameworks will be identified and developed for implementation over the course of the academic year. Such scenarios might include:

School has several devices, strong connectivity, access to some digital content, and teachers have a solid baseline of digital skills, but teachers need support in effectively

using the devices and content, and knowing which devices and content are best for different learning needs. Teachers may also be interested in creating content, and need support in using the new Quality Content Creation Guidelines.

Schools have few devices and access to Internet, if somewhat unstable. Teachers need support in upgrading their digital skills, identifying locally relevant online resources that are available for download and offline use, and pedagogical training to use technology in to drive inquiry and learner-centered activities.

Schools have weak to no Internet access at the school, but some teachers use their phones to look for information. Teachers want training in using resources designed for their situation, such as DIKSHA, and in identifying what kinds of devices could help upgrade their teaching and learning process to inform their requests to the district/state for investments in their schools.

Data Collection Protocol & Preparation

The survey is being carried out with 2,000 schools in Maharashtra through a mix of online and in-person means. The online survey, which has been translated into Marathi, has been distributed using Survey Monkey. The research team assumes that many of the most hard-to-reach and less digitally equipped schools that this survey is designed to support will be the same ones who may struggle to complete an online survey. Therefore, for the data collected through this survey to have the intended impact, Block Resource Persons (BRPs) will play a critical role in collecting in-person survey data at schools identified as being hard to reach or who lack the ability to easily complete an online survey.

Sampling

The 2,000 schools were selected to represent the state's urban/rural/tribal make-up, spread across regions, with a focus on government schools.

Timeline

- August 5th -17th : BRPs visit target schools to introduce the purpose of the survey, answer any questions and complete the survey.
- August 17th – 31st : Remaining schools complete the survey online.
- September 1st-30th: Data analysis and Action Research design and planning

Method

BRPs are expected to visit *all* of their selected schools within the allotted time frame. During each visit, the first step is to introduce the purpose of the survey to the School Heads before proceeding with the survey. BRPs have been trained to emphasize the following points:

- The purpose of the survey is to better understand the needs of the schools based on their specific circumstances, so their *truthful answers are critical*.
- The survey is for *all schools*, not just those that already have devices or are using ICT in classrooms. The idea is to help design ICT solutions for schools based on their needs and constraints.
- The person to complete the survey should be the person with the best knowledge of the school's ICT resources, use of ICT in lesson preparation and/or classroom, and/or readiness factors for future use of ICT in the school. This person might be the School Head, ICT teacher, or another tech savvy or otherwise interested teacher. Ask the School Head to identify who the best person to complete the survey would be.
- Ask the School Head if he/she has any questions and do your best to answer them. If there are any questions, ask them to direct their questions to the Research Department.
- Inform the schools to not to fill the online version of the same form in future.

To prepare for the data collection, members of the research team coordinated with MSCERT Head of Research to design and carry out webinar-based training sessions for all of the heads of Maharashtra's District Institute of Education and Continuous Professional Development (DIECPD) offices, as well as with the selected BRPs from each district who would be tasked with carrying out the survey. It was notable that these webinars were the first time that the Research Department of MSCERT conducted any ICT-enabled, distance training program. During these webinars, the DIECPD heads and BRPs were informed of the larger "Towards a New Indian Model of ICT-Led Growth and Development" research agenda that the Digital Schools Survey is a part of, the objectives of the survey, and the plans for how findings would be used to inform action research to support teachers from various school environments to improve their skills through training in integration of ICT in teaching practice. BRPs were also trained on key points to share with school heads and teachers as outlined above.

Using Survey Findings to Inform Action Research Plans

Based on the survey findings, an action research protocol will be designed to look at a sampling of approaches to pedagogical training for integration of ICT that are intended to meet the specific needs of various school contexts as identified in the Digital Schools Survey. The models for teacher training will be selected among existing innovative approaches being led by NGOs and/or DIECPDs, as well as at least one model to be designed by the research team in collaboration with Leadership for Equity and DIECPDs. Selected schools will receive at least 2-3 in person/blended trainings over the course of the academic year, and have access to staff for regular support using WhatsApp and other video conferencing technology. The research questions that this action research seeks to answer include:

- What are the different kinds of teacher training initiatives focused on pedagogy for ICT integration that are being conducted by DIECPDs and other education stakeholders (e.g. NGOs), and how do their approaches align/differ?
- Which training approaches (in terms of format, frequency, follow-up, etc) lead to most effective/sustained teacher uptake and changes in student participation?

Different models of teacher training will be studied, and will be identified in the coming weeks through outreach to various DIECPDs and NGO partners doing innovative work in the area of teacher training. For example, the Aurangabad DIECPD has been conducting teacher support calls using Zoom in order to reach remote schools. The company Jnana Promodhini has been developing e-content for 11 years, and over the past year has been developing content for the DIKSHA platform. Part of their offering includes providing content and skill-based trainings for teachers, and tailor their training to the needs of the schools they work with. They are currently developing an app to further support teachers with content and training tips, and planning to conduct their own internal research to develop a blended learning model for teacher trainings. These different approaches are likely to be among those selected for this action research and comparative analysis.

For the model to be developed by the research team, the team is looking at developing an adapted version of the Center for Sustainable Development's Virtual Reality Teacher Training Platform. The Virtual Reality (VR) platform was developed in 2017 by CSD's Connect To Learn initiative – a partnership with global telecommunications company Ericsson. Platform development was supported by Qualcomm Wireless Reach, and was designed as a follow-up to a 2-year engagement with 31 schools in Myanmar supported by UK Aid's Girls' Education Challenge. During the two-year program, 31 schools in Myanmar received installations of teacher computer kits and student tablets, and were equipped with connectivity. Teacher trainers from the Myanmar Ministry of Education received training in integration of ICT into

classroom practice, which they then implemented with teachers from participating schools. The project saw significant uptake in use of technology by teachers and students. To sustain that progress, the initiative needed to identify a low-cost approach to ensure teachers would have ongoing access to training and support.

CSD and Ericsson, together with a UK-based VR firm, developed a series of four modules to help 1000 plus teachers understand the goals of student-centered, ICT-integrated pedagogy and explore various approaches to integrating it in the classroom. The approaches and sample activities that are covered in the modules are based on a global literature review of recommended pedagogical practices from country curricula in order to ensure that the activities covered are applicable in different country contexts.

Based on expressed interest in this solution by the Maharashtra Education Commissioner as a possible area for further exploration in Maharashtra, the research team is looking into possibilities for adapting their solution for the Maharashtrian context in partnership with SCERT and LFE, and piloting it as part of this research strand looking at different approaches to teacher training focused on integration of ICT.

Alongside implementation of these various training approaches, the research team will conduct teacher and student surveys and interviews and regular classroom observations to monitor the degree to which involvement in teacher training correlates with increased use of technology in lesson preparation and/or delivery and modes of student participation. Classroom observations will measure the types of student engagement taking place in the classrooms, how much time is spent on various types of activities, and different ways ICT is used by teachers and students.

After the close of this research looking at different models of teacher professional development, a comparative analysis will be conducted to help understand which aspects of teacher training lead to the most significant changes in teacher practice and classroom engagement, considering cost effectiveness of the various approaches as well. Based on this analysis, a set of recommendations will be made for how effective teacher training in integration of ICT can be scaled up.

Timeline for Next Steps

The proposed timeline of activities during the 2019-20 academic year is as follows:

August 2019 • Conduct Digital Schools Survey in 1000 representative schools

September – December 2019	<ul style="list-style-type: none"> Analyze findings from Digital Schools Survey and identify 3-5 common scenarios for design/identification of teacher professional development models for comparative action research. Possibilities for including an adapted version of CSD’s Virtual Reality Teacher Training platform as one model for comparative research are being explored.
October – December 2019	<ul style="list-style-type: none"> Conduct a series of teacher professional development workshops in partnership with LFE and Block Resource Persons Observe other models of teacher and other NGOs and private eContent providers
January – February 2020	<ul style="list-style-type: none"> Observe classrooms where teacher participants in various training models teach to identify changes in teacher practice with regards integration of ICT
March -April 2020	<ul style="list-style-type: none"> Continue following up training with teacher support in collaboration with LFE and Block Resource Persons Continue observing classrooms to observe changes in teacher practice. Conduct teacher surveys and interviews on their experiences with teacher training and integration of ICT in classrooms over the past year.
May 2020	<ul style="list-style-type: none"> Analyze classroom observation, survey and interview data to identify the approaches to teacher training that lead to the most impactful changes in teacher practice for common school scenarios. Produce report of findings.

APPENDIX – DIGITAL SCHOOLS SURVEY QUESTIONS

Background Questions

1. District (drop-down)
2. Block
3. Name of School
4. UDISE Code
5. School Management Type
 - a. Zilla Parishad
 - b. MNC
 - c. NP
 - d. Tribal Welfare Department
 - e. Social Welfare Department
6. What is the medium of instruction of your school?
 - a. Marathi
 - b. Hindi
 - c. Urdu
 - d. English
 - e. Other: _____

General School Characteristics

7. What grades does your school serve?
8. How many students are enrolled in your school?
 - a. Boys_____
 - b. Girls_____
9. How many teachers work in your school?
 - a. Men_____
 - b. Women_____
10. How many classrooms does your school have?
11. Does your school have electricity?
 - a. Yes
 - b. No
 - i. If Yes, how is it supplied?
 1. Grid
 2. Solar

3. Generator

4. Other

12. How would you describe your school setting?

- a. Urban
- b. Rural
- c. Tribal area

13. What is the furthest that students travel to reach your school?

- a. 1km
- b. 2-3km
- c. 4-5k
- d. More than 5 km
- e. Residential School

School Support

14. Which type of Headmaster does your school have?

- a. Headmaster
- b. In charge Headmaster
- c. School is not designated for Headmaster/Principal

15. Does your school have at least 1 teacher who is highly skilled at using ICT?

- a. Yes, more than 2
- b. Yes, 2
- c. Yes, 1
- d. No

9a. If you answered "a" above, how many tech savvy teachers do you have?

16. Does your school receive regular support from resource persons from DIECPD?

- a. Yes
- b. No

17. What is the distance of your school from DIECPD/DIET?

18. How often does your school receive visits from DIECPD/SCERT staff?

- a. 1x/week
- b. At least 1x/month

- c. At least 1x/term
- d. Rarely
- e. None

19. How many times per year do teachers from your school receive professional development trainings?

- a. 0
- b. 1
- c. 2
- d. 3 or more

20. How would you rate your satisfaction with the support received by DIECPD/SCERT?

- a. Very satisfied
- b. Somewhat satisfied
- c. Somewhat dissatisfied
- d. Very dissatisfied

Digital Infrastructure

21. What kind of Internet facility is available in your school?

- a. Mobile network
- b. Wifi
- c. Broadband
- d. Dongle
- e. No Internet

22. Which of the following Internet connectivity scenarios best describes your school's situation?

- a. Our school has reliable Internet everyday, and numerous devices can connect at once without a problem.
- b. Our school has mostly reliable Internet. Only a couple or few devices can connect at a time.
- c. Our school has Internet, but there are regular outages, and/or only or two devices can connect at a time.
- d. Our school does NOT have Internet

23. How many of the below types of devices, in working condition, does your school have?

- a. Total number of Computers: _____
- b. Number of working Computers: _____
- c. Total number of Laptop computers: _____
- d. Number of working Laptop computers: _____
- e. Total number of tablets: _____
- f. Number of working tablets: _____
- g. Total number of projectors: _____
- h. Number of working projectors: _____
- i. Total number of TV/LED: _____
- j. Number of working TV/LED: _____
- k. Total number of Smart TV/Android TV: _____
- l. Number of working Smart TV/Android TV: _____

Teacher ICT Integration

24. Are there teachers at your school who use technology to **prepare** their lessons (i.e. research the topic online, finding resources to share in class, etc)?

- a. Yes
 - i. If so, how many? _____
 - ii. If so, how often?
 1. Everyday or almost everyday
 2. At least once per week
 3. Less than once per week
 4. Once per month or less
- b. No

25. Are there teachers at your school who use technology to **deliver** their lessons (i.e. using a projector to present slides, showing a video, etc)?

- a. Yes
 - i. If so, how many? _____
 - ii. If so, how often?
 1. Everyday or almost everyday
 2. At least once per week
 3. Less than once per week
 4. Once per month or less
 - iii. Please describe one example of how technology is used by teachers in your school.

b. No

26. Out of the working digital equipment in the school, which is ***easiest*** to use?

- a. Computer
- b. Laptop
- c. Smart phone
- d. Tablet
- e. LCD Projector
- f. Interactive Whiteboard
- g. TV/LED
- h. Smart TV
- i. TV with Android Stick
- j. None of these
- k. Other: _____

27. Out of the working digital equipment in the school, which is ***most used?***

- a. Computer
- b. Laptop
- c. Smart phone
- d. Tablet
- e. LCD Projector
- f. Interactive Whiteboard
- g. TV/LED
- h. Smart TV
- i. TV with Android Stick
- j. None of these
- k. Other: _____

28. How many tech savvy teachers are in your school?

29. How many sessions were held?

30. What was the focus of the training?

- a. Introduction of ICT
- b. Use of ICT in teaching learning process

- c. Use of ICT in evaluation
- d. Use of ICT in management
- e. Other

31. What teaching methods, in general (with or without ICT) are most commonly used in your school? Select the top 3 most used methods:

- a. Lecture method
- b. Discussion method
- c. Individual work
- d. Pair/group work
- e. Teacher demonstration method
- f. Student demonstration method
- g. Activity-based learning
- h. Constructivism
- i. Watch and Stop approach
- j. Other _____

Digital Content Availability

32. Check any of the below software/digital resources that your school uses on any of its devices. If you don't use digital content at your school, leave blank.

- a. Kompkin _____
- b. GuruG _____
- c. BSNL _____
- d. Nalanda _____
- e. DIKSHA _____
- f. e-Balbharati
- g. Khan Academy
- h. YouTube
- i. Microsoft teacher platform
- j. Self-made e-content
- k. DO NOT USE digital content
- l. Other _____

33. How satisfied are you with the availability of content for your subject?

- a. Very satisfied
- b. Somewhat satisfied

- c. Don't know/Not interested
- d. Somewhat dissatisfied
- e. Very dissatisfied

34. Do you have any expectations regarding e-content?

- a. Yes
 - i. If yes, what expectations do you have?
 - 1. E-content should be available as per grade/class
 - 2. E-content should be available as Board
 - 3. E-content should be available in various options
 - 4. E-content should be available in mother tongue
 - 5. E-content should be available as Board
 - 6. E-content should be available in English language
 - 7. E-content should be available in the form of worksheets, practice question paper, etc
 - 8. Other: _____
- b. No

35. What kind of additional content would be useful for your school (e.g. considering language, local relevance, etc)? (optional)

Digital Community Engagement

1. How would you describe your school's web presence? Check all that apply.
 - a. We have our own website
 - b. We have our own YouTube channel
 - c. At least one of our teachers has a content/YouTube channel
 - d. We have social media pages (Facebook, Twitter, etc)
 - e. We access/use the default government provided website
 - f. Our school has its own blog
 - g. At least one of our teachers has their own blog(s)
 - h. Other _____
 - i. We are not present online

2. How does your school engage with parents in the community? Please rank those that apply, starting with 1 for most commonly used method.
 - a. In-person meetings at the school ____

- b. Outreach to communities by school representatives _____
- c. Announcements/letters sent home _____
- d. Phone calls _____
- e. SMS
- f. WhatsApp messages/groups _____
- g. SMC
- h. Other: _____

36. Which of the following digital equipment did your school get from social contribution/CSR?

- a. Computer
- b. Laptop
- c. Smart phone
- d. Tablet
- e. LCD Projector
- f. Interactive Whiteboard
- g. TV/LED
- h. Smart TV
- i. TV with Android Stick
- j. None of these
- k. Other: _____

37. Please upload a photo of your school's ICT facilities/equipment