DIKSHA in Maharashtra
Needs Assessment Report

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DIKSHA Implementation Research Project
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EXECUTIVE SUMMARY

This report presents the key findings from a needs assessment conducted for the purpose of understanding the vision, goals, implementation plans and challenges for the successful rollout and uptake in Maharashtra of the National Digital Infrastructure for Knowledge Sharing platform, known as DIKSHA. DIKSHA was chosen as a topic for research due to its unprecedented potential to bring a wave of transformation in and access to the use of technology for instruction and teacher preparedness. In order to help ensure the program's success, it is imperative to document the processes from the beginning to understand what needs to be in place for such an ambitious platform to reach its maximum potential.

The range of features envisioned for DIKSHA includes in-class resources, teacher training content, assessment aids, teacher profiles, news and announcements, and communication tools to foster teacher community. Maharashtra took on the massive task of integrating QR codes into every textbook at every grade level up to grade 10, in all languages of instruction in the 2018-19 academic year. To ensure every topic across every medium and grade level was equipped with content, the Maharashtra State Council of Education Research and Training (MSCERT) worked with non-profits including Leadership for Equity to hold a series of content creation workshops which are ongoing toward the aim of training 1,000 teachers across the state as content creators.

Interviews and focus group discussions were held with stakeholders from MSCERT, the MSCERT textbook publishing arm Balbharati, DIECPD officials and teacher support staff from several districts including Satara and Aurangabad districts, NGOs contributing in various ways including Leadership for Equity and Rotary, and teachers from schools in Wai and Pune.

Key findings are presented according to a set of themes that emerged over the course of the data collection activities. Overall, the research team found great enthusiasm among all stakeholder groups for the potential of DIKSHA, however there were also some observed gaps in terms of how state authorities perceive the purpose of DIKSHA and how teachers perceive its utility that may be minimized through improved communications strategies. Many teachers noted that while they and their peers have become increasingly comfortable using technology, they require further training in pedagogical approaches for effective integration of technology into classroom practice. Innovative examples of training and supporting teachers in remote areas through blended models using technology tools were discussed with DIECPD officials and stakeholders involved in teacher training, and are one area proposed for further inquiry in the next phases of research.

With regard to content, teachers consistently noted that they put faith in their fellow Maharashtrian and Indian teachers when looking for quality, relevant content, but do not have clear criteria for discerning quality beyond this consideration. While many teachers are being trained as content creators to help populate the DIKSHA platform, the process for submitting content and receiving feedback remains rather ad hoc and lacks clear standards, processes and timelines leading to bottlenecks at the review stage.

In looking at how data from the platform is being used to inform ongoing content creation and teacher support, a significant gap in perception of what is possible on the DIKSHA platform was observed. While EkStep, the creators of the open source digital tools upon which DIKSHA is built, explain that DIKSHA is already offering automated data on the platform that can be disaggregated down to school levels, state officials and other teacher trainers indicated that, while data from the platform would be extremely

helpful to lend insight into what kind of content is most in demand and where teachers need further support, the platform is not yet enabling access to such data. Upon further inquiry into this gap, it became understood that, while usage data is being collected by the platform on the backend, frontend features to enable state leaders to download and share reports are not yet functional, and there is not yet a strategy in place for how such reports could be used to analyze what content is working well, and where are the content and teacher skills gaps. This is another area of interest for further research into how such a strategy can be developed and implemented.

Based on the findings themes, this report presents a set of proposed research questions and activities for the next phases of research. This report is being circulated to the stakeholders involved during the needs assessment for input into which of the proposed research questions and activities align to priorities for the state where further action research can offer the most support for further strengthening of DIKSHA implementation. Focus areas for further research, including action research components that will involve co-designed workshops by the research team and implementing stakeholders, are as follows:

- **Clear Communication of Purpose of the platform**
  Research questions in this area may include:
    1. How do teachers currently find out about DIKSHA/updates to DIKSHA?
    2. What do teachers and other education stakeholders believe the main purpose and value of DIKSHA to be?
- **Training on Quality Standards** for content creators
  Research questions in this area may include:
    3. How do different education stakeholders define quality content?
    4. How do content creator trainings approach the topic of content quality and consistency during training sessions?
    5. What are the criteria being used among content reviewers to check for quality, and how are those criteria being shared with content creators?
- **Pedagogical training** on how best to use the different kinds of content
  Research questions in this area may include:
    6. 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?
    7. Which training approaches (in terms of format, frequency, follow-up, etc) lead to most effective/sustained teacher uptake of ICT and pedagogical skills, and changes in student participation?
    8. How are teachers incentivized to participate in trainings in ICT integration and content creation?
- **Formalized feedback mechanism within the platform**
  Research questions in this area may include:
    9. How are comments/suggestions from teachers and other users regarding DIKSHA currently being collected? How should they be collected?
    10. How is teacher, parent, student and other user feedback taken into account as the platform continues to grow/evolve?
- **Formalize content submission and review process**
  Research questions in this area may include:
    11. How are teachers incentivized to submit content?

12. What is the current process for content creators to submit their content and receive updates/feedback on the status of their submission? How does this process align/differ across districts and/or implementing partners?
13. What are the best practices for streamlining the content submission and review process?

- **Disaggregated usage data** report distribution and analysis for use in district decision making Research questions in this area may include:
    14. How are education stakeholders made aware of the kinds of data reports available through the DIKSHA platform?
    15. How are data reports currently being analyzed and shared to education stakeholders at different levels?
    16. How can the state best support the analysis and sharing of data reports from the DIKSHA platform to support continued growth in uptake and improved quality of learning outcomes?
- **Defining a holistic set of criteria for "digital schools" to help target state and district support to schools' needs**

BACKGROUND

India is using Information and Communication Technologies (ICTs) to leapfrog economic development in key sectors: Education, health, infrastructure, finance, agriculture, manufacturing, and perhaps most important, governance. ICTs are being used to deliver critical goods and services to hundreds of millions of Indians. The role of ICTs in a new model of economic growth and structural change requires a deep and thorough macroeconomic analysis. Will India truly forge a new path to development, for example, bypassing a period of further heavy industrialization? Can ICTs be used to create new high-quality, low-cost services in health, education, and infrastructure, thereby enabling India to leapfrog in the development process?

ICT holds an important promise for education especially in rural areas, if it is optimized and tailored to local needs. The purpose of the larger study that this needs assessment is a part of is to focus on an education platform that helps the teachers to get supplemental materials aligned to the topics they teach at school. This being the reason why DIKSHA was chosen as a topic for research due to its unprecedented potential to bring a wave of transformation in and access to the use of technology for instruction and teacher preparedness. In order to help ensure the program's success, it is imperative to document the processes from the beginning to understand what needs to be in place for such an ambitious platform to reach its maximum potential. An initial Needs Assessment on the planning phase of DIKSHA will help to create the Theory Of Change by using stakeholder interviews to assess the alignment between intention, processes in place and expected outcomes. Observing as outsiders, the inputs and processes in place will help to inform and meet the outcomes. The needs assessment study will highlight gaps in the translation of intentions into actions to reach the expected outcomes and will guide program design and delivery. It is imperative that this study takes place alongside program planning and implementation since the intended outcome of the study is to support the success of the program, helping to inform program strategies at the initial stages of content launch, and adapt as needed. This objective of the study at this early stage will not be to assess the project outcomes for teachers or students at classroom level since the program is at a nascent stage, too early to be assessed.

This report presents the key findings from a needs assessment conducted for the purpose of understanding the vision, goals, implementation plans and challenges for the successful rollout and uptake in Maharashtra of the National Digital Infrastructure for Knowledge Sharing platform, known as DIKSHA. Maharashtra is the only state in India to launch the national platform in all grade levels and all medium of instruction in Year 1. Maharashtra is also playing a key role in the development of DIKSHA, having used a similarly envisioned platform during the 1-2 years prior called the Maharashtra In-Service Teacher Resource App, known as MITRA. Among those who were familiar with MITRA, DIKSHA is being branded as "MITRA 2.0", and accordingly, Maharashtra stopped using MITRA with teachers and is now pushing DIKSHA, even while the current version of DIKSHA still lacks some of the features that had helped make MITRA popular among those teachers exposed to it.

The range of features envisioned for DIKSHA includes in-class resources, teacher training content, assessment aids, teacher profiles, news and announcements, and communication tools to foster teacher community.[1] DIKSHA is built using the open, modular platform EkStep, which offers APIs to enable states to create their own versions of DIKSHA based on their own needs and priorities. To date, 7 states have

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[1] https://www.india.gov.in/spotlight/diksha-national-digital-infrastructure-teachers

adopted DIKSHA, rolling it out in at least 1 grade level or medium of instruction, with some states taking on teacher training components. The most widely used feature so far, adopted by 5 states, has been the development in 2018 of "Energized Textbooks" with Quick Reference (QR) codes embedded in textbooks that teachers and students can scan to be linked with relevant, open content. Maharashtra took on the massive task of integrating QR codes into every textbook at every grade level up to grade 10, in all languages of instruction in the 2018-19 academic year. To ensure every topic across every medium and grade level was equipped with content, the Maharashtra State Council of Education Research and Training (MSCERT) worked with non-profits including Leadership for Equity to hold a series of content creation workshops which are ongoing toward the aim of training 1,000 teachers across the state as content creators.

The Needs Assessment was conducted with the aim of gaining a greater understanding in the following areas:
- What is the vision among various stakeholders for how DIKSHA is expected to contribute toward improved teaching and learning?
- How is the state approaching the rollout of DIKSHA, including fostering teacher skills for content creation and pedagogical approaches for effective integration of ICT?
- What kind of monitoring processes are in place to help ensure a successful rollout?
- How has the process been working to date, and what are the next steps?

To gain insight into these questions, interviews and focus group discussions were held with stakeholders from MSCERT, the MSCERT textbook publishing arm Balbharati, DIECPD officials from Satara and Aurangabad districts, NGOs contributing in various ways including Leadership for Equity and Rotary, and teachers from schools in Wai and Pune. Stakeholders from whom data was collected are listed below:

Respondents	Data Collection Method	District	Sample Size
SCERT Officials	Interview	Pune	2
Balbharati Officials	Interview	Pune	1
DIECPD Officials	Interview	Satara	1
		Aurangabad	2
Teacher Support Staff (Vishay Sahayaks)	Interview	Aurangabad	1
	Interview	Aurangabad	1
	FGD	Kalamb, Nanded	3
Early Innovator Teachers	Interviews	Solapur, Pune, Beed	4
Teachers	FGD	Satara (Wai)	8
	FGD	Satara (Wai)	7
	Interviews	Mumbai. Nashik and Hingoli.	3
	FGD	Pune	6
LFE Staff	Interview	Pune	5
NGO contributors	Interview	Satara	1
EkStep Leader	Interview	N/A	1

The key findings discussed in this report are made with the understanding that this is a hugely ambitious undertaking which is in its very early stages, and so any perceived gaps are highlighted with the

intention of offering areas where implementation can be strengthened as the work continues and scales within Maharashtra and to additional states so that the platform can reach its maximum potential. Stemming from this, suggested research topics have been identified as areas where additional insight and outside perspective might offer potential to help further promote successful uptake, sustained use, continual growth.

ICT IN EDUCATION CONTEXT IN MAHARASHTRA

Maharashtra being the only state in India to take on the ambitious task of rolling out DIKSHA in all 8 mediums of instruction, in all grade levels in its first year makes sense when taking stock of the impressive roles teachers have played in spurring the ICT in education movement over the past decade. During the needs assessment, one theme that was relayed by stakeholders across the education spectrum was that rural, remote teachers from poorly-resourced schools were often the ones doing the most innovative things with technology in education, and going above their call of duty to seek out community and corporate support – even using their personal funds - to begin integrating technology into their classrooms.

A teacher facilitates an ICT-integrated lesson at a pilot international school in Wai

Those spoken to during the needs assessment often told similar stories – they worked in small, multi-grade classrooms in rural areas where, several years back, families didn't have too keen an interest in enrolling their children or making sure they attended regularly. Teachers saw technology as a way to get children and their families interested in schooling. So they started bringing their personal laptops to school, or collected some money to buy one laptop for the school, and began by showing simple videos or games they found online. After seeing increased enrollment and attendance, many started becoming more strategic about how they integrated technology, creating activities and learning exchanges that integrated ICT in innovative ways, and took it upon themselves to identify community and corporate funds to continue expanding the ICT investments in their schools. Before DIKSHA rolled out their energized textbooks, an early innovator teacher from Solapur had already created his own QR coded textbooks that helped spur the idea forward. Many teachers are known for creating their own YouTube channels, which other teachers look to as sources of locally relevant, quality content. Links to video highlights and examples of the kinds of innovative ways these early innovator teachers are integrating technology are included in Appendix 3.

The initiative of ICT Policy in School Education is inspired by the tremendous potential of ICT for enhancing outreach and improving quality of education that had been demonstrated by the early innovator teachers. The ICT Policy in School Education aims at preparing youth to participate creatively in the establishment, sustenance and growth of a knowledge society leading to all round socioeconomic development of the nation and global competitiveness. According to National Policy on Education 2016, *"ICT should be made an integral part of school education where it is used as an aid to teachers and students. Teachers have to gradually become facilitators and encourage self-learning by students…ICT can no longer be treated as a school subject, it has to become a way of learning process…Use of IT for*

'big-data' as a management and governance tool. It is suggested that a designated national agency should be encouraged to conduct experiments in regard to potential use of ICT in the field of education, and also monitor various initiatives being taken all over the country." The vision of DIKSHA offers a platform through which many dimensions of this policy can be realized – from integration of digital content, to resources for teacher training, to availability of big data that can help inform education decision making.

While these policy shifts have spurred increased investment in equipping schools and improving teacher skills, many teachers interviewed during the needs assessment reported problems with connectivity that had been installed in their schools, often discouraging them from using the Android TVs in their classrooms. It was also clear that, even as teachers enthusiastically used ICT in their classrooms, there remains a great range of capacity in how to use it effectively, even within the same schools, with some teachers using videos or other media as tools to facilitate engaging classrooms with lots of student participation, others putting on the video and sitting in the back as students watched, and still others perhaps trying to do too much at once, engaging students on tablets and textbooks and slates all at the same time.

This contextual background is provided to note that the most effective strategies for how ICT can improve school participation and the quality of teaching and learning often come from teachers. This needs assessment found that, in areas where the rollout of DIKSHA and the successful uptake of effective pedagogies for integrating ICT have further room for improvement, there are no shortage of examples of teachers and teacher support systems doing innovative work to fill those gaps. It is the aim of the implementation research project that will stem from this needs assessment to identify those examples, study how and why they are working, and develop proposals and plans for how those ideas can be scaled up through government support.

KEY FINDINGS

This section presents key findings from the needs assessment according to a set of themes that emerged over the course of the data collection activities. Themes include:
- Vision and objectives of the platform
- Communication and outreach
- Teacher training
- Content standards and availability
- Data and feedback sharing

Vision and objectives of the platform

Every conversation and focus group that was held from leaders within SCERT to teachers from rural schools expressed at least some degree of enthusiasm for the potential of DIKSHA as a tool to enable widespread, easy access to locally relevant, curriculum aligned teaching and learning materials. From among the range of features envisioned for DIKSHA, it seemed that the understanding among the vast majority of stakeholders using or promoting use of DIKSHA saw it as a tool for linking textbook topics to relevant digital resources through QR codes.

As one teacher in Aurangabad mentioned "*DIKSHA is good for checking for understanding, but not building understanding. That's why I make my own videos to teach, but for assessment activity I refer to DIKSHA app.*" Some teacher trainers described how, while DIKSHA designers intend the content to be a supplement to what exists in the textbooks, many teachers still perceive the platform as offering digital versions of what is in the textbooks. At this early stage of implementation, there seems to be a gap in terms of purpose of the platform envisioned by the higher authorities and how the teachers perceive the platform's utility.

<u>Communication and outreach</u>

During focus groups with teachers at two schools in Wai, teachers from both schools noted that they were first made aware of DIKSHA during the prior academic year during block level education meetings. Though none had been engaged in any trainings specifically on use of DIKSHA, many of the teachers said they were regularly using it. The basic introduction to the app, alongside other recent pedagogical trainings the teachers from one of the schools had received on constructivism seemed to be enough to make them comfortable with taking up use of the app. In Pune, one teacher during a focus group mentioned learning about DIKSHA during an education exhibition fair earlier in the academic year.

These examples align to the ways members from SCERT described their approach to getting the word about DIKSHA, through local channels within the education system, as well as through teacher networks on WhatsApp, Facebook, and other social media channels. While many teachers we spoke with mentioned communicating with their teacher peers through social media – primarily WhatsApp and Facebook – to get lesson ideas, share resources and find out about updates on training opportunities and other announcements from SCERT, we did not hear any teachers mention this as the way through which they first heard of DIKSHA.

While teachers we spoke to were aware of DIKSHA and many were either currently using it or had tried it in the past, the research team observed some key areas where teacher's and even some state level leaders understanding of the platform seemed to diverge from the vision and available features of the platform. One of those areas was regarding the offline availability of content. Several teachers explained that one drawback of DIKSHA was that content was only available online, with one teacher in Wai explaining *"For Diksha you need internet, you can use it only if you are online. While one can use software app offline. We have limited access to Diksha offline or when we have internet issue. While we can use software anytime."* A teacher support staff working in Aurangabad confirmed a similar finding among the teachers he supports, saying that many teachers assume they can only access the content online. During his school visits, he explains to teachers that they only need to be online once to scan the code and download the content, after which they'll be able to access the content offline. He said that once he explains this, teachers react by saying, "*now I will use it everyday.*"

The availability of usage data collected from the platform was another area where a common understanding seemed to be lacking among stakeholders at all levels. When speaking with leadership from EkStep, it was explained to the research team that a vast amount of data was being collected by the platform, which could be disaggregated down to the school level for analysis of areas such as what content was being used, how often, whether videos were watched to the end, etc. When speaking with members from LFE and SCERT, it seemed however that the understanding was that such localized data analysis was not yet possible through the platform as it is, and that such data availability was something that was hoped for in future iterations of the platform. For teacher support staff, they seemed unaware that such data

was available, but noted that similar data points as what were described as being available by EkStep would be useful to them to better understand the needs of teachers.

There seemed to be a lack of clarity among content creators as to what the timelines were for when content submitted for review would be reviewed and either returned for improvement or uploaded to the platform. One teacher who had participated in a content creation workshop mentioned that he had been checking on Diksha for an English lesson that he had submitted, but that he had not yet been able to find it.

Similarly, while most SCERT officials we spoke with explained that content was available in all mediums of instruction and for all topics, many teachers expressed that one drawback of DIKSHA in their experience so far was that some topics lacked content, or adequate content. A teacher from Nasik District explained that he is not using Diksha much, because he has not found enough resources whenever he has tried. A more extreme example from a teacher in Pune noted that she had deleted the app because it was not working for her. This points to a need for more clear communication from the state to the schools that DIKSHA is still a work in progress, and that teachers should be patient and continue checking back as more content is continually being added.

Teacher Training

Among both early innovator teachers using technology in creative, pedagogically diverse ways, and those teachers newer to technology using it in more plug-and-play ways, the need expressed most commonly and most emphatically was the need for more pedagogical training on how to integrate technology effectively into teaching practice. Teachers as well as SCERT and LFE staff noted that training up till now has been more focused on teaching ICT skills, e.g. how to use Microsoft Office software, how to find resources online using YouTube, etc, and that a shift is underway to determine the most effective ways for training teachers to take up more effective pedagogical approaches to integrating technology.

One early innovator teacher who teaches in Zilla Parishad school in Solapur and has vast experience developing digital content and networking with teachers throughout India and the world expressed this need for pedagogical training as follows:

"Teachers are lacking in skills for how to incorporate technology in the classroom, and how to incorporate resources. I have learned pedagogical skills from national geographic, and other opportunities I have sought out. But other teachers lack these trainings. The trainings they are getting is old-fashioned training. Training on the tools – how to make a video, etc. That's not their job. Their job is how to use that video and drive better learning outcomes. How to use ICT to engage the learners and make them think big. The ICT has to be used for this purpose. Government has to train teachers focusing on this area, not just on the different tools. Right now they are more focused on training of tools – using gmail, youtube, etc. Teachers don't need it. Just this mobile phone is enough for me, I can use. I have the QR coded textbooks, and the mobile. This is enough, I can change whatever I need to teach. I don't need every student to have a tablet, their own laptop. I need to know how to teach them and how to change learning style." – Teacher, Solapur

Several teachers in Wai noted that they had participated in trainings on spoken English and constructivism, but not specifically on how to use the technology. When explaining her perspective on one of the drawbacks of DIKSHA, one teacher demonstrated that, even having had experience with

training on constructivism, she seemed to have missed one of the core points of such a learner-centered method, explaining:

> *"The way I want to go...if the slate is clean then it becomes easier to write on it. If something is already written then writing something new would create confusion..(students) won't understand what told first and what was told later. To make their concept clear or what is there basic knowledge, we would have to check it before showing the videos. [DIKSHA] is not completely wrong but it has a lot of limitations. We accept it is a beginning, change will take place."*

Though this is just one example from one teacher, it highlights the challenge of changing a teacher's mindset from one that views a child as a "blank slate" to a person bringing their own knowledge and experience to the table. DIKSHA will likely be viewed as most beneficial to teachers who recognize students' abilities to play active roles in their own learning, and don't see student-led inquiry as a threat to their own role as teacher. This example highlights the importance of strategic design and implementation of teacher training initiatives to inculcate this shift in mindset in order for platforms like DIKSHA to succeed and become a useful resource not only for teachers but for students and families as well.

Grade 4 students share a tablet in a ZP school in Wai

DIECPD officials in Aurangabad described several innovative technology-enabled approaches to providing ongoing teacher professional development support throughout their region, even in remote areas. Monthly check-ins are held over video conference tools like Google Hangouts, and teacher support staff use google surveys to assess teacher training and content needs. Such solutions could be further examined to understand what elements work most effectively and have potential for scale-up.

Content

When asking teachers what to describe what they thought of "quality" content, and their process for determining what content was quality when searching online, the most common response was that any content made by fellow teachers from similar contexts would be relevant. Teachers trusted their peers from other Maharashtra or Indian schools to supply quality content. Beyond these descriptors of teacher-made and locally-relevant, teachers did not express having clear criteria for evaluating elements like validity, copyright, curriculum-alignment, etc. Some teachers explained that the criteria of content being made by teachers as compared to that made by software companies, noting that while software companies may be able to offer more visually appealing content, their pedagogical and contextual understanding is not as great as those of their fellow teachers. One teacher in Pune noted that a tablet initiative launched last academic year in her school, which offers math content for grades 6 and 7, includes problem sets that are not aligned to the curriculum, and are at a more advanced level, and so she has to spend extra time to pick and choose which problems are appropriate for her students. Such concerns were echoed by a teacher support staff who suggested that stakeholders from teacher content

creators and software companies come together under guidance Balbharati to create more high quality, visually stimulating content.

While several teachers were happy with DIKSHA as is, and others explained that they use it occasionally when they are able to find resources for their topics, a greater number of teachers named YouTube as their most trusted source for quality, stimulating content. Microsoft's teacher platform was another platform mentioned by several teachers. YouTube was noted as being more helpful for teachers of higher grades since the kinds of content that can be created on DIKSHA's platform are perhaps better suited for earlier grades and are perhaps not quite as capable of facilitating understanding of more complex concepts.

As noted in the communication section above, the research team heard from numerous teachers, and observed directly when scanning several QR codes, that not all topics in the textbooks are populated with content yet. It was also explained to the research team by officials from SCERT, DIECPD staff, and LFE staff that the process for submitting and reviewing content is still happening on an ad hoc basis, with content creators emailing their content submissions to their trainers from DIECPD and/or LFE. One DIECPD official estimated that about 70% of content pieces reviewed are accepted for upload to the platform, and that the other 30% are returned to the creators for feedback,

Teachers and Vishay Sahayaks participate in a content creator workshop in Aurangabad

with quality and copyright being common causes for return. The stakeholders from SCERT, DIECPD and LFE all acknowledged that this bottleneck in content submission and review is an area in need of improvement as DIKSHA continues to develop, with some content creators suggesting that a future version of the platform could include a more formalized submission feature. The submission process could include quality checks that the submitter must go through before completing submission, including affirming that they have the rights to the content, that objectives are clear, and what the content purpose is (e.g. practice, assessment, etc).The submission feature might include sample steps and timelines included in the review process so that submitters know what to expect in terms of when their content will be reviewed, when it might be uploaded, and reasons it might be returned.

Data Feedback and Sharing

The value of being able to access and analyze data from the DIKSHA platform, disaggregated to district, block, cluster and school levels was expressed by stakeholders from SCERT, LFE and the DIECPD. Stakeholders named data points including time spent on the app, how frequently the app is accessed, how often each content piece is used/downloaded, and whether users are completing videos. One observed disconnect however was that, when speaking with stakeholders from SCERT and LFE, the message received was that the platform was not yet able to support such data sharing at localized levels. This was a feature that leaders working on DIKSHA's implementation are looking forward to as the platform continues to develop. When speaking with a leader from EkStep however, it was expressed

that these features are already available, with data that can be disaggregated into reports down to the school level, and that education leaders in the state are well aware of these features. Upon further inquiry into this observed gap, it was explained that, while DIKSHA is collecting this automated usage data on the backend, frontend features to enable easy download and analysis of the data are not yet available.

Clarity on the process for what steps must be taken to make this data available must be sought among all stakeholders working on the rollout of DIKSHA, with a strategy and plan put in place for which data points will be prioritized for regular analysis and reporting that can be distributed to DIECPD's and their teacher support staff, and used by content creation trainers to drive content creation that is aligned to the areas generating the most usage among teachers and students, and correcting issues with content that doesn't seem to appeal to users. Data reports can also shed light on geographic areas that seem to have low usage rates so that teachers in those areas can be targeted for further training support in how to use the platform and identify/create relevant content for their needs.

IMPLICATIONS FOR RESEARCH

Based on these Key Findings, the research team proposes the below Focus Areas for the next phase of Implementation Research on the rollout and uptake of DIKSHA. Each Focus Area includes relevant research questions below. Two additional proposed strands of research that focus on other areas for effectively supporting the integration of ICT in education are included in Appendices 1 and 2.

Clear Communication of Purpose – outreach for the platform should include clear explanations of what DIKSHA provides, and what it doesn't. It's not a panacea for all content needs, but can help in specific ways (e.g. for early grade curriculum). There must be clear communication at all levels about what is currently available, what gaps are currently being filled, timelines for content uploads, etc, so that teachers are not surprised/disappointed if they find that certain topics/mediums are missing content. Communication on what is available/not available might also consider different types of content for each topic – prep, teach, learn, practice, assess.

Research questions in this area may include:
17. How do teachers currently find out about DIKSHA/updates to DIKSHA?
18. What do teachers and other education stakeholders believe the main purpose and value of DIKSHA to be?

Activities would include:
- Teacher interviews and FGDs

Training on Quality Standards for content creators and users about what standards to consider when creating/identifying "quality content", including content to be used for different purposes.

Research questions in this area may include:
19. How do different education stakeholders define quality content?
20. How do content creator trainings approach the topic of content quality and consistency during training sessions?
21. What are the criteria being used among content reviewers to check for quality, and how are those criteria being shared with content creators?

Activities would include:
- Workshop to define quality standards, criteria, and methods for communicating these to content creators. Workshop to be co-designed by research team and LFE, and implemented by LFE. Research team will attend to observe.
- Training observations
- Review of training materials

Pedagogical training on how best to use the different kinds of content – including guidelines within the platform itself for each topic, and in-person or blended models of teacher training support (e.g. using video conference platforms to check-in with teachers between in person visits as in the case of Aurangabad).

Research questions in this area may include:
22. 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?
23. Which training approaches (in terms of format, frequency, follow-up, etc) lead to most effective/sustained teacher uptake of ICT and pedagogical skills, and changes in student participation?
24. How are teachers incentivized to participate in trainings in ICT integration and content creation?

Activities would include:
- Teacher training observations
- Review of training materials
- Classroom observations
- Interviews with headmasters and teachers

Formalized feedback mechanism within the platform and through cluster/block/district support staff for teachers to identify content gaps and make suggestions.

Research questions in this area may include:
25. How are comments/suggestions from teachers and other users regarding DIKSHA currently being collected? How should they be collected?
26. How is teacher, parent, student and other user feedback taken into account as the platform continues to grow/evolve?

Activities would include:
- Workshop to plan for how user feedback should best be collected, analyzed and disseminated to decision makers for action. Workshop to be co-designed by research team and LFE, and implemented by LFE. Research team will attend to observe.
- Teacher interviews and FGDs

Formalize content submission and review process with clear timelines and feedback delivery mechanisms. Submission process can include quality checks that the submitter must go through before completing submission (e.g. affirming that they have the rights to the content, that objectives are explicitly included, what the content purpose is, etc)

Research questions in this area may include:
27. How are teachers incentivized to submit content?
28. What is the current process for content creators to submit their content and receive updates/feedback on the status of their submission? How does this process align/differ across districts and/or implementing partners?
29. What are the best practices for streamlining the content submission and review process?

Activities would include:
- Workshop to plan for how a streamlined content submission and review process could look, and what checks, timelines, and feedback processes should be in place. Workshop to be co-designed by research team and LFE, and implemented by LFE. Research team will attend to observe.
- Content creator interviews and FGDs

Disaggregated usage data reports should be downloaded from the platform and analyzed to district/block/cluster/school level so that education leaders can look at what is being used, how often, how long, whether videos are watched to the end, etc, and make informed decisions on future content creation and teacher training needs accordingly. Based on data review, reviewers can submit feedback to platform so that there is an iterative feedback loop to continually refine the available content for each topic and ensure relevance.

Research questions in this area may include:
30. How are education stakeholders made aware of the kinds of data reports available through the DIKSHA platform?
31. How are data reports currently being analyzed and shared to education stakeholders at different levels?
32. How can the state best support the analysis and sharing of data reports from the DIKSHA platform to support continued growth in uptake and improved quality of learning outcomes?

Activities would include:
- Workshop to plan for how automated data from the DIKSHA platform can best be analyzed and disseminated regularly to state, regional, district, block and cluster level leaders to inform training and content creation priorities. Workshop to be co-designed by research team and LFE, and implemented by LFE. Research team will attend to observe.
- SCERT and DIECPD interviews

NEXT STEPS

The research team submits this Needs Assessment report to seek feedback on the proposed research questions and activities in terms of their potential to offer useful insights and plans for the successful uptake of DIKSHA, and effective integration of ICT into teacher practice more broadly. Based on response from education stakeholders in Maharashtra, the team will finalize an implementation research plan to span the remainder of the academic year. Based on findings from the implementation research, an Action Research component will be developed for the following academic year to hone in

one or two areas where further testing and development of an identified approach to improving one of the current gaps in implementation will be conducted and studied. The timeline for these next steps is proposed as follows:

January 2019: Collect feedback on Needs Assessment Report's proposed Research Questions and Activities and develop Implementation Research Plan

February to April 2019: - Implementation Research: Will assess the inputs and processes of the program that are in place at the current stage of implementation of the DIKSHA platform, and collaborate with LFE on a workshop to begin planning for how to address some of the identified gaps/opportunities. Other data points will include interviews with the teachers, trainers, content creators and other education stakeholders, as well as extensive literature reviews of similar initiatives, which will result in a gap analysis and identification of potential solutions for further exploration.
Activities will include:
- Attend and observe teacher training and content creator training sessions
- Conduct focus groups and interviews with the teachers, content creators, content reviewers, and DIECPD leaders
- Collaborate on design of workshop to begin planning for some of the next steps in implementation that address some of the identified gaps, e.g. analyzing and sharing localized DIKSHA data reports; defining components of "digital school" definition and creating a tool. Workshop will be co-designed with LFE and implemented by LFE.
- Develop Agenda for the Action Research component

May 2019 to TBD - Action Research: Potential solutions to address gaps identified during earlier phases will be further tested and studied in sampled schools/blocks. Potential solutions will be selected among examples identified during the course of the implementation research.
Activities will include:
- Develop specific research questions
- Select sample of classrooms/schools for field-based implementation.
- Conduct field-based implementation, document and study the processes.

APPENDIX 1

RESEARCH STRAND ON DEFINING "DIGITAL SCHOOL"

One theme that came up often during the needs assessment was the rapid increase in the number of schools considered to be "digital schools", with over 90% of government in schools in Maharashtra self-reporting themselves as being "digital". This was defined by SCERT and DIECPD officials during interviews as a school with at least one mobile device and one magnifier *per school*, and schools reporting so far are believed to be using this definition. These officials however noted that the definition is being changed to require the definition to mean at least on device *per classroom*.

Without clarity on what individual schools mean when they claim to be "digital schools", the label loses its potential to help guide the government in how to allocate resources to improve schools' infrastructure and teacher capacity to make effective use of ICT. It also offers the government little insight into what kinds of infrastructure, devices, content and support are most efficient and effective for schools with different characteristics. The research team proposes developing a new definition of digital school that considers not only the digital infrastructure within the schools, but the kinds of content they have access to and whether they are creating/adapting their own digital content, the skill levels of teachers to integrate digital resources in engaging ways, the kinds of training opportunities they have access to, including through technology, and how they are using technology to engage parents and community regarding the learning of their students.

An improved system for recognizing schools' digital status might weigh these different criteria such that schools would receive a benchmark scores for the set of criteria that indicates how far along the path to having a robust digital capacity they are. This more nuanced system could help the government see what different kinds of further investment and support different schools need, so that interventions can be tailored to individual school needs. For example, a school with great devices but weak teacher skills could be targeted for more teacher training, where a school that has innovative teachers but few devices could be targeted for further technology investments. An example of what such a rubric might look like is included to the right.

	Digital infrastructure	Teacher ICT Integration Skills	Digital Content Availability	Digital Community Engagement
4	Full teacher kit and/or set of student devices per classroom. Reliable connectivity	All teachers and school leaders well equipped with ICT and teacher-as-facilitator pedagogical skills, regularly employing such skills	All or nearly all teachers and school leaders regularly using digital content to plan for and/or facilitate their classrooms	All teachers and school leaders using technology to regularly update parents and communities, including through an active school website
3	One device per classroom and/or computer lab/set of class devices to share. Reliable connectivity	Some teachers and/or school leaders well equipped with ICT and teacher-as-facilitator pedagogical skills, regularly employing such skills. Some teachers lack adequate skills and/or not using them frequently in class	Most teachers aware of a variety of digital resources, including DIKSHA, and using at least once per week to plan for or facilitate their classrooms	Most teachers and school leaders using technology to regularly update parents and communities
2	One device per classroom. Inconsistent connectivity	At least some teachers possess adequate ICT skills, but lack adequate pedagogical skills	Some teachers accessing DIKSHA or other digital content resources occasionally	Some teachers using technolgy to regularly engage parents and communities
1	One-two devices per school. No/inconsistent connectivity	Some teachers have at least some ICT skills, but most lack pedagogical skills for efective ICT use	Most teachers do not access locally relevant digital content. Don't use or are unaware of DIKSHA or ther free platforms	Some teachers are using technology to communicate with parents and teachers occasionally
0	No devices used in the school	Most teachers lack adequate ICT skills to use it in their classrooms	No teachers are accessing digital content to plan for or facilitate their classrooms	Teachers are not using technology to engage parents and communities

Collecting data on these schools to arrive at this more detailed definition of "digital school" will be more complicated, since an understanding of the kinds of teacher skills being deployed in classrooms would require classroom observation and not simply a survey response. Exploration of how such data could be collected in a cost-effective, efficient way could be an area that this research strand would explore. Further, this research could look at how such a leveled approach to defining "digital school" could be done in a way that schools and communities would find motivating, and not discouraging, especially in cases where communities have invested a lot in improving their own schools' digital infrastructure.

APPENDIX 2

RESEARCH STRAND ON MAPPING CIVIL SOCIETY CONTRIBUTIONS TO SCHOOLS' DIGITAL INFRASTRUCTURE AND TRAINING

One important theme that was observed during the needs assessment was the critical leadership role played by communities, civil society and the private sector in spurring investments in ICT for government schools. Indeed, Maharashtra is the state receiving the most support from Corporate Social Responsibility efforts.[2] Early innovator teachers shared similar stories of identifying funding support for digital investments on their own without government support, finding funds through corporate social responsibility initiatives and through community mobilization. While the state government has plans to invest further in digital infrastructure for schools, and an ideal scenario would see the state ensure equity by funding such investments for all schools, that ideal scenario is not yet practical in the current reality, and so the question becomes, how can the government help coordinate the different actors contributing to improving the quality of education through digital infrastructure, content, and teacher skills to help ensure greater alignment and greater equity for students?

The research team proposes another research track that would map the different actors contributing to building digital schools – including through technology infrastructure investments, curriculum resources, teacher training initiatives, and school leadership initiatives. This research strand would look at who the players are, and how they approach their various interventions – do they drive them or do they act in response to requests received from schools? How are trainings facilitated and who is involved? What topics are most often focused on, and why were they selected? Do they provide content that is government approved, or supplemental to what is provided by the government? How do they align to existing government initiatives like DIKSHA, if at all? How can the government work to align different actors in areas such as training curriculum, and indicators used to guide data collection?

A illustrative snapshot of the kinds of data to be collected in this mapping exercise is included below.

Name of the platform	web address	Founding Year	Ownership (public/private)	Intended objective	Key leaders/ founders	Target population	# Schools, Districts	Features
Nalanda Project (one of the project by motivation for exellence)	https://www.motivationforexcellence.org/nalanda-project	2014	private (ngo)	The Nalanda Project is an in-class technology intervention that empowers students to take charge of their learning and allows teachers to efficiently deliver classroom instruction. It aims to provide teachers with training and support on how to blend technology with their traditional classroom practices.	Avi Nash	student above grade 6 across Pune , Mumbai and Delhi.(govt and low income private schools)		Provides affordable hardware and software. Content provided is aligned and mapped to local curriculum. Real time data for monitoring and tarcking student's progress. Program support and cloud backup. One to one student to tablet ratio. Tabs are equipped with curricula- designed, student friendly math content. Partenered with Khan Academy lite and MagoGenie- two high quality open sourced content providers.
Ekshiksha Project (ConnectEd Technologies)	http://connected.org.in/	2016	private (ngo)	EkShiksha' was launched by Education Department of Maharashtra in collaboration with ConnectEd Technologies, an education-technology start-up that creates rural-focused solutions. The campaign aims at uniting socially-responsible corporates, NGOs, school managements and grassroots-level educators to eliminate educational inequity and provide world-class education to children studying in rural schools.	Lehar Tawde	started with Palghar district		It is a robust, solar-powered, teacher-aid product that works flawlessly in demanding rural conditions and enables educators to easily integrate tailor-made multimedia educational content into conventional teaching practices, thereby improving learning environment and academic performance in rural classrooms. Dewan Housing Finance Ltd (DHFL) is sponsoring the programme in Palghar district as part of its CSR activities. The system enables educators to
E-Shiksha Project (Rotary India Literary Mission)	https://rotaryteach.org/elearning.php		The Rotary India Literary Mission (RILM) is an initiative of Rotary South Asia Society for Development	RILM's E-learning program, "E-Shiksha", aims at improving the teaching-learning experience through the use of curriculum based audio-visual modules in local languages in Govt. / Govt. aided schools.	Roatry Club	government schools or govt aided schools		aims to improve the teaching-learning experience through an integrated solution consisting of a LCD projector / LED TV / Smart LED TV loaded with the educational audio-visual software mapped with State curriculum in local languages. Software content can be offline entrenched in a SD card / pen drive or online created to any educational application
Deshbandhu and Manju Gupta Foundation	http://www.dbmgfoundation.org/		NGO	Achieved 100 % digitization of ZP Schools (1103 schools) through support of E-learning systems in the schools in collaboration with Mr. Harshal Vibhandik, who is a NRI belongs to Dhule.		schools in MH		They have worked on providing infrastructure support to tribal Ashram Schools. Promotion of E- learning system in Ashram School. Development of Model Ashram Schools.

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[2] See: https://csr.gov.in/CSR/statelist.php

APPENDIX 3

<u>EARLY INNOVATOR TEACHER HIGHLIGHTS</u>

The below links were shared with the research team by early innovator teachers, and help illustrate the kinds of innovate approaches these teachers are taking to integrate ICT in their classrooms.

<u>Articles/Websites</u>

- "Digital Zilla Super School"
- "These teachers are taking their students places with Skype"
- Technoteachers

<u>Videos</u>

- "The world is my classroom"
- Students playing kodu game
- Students playing Kahoot in relay format
- Learning through puppetry games
- How to make a finger puppet