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Strengthening the Online Education Ecosystem in India

ABSTRACT

The COVID-19 pandemic has disrupted the formal schooling system in India, as it has across the globe, causing massive pressure on the online education sector. This paper analyses the state of digitalised education in India. It outlines current government guidelines on digital-mode schooling, and uses the case of Maharashtra's five-year-old efforts at digitalising government schools to gauge preparedness for implementing the guidelines. It highlights systemic weaknesses in educators' pedagogical capacities, critiques the assumption that the availability of digital tools is sufficient to cater to the requirements of online education, and calls for the creation of policies on online education that are context-specific.

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INTRODUCTION

The COVID-19 pandemic has given online education in India an unexpected push, as it has allowed the continuation of formal education as schools closed to mitigate the spread of the virus. As India went into lockdown at the end of March 2020, most schools were wrapping up the 2019-20 academic year. By May, amidst the upsurge in COVID-19 cases across the country, it no longer became possible to resume in-school classroom sessions for the new academic year. Well-endowed private schools were quick to reinforce their digital capacities and prepare to conduct classes online. State governments were spurred to follow this example in schools operated and aided by them, but this was no easy task as about 78 percent of all primary and secondary schools in India are either run or aided by the government.[1] The enforcement of such an approach in India's already stratified education sector disrupted the general normative patterns of schooling. Although provisions were made in government schools to conduct classes online, existing faultlines—"between rural and urban, male and female, rich and poor"—were ignored.[2]

In April, the Ministry of Human Resource Development (MHRD) presented the Alternative Academic Calendar for Students (AAC)[3] guidelines on continuing formal school education in online mode in the 2020-21 academic year. The AACs are a set of four documents—one each for primary, upper primary, secondary, and higher secondary schooling—that outline measures for educators to ensure continuity in curriculum learning from the safety of students' homes. This paper focuses on the AAC guidelines for primary and upper primary education. Individual State Councils of Educational Research and Training and their Directorates of

Education were expected to take the lead in implementing the AAC and were tasked to provide support to teachers using mobile phones and other technological tools, and access to social media. The AAC documents provide specific procedures for conducting "four weeks of classes, which may be extended further"[4] across all school years and suggest a blend of online and offline daily school activities. Analysing the steps laid out in the AAC is crucial to understand its implementation within socioeconomically-diverse India. It is essential to understand the reality of access to digital tools at the household level across the country to know the AAC's operational matrix. Only 10.7 percent of Indian households have computers (desktops, laptops and tablets but excluding smartphones) and 23.8 percent of households have internet facilities, including unlimited broadband connections and limited mobile data connectivity.[5]

Over the last decade, India's internet user base has grown exponentially to become the world's second-largest due to the availability of affordable mobile phones, the expansion of 3G and 4G coverage, and people's reliance on digital transactions.[6] India's digital telecommunications landscape is dominated by private players, with the arrival of Reliance Jio in 2016 resulting in the scaling up of digitalisation measures across the economy.[7] At the same time, there has been a drastic reduction in the market share of the government-owned Bharat Sanchar Nigam Limited (BSNL).[8] Can private firms fulfil the BSNL's commitment to provide telecommunications services in the country's hinterlands? The ability and willingness to do this will have a direct impact on realising the goal of online education for all.

Internet in India[9]

As of November 2019:

- 54 percent of the urban population of 12+ years and 32 percent of the same in the rural areas had internet access
- 77 percent of urban and 61 percent of rural internet users aged 12 and above used it every day, while 7 percent of urban and 13 percent of rural users used it less than once a week
- 99 percent of both urban and rural internet users aged 12 yrs. and above used mobile phones to access the internet
- 433 million people aged 12 yrs. and above, and 71 million people aged 5-11 yrs. were active internet users in India

Mobile penetration in India

- 502.2 million people in India had smartphones as of December 2019[10]
- The number of smartphone users is expected to be 859 million and 504 million, respectively by 2022[11]

The AAC requires (and assumes) a certain level of preparedness from the various stakeholders of school education for online teaching-learning, including equipment-readiness and the necessary skill sets needed for digitalised education.

Although the AAC accounts for users of ordinary mobile phones, it acknowledges that not all students may have smartphones. It calls on teachers, parents and students to overcome this constraint

by finding alternatives. The AAC assumes that Indian states already have established digital ecosystems where all teachers and students have easy and seamless access to the internet and smartphones. But are the states, especially in India's underserved rural regions, ready and capable of handling the expectations of online education arising from the AAC guidelines?

Before the COVID-19 pandemic, India had already been making slow forays into digitalised education. The percentage of primary schools with functional computers grew from 10.7 percent in 2005-06 to 26 percent in 2015-16.[12] But technology and its use for schooling is only one aspect. Excessive focus on the equipment and processes of content delivery has resulted in a mechanistic understanding of digitalised education, which diverts attention from the pedagogical principles involved.

Given the extraordinary circumstances caused by the COVID-19 pandemic, the MHRD's Central Institute of Educational Technology recommended that teachers use apps like DIKSHA, NISHTHA and ePathshala, which aim to provide training opportunities to educators. Teachers were also encouraged to form peer groups on WhatsApp to exchange information and knowledge. During the nationwide lockdown, the Maharashtra government undertook various online initiatives targeting the educator community, including organising webinars on non-teaching subjects with renowned personalities from the education and other sectors.[13] But such initiatives did little to improve the pedagogical skills of teachers to use digital tools in the new academic year.

This paper offers insights on the implementation of the AAC in rural areas by exploring Maharashtra's efforts to digitalise

rural government schools, initiated in 2015 under the *Pragata Śaikshanika Maharashtra* programme (Educationally Progressive Maharashtra).[14] Over 64,978 primary schools (rural and urban), from Class I to VIII, were designated as 'digital' in 2018-19.[15] The paper uses Maharashtra's experience in digitalising schools as a proxy to analyse the practicalities of online education envisioned in the AAC. State government resolutions (GRs) and circulars on the establishment of digital schools have been analysed, which clarify Maharashtra's vision and objectives. Experienced teachers from rural government schools have also been interviewed. The GRs claim that digitalising schools have had a positive impact on education in the state, and that government schools have become 'digital' and the teachers, 'tech-savvy'. In a way, this implies that educators in Maharashtra government schools can effectively manage online teaching and that the state's educational ecosystem is well-prepared to implement the AAC directives. But Maharashtra's digital school initiative lacks a coherent framework to measure learning outcomes because of the digitalisation efforts.

Only about 20 percent of students in rural Maharashtra have access to smartphones.[16] This figure will likely plummet after accounting for erratic electricity supply and intermittent internet connectivity in these areas. Power outages are common in rural regions and are more frequent in the rainy season from June to September. The start of the academic term (mid-June) is crucial to the rollout of online education in the state, and could be considered a pilot to understand the challenges of implementing online learning in rural areas.

The interviews with rural educators were conducted in June 2020, before the implementation of the AAC guidelines at the start

of the 2020-21 academic year. Thus, the challenges and impacts of implementing the guidelines could not be observed empirically for this paper. The MHRD may also introduce additional policy measures in the current academic year, depending on changes in the pandemic situation. At the time of writing, the AAC remains the only policy measure for online education to mitigate the impact of school closures during COVID-19.

CASE STUDY: RURAL MAHARASHTRA DIGITAL GOVERNMENT SCHOOLS

Reviewing Maharashtra's experience in digitalising rural government schools provides insights on the implementability of the AAC in rural schools across the country. A review of GRs and circulars provided an understanding of the state government's vision, objectives and plans to recognise schools as 'digital'. Interviews with teachers and domain experts helped verify findings from the documents.

Maharashtra GRs are public documents that provide information on policy measures and directives.[17] Nine GRs and circulars have been analysed (see Table 1).

Table 1: Government Resolutions and Circulars Analysed*

Type of Document	Identification (Romanised)	Date Issued	Title (English translation)	Issuing Authority
GR	Government Resolution No.: *śaiguvi* 2015/ (80/15)S.D.6	22 June 2015	Implementation of Educationally Progressive Maharashtra (*Pragata Śaikshanika Maharashtra*) programme from 2015-16	School Education and Sports Department
GR	Government Resolution No.: *śaiguvi* 2016/ (5/2016)/SD-6	23 March 2016	Social Acceptance for Money and Other Resource Donations by Society	School Education and Sports Department
GR	Government Resolution No.: *śaiguvā*-2016/ *prakra*.(181/16)/ SD-6	06 December 2016	Use of e-content available on website	School Education and Sports Department
GR	Government Resolution No.: *sankīrna* 2016/ *pra.kra*.202/ SD.-6	09 January 2017	Rapid Educationally Progressive Maharashtra (*Jalada Pragata Śaikshanika Maharashtra*)	School Education and Sports Department
GR	Government Resolution No.: CSR-4316/ (79/2016)/ *praśikshata*	19 April 2017	Regarding digitalisation of schools in the state with the co-operation of Rotary South Asian Society (RSAS)	School Education and Sports Department

Type of Document	Identification (Romanised)	Date Issued	Title (English translation)	Issuing Authority
GR	Government Resolution No.: *sankīrna*-2020/ *pra.kra*.86/SD-6	15 June 2020	Guidelines for phased start of schools/ education in the state after relaxation of Corona lockdown	School Education and Sports Department
Circular		01 January 2016	Regarding attendance of expert tech-savvy guides at the state level workshop for tech-savvy teachers	Maharashtra State Council of Educational Research and Training
Circular	*viprā*/I T/1105/2017-18	25 March 2017	Releasing the relevant individuals from work for the workshop on creation of e-material for MITRA app	Maharashtra State Council of Educational Research and Training
Circular	*viprā*/ *ingrajī*/3140/ 2016-17	04 September 2017	Regarding the noteworthy work of schools	Maharashtra State Council of Educational Research and Training

**Contents of these documents, including their official identification details, are only available in the Devanagari script used for Marathi. The identification details have been presented in the Romanised transliterated form and the title of the documents are translated in English.*

The nine documents and the interviews with key informants, all helped establish a grounded picture of digital schools in Maharashtra.[18] The interviewees were selected via a combination of opportunistic and typical case sampling,[19] and comprised those who have handled multiple profiles in rural government schools and have sufficient experience to share insights about the digital school initiative and its impact. Education department officials were tough to reach during the nationwide lockdown, as were school children, who were geographically dispersed in small villages and had little to no access to internet-enabled devices for a virtual interview. The restriction on movements during the lockdown compelled the selection of a limited sample size to be interviewed virtually. The interviews were conducted in June, and so the respondents' experiences of implementing the AAC guidelines at the start of the new academic year is beyond the scope of this paper.

All educator participants are in-service teachers from rural government schools, while the only non-state participant is a pedagogy expert who has designed and conducted online courses for the Maharashtra State Council for Education Research and Training (see Table 2).

The interviews were semi-structured and conducted in Marathi, the language for teaching-learning in state schools and used by the respondents for all official communication. The interviewees were asked questions about their views on and experience with various aspects of Maharashtra's digital school drive, its implementation and operational elements within the schools (see Appendix 1).

Table 2: Details of Interviewees

Designation* (gender)	Type of school	Teaching experience (years)	Subjects currently teaching	Class currently teaching
Teacher 1 (F)	Tribal Development Department	9	All subjects	6
Teacher 2 (M)	Zilla Parishad	17	All subjects	1-4
Teacher 3 (M)	Zilla Parishad	14	All subjects	1-5
Teacher 4 (M)	Zilla Parishad	15	All subjects	1-4
Headmaster (M)	Zilla Parishad	19	Marathi, Hindi, English	6-8
Director of a non-state educational organisation	25 years of experience as an educator, including working with government schools in rural Maharashtra.			

**Only the primary roles of the participants are listed, but three have engaged in additional roles concerning digital schooling (at the Regional Academic Authority and District Institute of Education and Training, or as a trainer for ICT education).*

Theoretical framework

Analysing prevalent global efforts to develop a framework to measure the digitalisation of education and contextualising this framework for Maharashtra will help illustrate the state's drive to digitalise government schools. The evaluative metrics for digital transformation are discussed below.

Developing measurement metrics

A robust strategy is needed to assess the levels of digitalisation in school education, but the existing metrics and tools to measure levels of digitalisation in a wide range of domains, including education,[20] suffer from several inadequacies. For instance, the metrics are only moderately standardised in terms of the

definitions and calculations they employ, thereby requiring further work on their benchmarking.[21] Therefore, an alternative strategy is needed to identify the key indicators of digitalisation of education to develop an evaluative framework. For this purpose, the integration of information and communication technology (ICT) in education is a useful measure. ICT is one of the subjects taught in schools in India. In principle, ICT in education incorporates a variety of digital technologies and is an umbrella concept that covers a range of school-based activities. The relevance of this to digitalisation can be understood by exploring the definition of digitalisation: Digitalisation is the use of digital technologies and data as well as interconnection that results in new or changes to existing activities.[22] Therefore, indicators for the integration of ICT in education are a suitable measure of the level of digitalisation of education.

In 2019, the European Commission initiated a survey of schools on their integration of ICT, which had two objectives—to benchmark progress in ICT in European schools, and to develop a model for a highly equipped and connected classroom.[23] The survey identified several key indicators or parameters for each objective:

- For benchmarking progress in ICT in European schools
    - Access to and use of digital technologies
    - Digital activities and confidence of teachers and students in their digital competence
    - ICT related teacher professional development

- Digital home environment of students
- Schools' digital policies, strategies and opinions

- For the development of a model for a highly equipped and connected classroom
  - Digital technology equipment
  - Network requirements
  - Professional development of teachers
  - Access to digital content

These indicators are also found in other studies. In a report on initiatives to standardise the indicators for ICT in education, the UNESCO Institute for Statistics identified the following indicators as "internationally comparable":[24]

- Political commitment
- Public-private partnership (ratio of non-governmental to government sources of current expenditure for ICT in education)
- Curriculum
- Infrastructure
- Teaching staff development

- Usage (proportion of learners having access to computers and the internet at schools)

- Participation, skills and output (gender-based data for educational enrolment in ICT-related fields, the learners-to-teacher ratio for using ICT)

- Outcomes and impact

- Equity (proportion of schools in rural areas using ICT, the female-to-male ratio among graduates in ICT-related fields)

Additionally, a UNESCO working paper on education policy also provides a model for establishing ICT indicators in education.[25] The model proposes 'pedagogical practice' as one of the analytical layers to evaluate the integration of ICT in education. The evaluative dimensions of this layer are:

- Infrastructure and digital resources

- Curriculum

- Use (experience and frequency of using ICT, its incorporation in assessment)

- Beliefs (attitudes towards ICT, motivations for using ICT, expectations regarding ICT)

- Training and competences

Developing a contextualised framework

The existing and proposed ICT indicators have highlighted the various aspects that must be incorporated into a framework to measure the level of digitalisation of education. However, the framework must be contextualised to any given study to recognise the advantages and constraints contingent on the methodology. Given that this study is primarily based on the analysis of government documents (GRs and circulars), the following dimensions have been established to assess the digitalisation of education in Maharashtra:

- Digital equipment: Indicators for access to and use of digital technologies,[26] digital technology equipment,[27] infrastructure and digital resources.[28]

- Tech-savvy teachers: Indicators for teacher competence, and the professional development and training of teachers.[29]

- Digital content: Indicators for curriculum[30] and digital content.[31]

- Funding: Indicator for infrastructure[32] and public-private partnership.[33]

Findings and analysis

The findings and analysis from the GRs, circulars and interviews are framed based on the four dimensions:

1. Digital Equipment

The analysis of two GRs (Table 1: items 1, 4) suggests that providing digital equipment is considered paramount in determining

a digital school. But what constitutes 'appropriate' digital equipment is loosely defined in the GRs. Additionally, the range of equipment mentioned in the GRs raises several ambiguities and inconsistencies. The list of equipment includes but is not limited to computers, television screens of a minimum size of 32 inches, LCD projectors, Android computer stick, screen-mirroring dongles, tablets and teachers' phones.[34] Since the list of specified equipment is vast, it does not allow for consistency in the equipment required across digital schools.

The interviewees suggested that even if one classroom has any of the specified equipment, it is sufficient for the entire school to be termed as digital. Further, the number of students who will use each digital equipment is not taken into consideration. One of the interviewees acknowledged that in many instances, the school's sole digital gadget (often an LCD projector) was not in working condition. Further, teachers were barred by school authorities from using some equipment over fears of it getting spoiled and inability to repair it due to a lack of funds. The teacher respondents also lamented about the absence of a dedicated budget to pay for the school's monthly electricity bills (schools in Maharashtra are charged commercial tariffs), which discourages school authorities from using power-intensive equipment like an LCD projector. The respondents also mentioned how frequent power cuts and limited internet connectivity (despite the government's claim of all schools being Wi-Fi enabled under the Digital India mission[35]) hampers the regular use of digital equipment for online activities, even if the school has the necessary equipment in working condition.

Making digital equipment the key factor in declaring a school as digital raises concerns over its perceived correlation with the

quality of education. Having digital equipment as a significant marker of digitalisation has enabled the Maharashtra government to rapidly increase the number of digital schools, from 27,686 in 2016-17 to 63,458 in 2017-18 and 64,978 in 2018-19.[36] But these numbers present a misleading picture as the digitalisation of schools (on the digital equipment parameter) is flawed.

2. Tech-savvy Teachers

Three GRs and circulars (Table 1: items 1, 4, 7) suggest tech-savvy teachers as a key prerequisite for the 'digital preparedness' of schools,[37] indicating that the state government must invest in training educators for digital schools. The GRs and circulars do not identify any explicit method to qualify or certify teachers as tech-savvy, and instead implicitly suggests self-certification as the ideal route.[38] One GR (Table 1: item 4) claimed that 47,142 of the state's 7.25 lakh teachers had declared themselves 'tech-savvy', and directs such self-certified teachers to train other teachers to qualify as tech-savvy.[39] One circular (Table 1: item 7) provides details of state-level training programmes organised (in January 2016) to train teachers who had already declared themselves as tech-savvy,[40] while another circular (Table 1: item 8) provides details on a training camp for tech-savvy teachers to develop content for the MITRA app (Maharashtra In-Service Teacher Recourse app).[41]

The teachers interviewed said that the state government has not been clear on what is expected from them in 'tech-savviness'. This was also reflected in the government-run trainings, which lacked a cogent and systemic capacity-building framework. One respondent discussed facing issues of connectivity while participating in online activities during a training camp, while others mentioned the

pressures of training colleagues to increase the number of tech-savvy teachers. Several respondents also provided examples of self-motivated teachers who have built their digital skillsets without any training from the state.

The state should not construe training programmes as the only effort needed to prepare teachers to become tech-savvy for digital schooling. More studies are required to understand how teachers who participated in training programmes transferred their learnings in digital schools. Responses from the interviewees suggest that, in many instances, teachers misconstrue digitalisation as the audio-visual representation of textbook content. This kind of content, widely shared among the teacher community on social media platforms, is a narrow use of the vast capabilities of the digital media. Without due pedagogical evaluation, the effectiveness of such content will remain highly limited as an aid to students' learning.

The Maharashtra government's efforts appear to be a tick-the-box approach when it comes to developing the tech-savviness of teachers. In the absence of a clear framework on what qualifies as tech-savviness, the current number of self-certified tech-savvy teachers are merely a token. There is also an underlying assumption that having access to digital classrooms is qualification enough for a teacher to be tech-savvy. One GR (Table 1: item 4) makes misplaced and hyperbolic claims that the mobile-era has, by default, made every teacher tech-savvy (translated below).[42]

Every teacher is tech-savvy, if analysed differently. This is because mobile handset's contemporary technology is significantly superior to the supercomputer developed for the lunar landing in 1969. If the

components used in the contemporary mobile handsets were used that time (1969) it would have cost Rs. 7 crores. Everybody needs to agree that the modern mobile handset, though cheap and easy to use, is a supercomputer. Therefore, every teacher should accept that they can use a computer. Teachers need to remove the notion from their minds that they are not techno-savvy. This understanding should be shared through all the tech-savvy teachers in the state. This process should be completed by March 2017.

Finally, whether the teachers' tech-savviness enhanced their perspective towards effective pedagogy in digital classrooms will need further exploration.

3. Digital Content

The GR on the implementation of the *Pragata Śaikshanika Maharashtra* (Educationally Progressive Maharashtra) programme (Table 1: item 1) recommends that teachers use the e-knowhow generated by reputable non-state educational organisations and provides a list of organisations with public e-resources.[a, 43] More web links and e-resources are aggregated on the Maharashtra State Council of Educational Research and Training website.[44] Another GR (Table 1: item 3) asked teachers to use another mobile app, EkStep Genie, to access textbook-based digital content created with the help of tech-savvy teachers.[45] This GR states that the app automatically surveys the use of this content by teachers,[46] but provides no explanation on the purpose of this review and its benefits to teachers. It is not clear how such a survey supports content curation, and its impact on broader digital education remains unclear.

a The list of organisations includes Khan Academy, Centre for Equity and Quality in Universal Education, Navnirmiti Learning Foundation, Quest and Rayat Shikshan Sanstha.

Conversations with the respondents suggested that teachers need to be discerning in effectively using e-resources for classroom interactions, but none of the teachers interviewed were confident about this. A respondent involved in teacher training programmes discussed the issue using the example of e-resources for teaching mathematical fractions in primary classes. Teachers often misconstrue that merely watching videos of fractions being taught will enhance their understanding. That they also need real-time and prompt feedback on queries while watching the videos is often overlooked. The respondents also discussed the MHRD's MITRA app, the audio-visual content of which is intended to align with the textbook content.[47] The Maharashtra education department also encouraged teachers to use the MHRD's DIKSHA app during the lockdown,[48] and has been urging teachers to proactively create and upload content on the app for the benefit of the wider educator community since its launch in September 2017.

Critically assessing the content of government and private apps such as MITRA, DIKSHA and EkStep Genie is beyond the scope of this paper. Educational content creation requires specialised knowledge that is acquired through the synthesis of knowledge of curriculum, knowledge of subject matter and knowledge of the learners' context. However, interactions with the respondents suggest that the content they access on various apps may have an underlying deficiency in such specialised knowledge. Furthermore, the tendency to push teachers to adopt technology has resulted in a deluge of teacher-created but un-curated material being shared through social media platforms and apps. This further confounds teachers from identifying content that is appropriate for their students and contexts.

The GRs appear to suggest that merely providing a list of audio-visual content to teachers will result in enhancing their classroom teaching capabilities.[49] However, dialogic interaction with children cannot be replaced by voluminous content, no matter how audio-visually striking it may be. Even in online education, such content will only have a supplementary role to play. This awareness appears to be missing in the government's approach to both content curation and teacher training.

4. Funding

The GR related to funding (Table 1: item 2) encourages a reliance on community participation and private donations to equip digital schools with resources.[50] This circumvents the need for the state to have a dedicated budgetary provision for digital schools. The GR uses anecdotal information, drawing testimonials of gratitude from beneficiaries,[51] and appears to be specifically deployed to project the transformative impact of community participation in strengthening digital schools. The interviewees criticised this approach by explaining how it results in a disarrayed digital spread since donations by non-state actors varies depending on their generosity.

Such a funding strategy should be understood in the context of the state's urgency to make schools digital. Monetary contributions by local communities, members of the public, charitable organisations and corporate entities form a part of the community participation emphasised by the state. However, such contributions cannot be equal nor equitable across the state. This non-uniformity compounds the actual problem of the digital divide. Furthermore, the onus to generate funds falls on schools. This responsibility

ultimately comes to rest on the shoulders of teachers, adding to their already overloaded non-academic duties. Such an approach also creates the possibility of non-state funders wielding influence on decision-making matters under the purview of local school authorities. This is undesirable as external funding agencies may utilise the schools to further their self-interests (for instance, promoting a particular brand of digital equipment or e-learning software).

Key learnings

Understanding the Maharashtra government's efforts to digitalise schools has broader learnings for the discourse on online education. The state's efforts have led to schools receiving some digital equipment, trainings to enhance the digital skills of teachers, and community participation. On the other hand,

- The definition of a 'digital school' is vague and ignores nuances involved in preparing teachers and learners for digital education. Teachers from a digital school must learn to navigate through the maze of online material, pick grade-appropriate resources and successfully embed them in teaching practices. Students must be able to use digital technologies (including software platforms and devices) to teach particular virtues of self-learning. But this is far from the reality in Maharashtra.

- The government's tick-the-box approach is aimed at increasing the number of digital schools. It does not address crucial aspects such as having a well-oiled digital ecosystem at schools and the pedagogical preparation of teachers to handle the digital load. Addressing these matters will empower teachers to engage learners with digital platforms in a productive manner.

The COVID-19 pandemic has forced Maharashtra to think of online education as not only an aid to conventional schooling but as a significant component of formal education.[52] By relying on the quantitative data of digital schools, the state government may delude itself from the real needs of online education. Digital schools are far from having the preparedness that the COVID-19 situation demands, and there does not appear to be any clear pathway to create a digital education ecosystem over the long run.

Although the central and the state governments are aware of the inadequacies of the existing digital ecosystem, especially in rural areas, online education is still seen as a viable option. But as the Maharashtra case study illustrates, government schools are underprepared to support the digital schooling of children from rural areas. This makes the implementation of the AAC guidelines and the state's plans[53] for online education during COVID-19 a daunting task.

IMPLICATIONS FOR IMPLEMENTATION OF AAC GUIDELINES

Maharashtra's experience with digitalising schools provides three important lessons for the appraisal of the AAC guidelines and the challenges to implementing it in rural areas. First is the importance of a sound and comprehensive conceptualisation of the intended outcome of the AAC as a policy measure. The AAC needs to reflect clearly on why specific outcomes are desired over others, the constructive steps to achieve these outcomes and rationale behind these measures. Second, such a conceptualisation should inform the goal setting, which could be ambitious but mindful of possible realistic steps. The planned goals should also show an awareness of practical challenges. Thus, clearly defined realistic measures in

sync with ground realities are likely to bring the same clarity for the implementation of the AAC guidelines. Third, the tick-the-box approach, which typically leads to a perfunctory sprucing up of official statistics, needs to be shunned in favour of a well-defined metric for measurable learning outcomes from online education. This kind of an open approach will lead to the development of a holistic model for statistical data collection, which will be an accurate reflection of the reality of online education, even if it shows an unanticipated picture of progress in the short run.

Against this backdrop, the plan to implement the AAC guidelines for online education in rural areas seems implausible on several fronts, along with the inadequacy of digital devices (computers, tablets, smartphones or mobile phones) at the students' end. Through quotes from the AAC (primary) document,[54] four instances are highlighted to demonstrate the implausibility of its implementation. These corroborate the broad findings on the ill-defined goals, skewed policy measures and digital unpreparedness in the Maharashtra case study.

1. Currently, there are various technological tools and social media tools available for imparting education in fun-filled, interesting ways, which can be used by children to learn even while at home.[55]

Assuming that teachers and students have the necessary gadgets (either a desktop, laptop, tablet or smartphone) or at least a mobile phone to teach and learn from their homes is problematic. Although the mere possession of any digital gadget is not a given, there are also other issues, such as unreliable electricity and internet connectivity, that hamper the use of such devices.

More importantly, for any kind of 'study at home' initiative to be effective, children must possess the skills and motivation for self-learning. Research suggests that these need to be developed, and cannot be relied upon presumptuously.[56]

2. *Fortunately, almost everyone owns a mobile…the solution is that students may be guided through SMS on mobile phones or mobile call; for very young students, this can be done with the help of their parents.*[57]

For those students with no access to a desktop, laptop, tablet or smartphone, the AAC suggests a regular mobile phone be used. Teachers are supposed to guide by calling or sending SMSs to these students. But this could only work if teachers and students have the time and energy to engage in such a tedious exercise. It also presumes that parents and students have the capability and resources to follow and act as per the teacher's guidance. These measures may not be viable over a long period, which requires multiple such engagements between teachers and students.

3. *The purpose of mapping of themes with learning outcomes is to facilitate teachers/parents to assess the progress in students' learning…the elder sibling can guide the younger one…*[58]

The AAC document does not explain the assessment metric for online learning. The assessment of students' learning is a technical and pedagogical process. Expecting parents or older siblings to get involved in it is a short-sighted measure. These expectations also raise the questions of time availability and capacities to provide academic support at home.

4. In case tools such as WhatsApp, Google Hangout etc. are being used, teachers may do audio and video calling with a group of students and discuss with them in small groups, or all of them together. Teachers may also guide students for peer learning or group learning through these tools.[59]

Using social media to connect with students can only work if students have a smartphone and a reliable, high-speed internet connection. This will create an unfair distinction in students' learning experiences based on their access to certain types of technological tools. Moreover, the suggestion to establish peer learning groups also encounters the problem of access and subsequent inequity in the student's learning experience.

CONCLUSION AND RECOMMENDATIONS

The AAC expects teachers to actively engage a student's family members to provide support in learning and assessment processes. A teacher is expected to be involved in a range of tasks, from conducting classes to forming WhatsApp groups and equipping family members to evaluate the student's progress. Very few of these tasks are practical for a rural teacher, even in normal circumstances.

As Maharashtra's experience in digitalising schools has shown, loosely conceptualised objectives obfuscate the reality while implementing programmatic activities and does not translate into meaningful learning outcomes. In the absence of a supportive ecosystem, such goals are likely to be perceived as unattainable by teachers, resulting in a sense of paralysis setting in and allowing only for lethargic incremental progress, if any. In a similar vein, the measures stipulated in the AAC guidelines are devoid of contextual

realities and lack inclusivity to consider India's heterogeneous education system. Consequently, despite the presumably good intentions, the AAC guidelines in totality appear implausible for online education in rural areas.

The findings from the Maharashtra case study, along with the analysis of the AAC documents point to the conceptual gaps in the current framework of online education. By plugging these gaps, the policymakers can build a sustainable, dynamic and meaningful ecosystem of online education for all. Identifying values of online education is a key prerequisite of this process. The following recommendations illustrate how these values could be determined and realised in practice.

Identifying the value of digitalisation of education

This will impart clarity to policies in terms of their purpose and goals, help in creating appropriate benchmarks, and offer more precise roadmaps for the effective implementation of such policies. Specific and structured recommendations for the four dimensions to assess the digitalisation of education are as follows:

Digital equipment

- The focus should be on clear definitions and setting up detailed parameters regarding the quantity and quality of digital equipment and the requirement based on the number of students per class. Addressing these matters will ensure the consistent and equitable distribution of digital equipment across schools.

- Similar standards must be developed regarding the regular use and maintenance of digital equipment, including a provision for

its cost. This will encourage and support the sustained use of the equipment.

- The standards for using the equipment must accommodate for teachers' autonomy regarding utilising the equipment to suit their contexts. This will provide a space to foster teachers' agency.

Tech-savvy teachers

- The process to be accredited as a 'tech-savvy' teacher must be clearly defined. The norms must promote the pedagogically-sound use of technology in addition to the development of skills to handle hardware.

- Systematic training should be provided to all teachers to gain the 'tech-savvy' accreditation. The training programme must be compatible with the norms for accreditation. This will ensure consistency in knowledge and skills among accredited teachers, which will in turn help achieve parity in students' access to digitally skilled teachers.

- Teachers' professional development in technology must be supported with periodic mentoring by more experienced teachers or others with expertise in digitalised education. Such mentoring will provide teachers with contextualised support, which they may not get in more generic training programmes. This will contribute to teachers' dynamic engagement with digitalisation.

Digital content

- The government should play the role of a content curator-facilitator with the support of experts and researchers in each subject. Curated digital content should be subject-specific, contextualised, and age- and grade-appropriate, and should be made available to teachers on the state's portals and social media platforms. This will ensure that teachers, and their students, have access to quality content.

- Teachers should be apprised of their rights and obligations regarding copyright laws and plagiarism while sharing content on mobile apps and social media platforms. This will help them in understanding the ethically and legally responsible ways to share knowledge.

- Professional development programmes for teachers, including pre-service and in-service teacher education, should be provided with accessible resources and support to develop judgment for discerning pedagogically appropriate content. Teachers should also be encouraged to develop their own content. This will support and promote the development of teachers' agency and professional identity.

Funding

- The central and state governments should mandate a steady source of funds through budgetary provisions for the equitable spread of digitalisation in schools, which will go a long way in bridging the digital divide. Budgetary provisions will also reduce the workload of teachers and remove from their manifold burdens the responsibility of looking for funding sources.

- Advocacy of alternative funding sources needs to be complemented with the establishment of systemic measures to ensure and monitor transparency in local school governance.

Developing an appropriate measurement metric

A potentially effective strategy might be to devise levels or degrees of digitalisation of education along each of the four dimensions (digital equipment, tech-savvy teachers, digital content and funding). This is beneficial in the following ways:

- A metric incorporating some stratification of digitalisation for each of the four dimensions will be more suitable to address the nuances of digital education. This will help in avoiding the binary view on digitalisation that recognises a school as either digital or not digital. Also, the corresponding data generation will be richer, thereby aiding the concerned authorities in building a more authentic picture of the status of the digitalisation of education.

- The identification of levels of digitalisation is intended to promote the development of standards for the various dimensions of digitalisation, which are more detailed, better structured, clearer in scope and better suited for benchmarking. Consequently, these standards will be more efficient and productive in terms of their implementation.

- The levels of digitalisation should aim to identify the existing strengths along each dimension, indicate how these strengths can be augmented and utilised, and point to areas for improvement. This will require establishing a sustainable and effective 'monitoring + mentoring' mechanism for the digitalisation of education.

- Designing levels of digitalisation should aim to strike a balance between two imperatives—first, establishing stringent benchmarks and goals for the relevant stakeholders; and second, accounting for the disparity among schools in their access to digital resources, and the diverse sociocultural, economic and geographic contexts in which they operate. This process of balancing must be dynamic and continuous for digitalisation to respond to the evolving and multiple needs of school education, especially during crises like COVID-19.

A broader perspective to digitalisation of education

While identifying the values for creating the conceptual framework of online education, it is crucial to ask: Who gets to participate in the discussion on digitalisation and who gets to benefit from digitalisation?

These questions relate to democratic values. The purpose of education, whether digital or conventional, should be identified with the realisation of the democratic values of fairness, liberty, equality and fraternity. This necessitates inclusive education, which implies the active participation of various stakeholders, such as students, teachers, parents and school authorities, in making decisions on issues that concern them. This also means ensuring that the needs of the marginalised and disadvantaged are considered in decision-making. The digitalisation of education is a potent opportunity to democratise education in India. Rather than treating digitalisation as an instrument to achieve inclusive education, inclusiveness should be incorporated in digitalised education.ORF

APPENDIX 1

Semi-structured interview questions (English translation of the original Marathi questions)

1. When did your school become digital? When did you declare it as a digital school?

2. Are there any guidelines/recommendations from the government for using digital tech in schools? Do you use digital tech in accordance with them? Please elaborate.

3. Do you think it is appropriate to call your school digital? Why or why not?

4. In your opinion, what is the purpose of promoting digital technology in education?

5. Have you or other teachers in your school attended any course/ programme on using digital tech as part of in-service teacher training? Who conducted it? What was your experience? What was the duration of the course?

6. What devices/technology do you use in your lessons? What do you use it for? (Prompts – more use of mobile phone, by students, increased reliance on digital devices, use of animation etc.)

7. How has it changed (both positively and negatively) your teaching/lessons? How has it changed (both positively and negatively) children's learning?

8. What challenges do you face in using digital tech? (technical, practical, affective – self-beliefs about using technology)

9. What challenges do your students face in using digital tech? (technical, practical, affective – self-beliefs about using technology)

10. What kind of *continued* support is available to teachers (in relation to digital education) if they need it? Do you think there is enough support available? Please elaborate.

11. In your opinion, how useful was digital technology during the COVID-19 pandemic for you and your students? Please explain.

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