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Bridging the Digital Divide in Online Learning in Maharashtra, India: Learnings from the Pandemic

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Abstract

Online learning mushroomed by replacing classroom teaching during the pandemic. While private schools in the metros in India shifted to online learning, synchronous learning was not an option for most students in rural areas, where smart devices and stable internet connections are sparsely available. A large-scale survey was thus conducted across stakeholders of government and low-income private primary schools, to understand the status of online learning in the state of Maharashtra, India. Interviews conducted with 1,254 students, 1,260 parents, 409 teachers, and other officials of the education department showed that only 5% of households had a desktop/laptop/tablet. The percentage of households with a television set was much higher (54%), but a smartphone was the most widely available device, with 94% of households owning at least one. Observation of 609 online sessions revealed that 73% of classes were being conducted asynchronously, of which 98% utilized WhatsApp. The platform was also favoured by teachers and officials for sharing learning materials, assigning homework, monitoring the implementation of online learning, and discussing good practices. The study highlights the digital divide in online learning in the state but also throws light on how existing technology was leveraged to ensure that the learning continued. The study has implications for the effective utilization of available infrastructure for online learning in the context of the existing digital divide, even post the pandemic.

Keywords: Distance learning; pandemic; primary education; technology; WhatsApp

1. Introduction

Educational institutions all over the world had to be shut down to avoid the spread of the COVID-19 pandemic. Online learning, which was either considered a luxurious option or a complementary methodology, emerged as an almost mandatory solution to ensure the continuation of education, fostering the bonding between teachers and students and providing a sense of hope and support until students could resume regular life on campus (Akour et al., 2021). Schools were required to choose from the available options, namely - distance education, e-learning, correspondence education, external studies, and massive open online courses (MOOCs). A report by the World Bank (2020) revealed that several countries had introduced different learning systems as a response to the physical closure of schools due to COVID-19. For instance, China made use of an online learning system for conducting simultaneous online learning exercises, intending to provide uninterrupted education. In Bulgaria, an e-learning system was introduced by the Ministry of Education and Science, while in Finland, distance learning, digital learning environments, and solutions were utilized. Where necessary, independent learning too was used. Some other countries started creating e-content repositories. Schools in Indonesia initiated the School from Home (SFH) system, to ensure the safety of all stakeholders (Rasmitadila et al., 2020).

Normal life has resumed in most countries but the discussion about online learning will continue as education pedagogy across the globe prepares to undergo changes owing to technological developments. The pandemic allowed us to evaluate the current status and future preparedness of educational systems across countries. Experiences gained throughout this period can prove to be the foundation of education policy decisions, teaching strategies, and online learning programs in the near future.

1.1 Regional Challenges in Online Learning

Ensuring equity in online learning is among the 14 crucial elements identified by the International Society for Technology in Education (ISTE) for ensuring the effectiveness of using technology in education (Morgan, 2020). The experiments with large-scale implementation of online learning in the previous year, unfortunately, have highlighted the existing regional disparities. Developed countries with the necessary infrastructure for implementing online learning experienced a rather smoother transition to online learning. In some lesser developed regions of the world, on the other hand, challenges faced by the educational system even in the pre-pandemic period were significantly widespread. In Ethiopia for example, a wide spatial disparity was identified in the distribution of educational facilities across the administrative zones (Ajala & Asres, 2008). A study by Moinipour (2020) on the availability and accessibility issues in Iran in the context of children's right to education, brought to light issues like poor Information and Communication Technology (ICT) infrastructure, unaffordability of education for a large section of the society, unethical practices in teacher recruitment and so on. A peek into the status of education-related

facilities available in developing and underdeveloped countries highlight the concerns related to the successful implementation and execution of online learning.

In the Indian context, several policies and programs to improve the digital infrastructure of the country have been declared and efforts to increase the reach of internet facilities are underway. A report jointly released by the Indian Cellular and Electronics Association and KPMG, suggests that rural India witnessed a 35% increase in internet users between 2017 and 2018. Smartphone penetration has also increased from a mere 9% in 2015 to 25% in 2018. The report projected that India will have 840 million smartphone users by 2022 (ET, 2020). The variety of geographical conditions, social inequalities, and economic disparity translates into a significant digital divide nonetheless. The sheer size of the population, too, poses further hurdles in the implementation process.

More than 143 million primary school students and more than 133 million secondary school students have been affected by school closures due to the pandemic (UNESCO, 2020). In the state of Maharashtra alone, the closure of nearly 0.1 million primary schools, impacted over 5 million students studying in these schools. The impact is expected to be the highest for girls, children with special needs, children from underprivileged families, and minority and marginalized communities (Azevedo et al., 2020). As per the circulars by the Department of School Education and Sports, Government of Maharashtra, it was to be ensured that the learning continues from home in online or offline mode, for which the schools would need to use the e-learning resources made available to them and make use of varied digital media. It would be crucial to focus on the experiences of the pandemic phase, in order to chalk out more effective plans for online education even in the post-pandemic period.

1.2 Challenges in Online Learning for Primary Education

Online learning for adult learners is well established with certain assumptions of adult psychology and their needs for learning. Existing educational theories have been extended to online learning for maximizing its effectiveness. The self-regulated learning theory, for instance, emphasizes the role of teachers as providers of necessary scaffolding to the learners when needed. The concept of collaborative control too can be applied to distance education, wherein online learning is not considered synonymous with independent learning, and suggestions for better collaboration are provided (Andrade, 2015). Both these educational theories assume the learner plays an active role in the learning process, is self-driven, and proactively seeks opportunities for improving the learning process. Such assumptions cannot however be made for younger learners, who require a more supportive environment. Discussions on applying educational theories for primary school students in the realm of online learning are yet to gain the necessary momentum.

Online education is a grey area concerning students in the primary stage of schooling, which are the formative years of a child's growth and development. There is a significant amount of literature on online learning effectiveness, but such attempts in the area of primary education have been sparse. The present study thus aimed to understand online learning in the context of primary education, by also incorporating the vital issue of availability and accessibility to digital infrastructure. Stakeholders from government and budget public schools were considered for the study, keeping their fairly similar socioeconomic status in mind. For the purpose of the study, availability was defined as the presence of devices and internet facilities. Accessibility on the other hand encapsulates the actual usability of devices and internet facilities by the students when needed and the knowledge level of the students and parents to use these facilities.

2. Literature Review

Online education emerged as a solution to ensure that learning continues even in the absence of regular face-to-face student-teacher interactions. The optimism associated with tech-based distance education however seems to reduce once the digital divide is taken into consideration. Gauging the expanse of this divide in the pre-pandemic phase and the early stages of the pandemic is crucial to understand what impact these conditions could have after the pandemic if online learning or blended learning is to be continued in some way or the other. A review of the general digital divide scenario of India is presented here, along with empirical data specifically available for the state of Maharashtra.

According to the 75th round of the National Sample Survey, only about 13% of people aged over five years in rural areas, have the ability to use the Internet, as against 37% of individuals in urban areas (Ranjan & Muraleedharan, 2020). In the state of Maharashtra, 52% of the urban population could use the Internet, whereas, in rural areas, this percentage was a mere 18.5. As far as the ability to use computer devices is concerned, these percentages were 27.4 and 3.3 for urban and rural areas respectively (Pandey, 2020). This digital gap widens further when other variables like gender and socio-economic status are taken into consideration. For instance, the Mobile Gender Gap Report 2020 reported that while 79% of men own a mobile phone in the country, the percentage of women owning a mobile phone is 63. Moreover, the gender gap among mobile internet users is even more - about 50% (GSMA, 2020).

The specific availability and accessibility concerns regarding students further add to our understanding of the effect of the digital divide on the actual reach of tech-based distance education. As far as rural public school students' access to smartphones is concerned, it was reported to be merely 20% (Deshpande, 2020). A study by the Azim Premji Foundation Research Group covering 1,522 public schools across 26 districts and five states explored the reach and effectiveness of tech-based distance education in some of the most geographically

disadvantaged regions of the country. The study revealed that on average, a staggering 60% of students could not attend online classes across the schools surveyed, due to reasons like the unavailability of smartphones or sharing of the same smartphone among siblings, or the inability to use educational apps well (Mukhopadhyay & Chomal, 2020). In a recent survey undertaken by the Maharashtra State Council of Education Research and Training (MSCERT) in collaboration with UNICEF, it has been found that only 50% of government school students in grades one to eight could access digital learning. Although 59.8% of them have access to smartphones, only 30% use the Diksha app — the national online platform for educational content — and other such online media. Of those who are not able to access online learning, 72.2% of parents do not have digital skills to access the home package devised by the state and 66.4% of families do not have access to smartphones. The availability of desktops and laptops among students is also negligible (0.8%). Overall, 50.5% of students have accessed online learning material. 34% of students each studied via digital learning material and TV, followed by online classes (26%) and radio (10%), it said. Only one device shared by the family, lack of digital skills on the part of the parents to access the material, issues regarding recharge of phone/internet facility, connectivity problems especially in remote areas, students getting distracted on devices (for example, playing games on cell phones), material not being available in their regional languages, were found to be barriers in accessing online education (Goradia, 2020).

With the aim of filling the gaps in the literature with reference to understanding the implementation, especially in primary education, and building a sound empirical foundation for recommending future steps in exploring online education for this cohort specifically keeping the digital divide in mind, the following research questions were formulated for the present study.

1. What devices and internet facilities are available to stakeholders in primary education across Maharashtra?
2. What is the status of the delivery of primary education through synchronous and asynchronous online learning, across Maharashtra?
3. What are the hurdles in accessibility to online learning for students in primary education across Maharashtra?
4. Which platform gets leverage over others for teaching, learning, monitoring of the implementation of online learning, and sharing good practices in online learning?

3. Method

3.1 Study Context

The study was conducted in the state of Maharashtra, which is the second-most populous state and area-wise the third-largest state in India. Data was collected during the pandemic-induced partial lockdown period from 26th October to 30th November 2020 and included stakeholders of government and low-income private primary schools. All necessary COVID-19-related guidelines were observed.

3.2 Participants

Stakeholders from 26 blocks across all the administrative divisions of the state were considered for the study to ensure a fairly representative sample. The quota sampling technique was used to collect data from these blocks after identifying schools where online learning methods had been adopted, which comprised 237 administrative locations. The final student sample comprised 1,254 students studying in second to fifth grade, of which 930 were studying in government schools and 324 in budget private schools. The rural-urban distribution was 829 and 425 respectively. Students studying in the first grade were excluded considering their lack of experience with regular offline schooling and their unsuitability of age for participating in an interview process. For the parent data, interviews with 1,260 parents were conducted. 409 teachers were interviewed, of which 323 were serving in government schools and 86 in budget private schools, with a rural-urban distribution of 313 and 96 respectively. The sample also consisted of 107 other officials of the education department. A total of 609 observations of ongoing learning sessions were conducted as well.

3.3 Instruments

In order to understand the experiences of all stakeholders, corresponding structured interview schedules were developed for parents, students, teachers, and officials of the education department. The tool development process took into consideration factors like the time constraints of the stakeholders, the comfort of the respondents, age and attention span of the students. Relevant demographic details like location (rural vs. urban), family income category, education level of the parents, etc. were collected as well. Additionally, two observation tools were developed for observing synchronous and asynchronous classes in progress. The pre-coded options were based on expert suggestions and also derived from recurrent themes that emerged in a pilot study that was conducted. Octopus, an app specifically developed for on-field research data collection was used for data entry of all tools for accurate and efficient collation of data in one central system. Data from parents and students were collected using structured interviews through home visits by the field

investigators. The observation of ongoing classes was to be completed during these home visits. Telephonic interviews with teachers and other officials of the education department were conducted.

3.4 Procedure

After receiving the approval letter for conducting the study from the Director of Maharashtra State Council of Education Research and Training (MSCERT), an orientation session was conducted for the field investigators who were recruited from the pool of experienced field investigators registered with the research organization. Following the orientation, a four-day training program was conducted in a workshop mode for the field investigators. The program included a walkthrough of all tools, question-answer sessions, supervised mock interview conductions in smaller groups, debriefs, and dummy data entry sessions on the Octopus app. The code of conduct, ethical considerations of the study and the relevant COVID-19 safety protocol to be adhered to during their household surveys were finally discussed in the training program.

All the requisite permissions were taken before commencing the data collection. Verbal informed consent was taken from all participants for recording their responses (in the case of students, verbal informed consent was taken from parents/guardians). The questions were designed in a manner that would not cause any discomfort to the participants. Interviews of students were conducted at their homes in the presence of at least one parent to ensure their comfort level when responding. Identifiable data collected for matching the student-parent-teacher triads was later anonymized to ensure the confidentiality of the participants.

3.5 Data Analysis

Data accumulated in the app was exported to Microsoft Excel sheets for further analysis. The data cleaning process focused on four types of errors, namely the selection of contradictory options within a question, the selection of conflicting options across two related questions, thereby leading to inconsistency, data entry errors in the demographics section, and any other system-generated errors. The errors present in each tool were subsequently identified and the best fitting treatment was done with such errors. Elimination of responses was used sparingly and in only those where rectification of errors was not possible. Considering the type of questions in each tool, and the type of responses, descriptive statistical analysis was deemed most appropriate and percentages were used to evaluate the research questions.

4 Results & Discussion

The findings of the study based on the data collected from the interviews and observations are presented and discussed in this section. The descriptive data obtained in terms of percentages were used to answer the research questions.

4.1 Availability of Devices and Internet Facilities

The first research question of the study aimed at identifying the availability of devices and internet facilities to stakeholders in government and budget primary schools across Maharashtra.

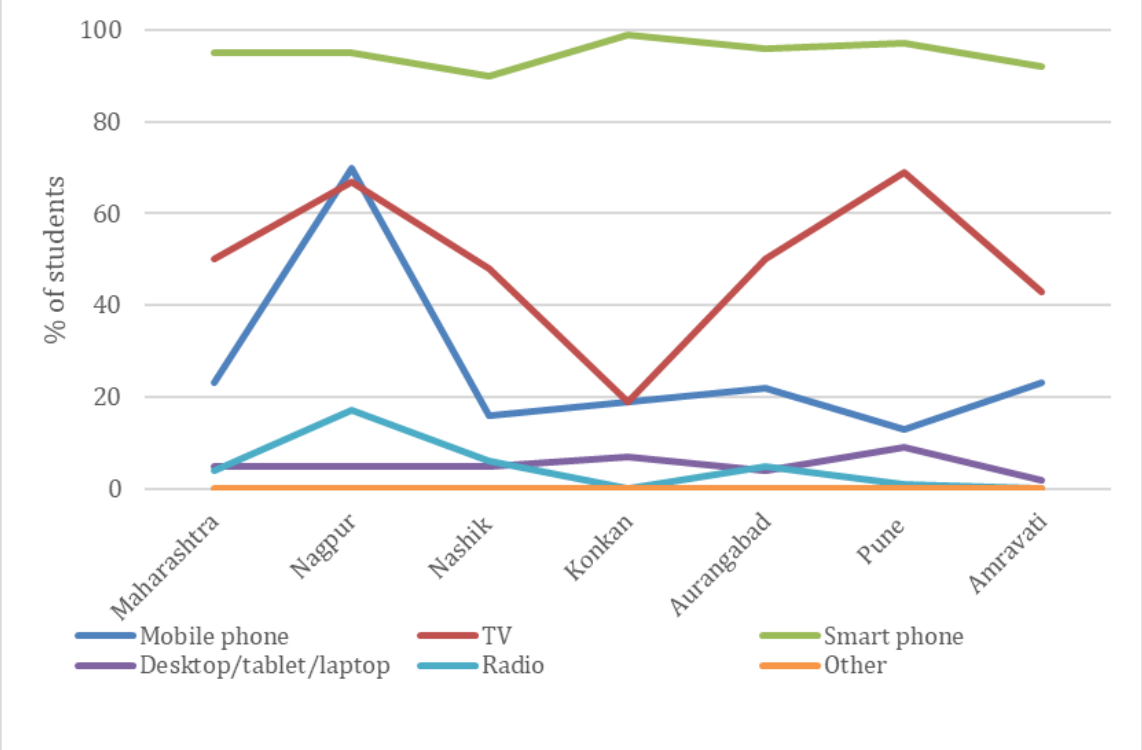

Figure 1: Availability of devices for online learning in the state and across regions

Note: The availability of devices for online learning is denoted in percentages based on responses received from the participants. The values mentioned for Maharashtra depict the overall availability of devices in the state and the consequent values depict the availability in each region of the state of Maharashtra.

As seen in Figure 1, smartphones were the most used device for attending online classes by students and also for communication between teachers and parents. Smartphones were available in 94% of the households covered in the study, across all the regions of Maharashtra, although differences in the availability of other devices in the urban and rural regions were quite stark. Urban regions showed a higher percentage of desktops/laptops/tablets and TV than the rural regions. One of the regions with a higher tribal population recorded the lowest number of devices. Although 50 % of the students responded by saying that they have a TV at home, only 12% of them were using it for educational purposes.

It is important to note here that the state government had rolled out many educational programs for students with the intent of reaching out to students of all grades and students from rural areas as well. Many students and parents stated that they were not aware of such educational programs being run by the government. The findings of the present study are quite aligned with a previous study conducted by the state government and UNICEF (Goradia, 2020) regarding disparity in the regional usage of devices. The availability of devices was evidently affected by the socio-economic conditions of a region, with the urban students having an upper hand in availability. Ownership of additional devices other than the smartphone, specifically for connecting to online learning incurs additional costs and thus the purchasing power of the parents can be assumed to directly impact the online learning experience of students.

In the context of the type and quality of internet connection, 98% of parents reported that they use a personal cellular network connection for their students' online learning purposes, and reported that community Wi-Fi/internet connection was not available to them. 99% of the interviewed teachers reported using their personal cellular network for connecting to the internet, of which, 76.77% of teachers mentioned that their internet speed was good enough to support sharing of documents, audio as well as video files. The remaining teachers faced issues with sharing online learning resources using the internet. The study also brought to light other issues like the unavailability of compensation to teachers for internet-related expenses and a significant regional disparity in the speed of internet connection.

4.2 The Status of Delivery of Online Learning

After understanding the availability of resources for online learning, it was crucial to inquire about the actual implementation of online learning, especially when compared with regular offline learning. The second research question thus explored the status of the delivery of primary education through synchronous and asynchronous online learning, across Maharashtra.

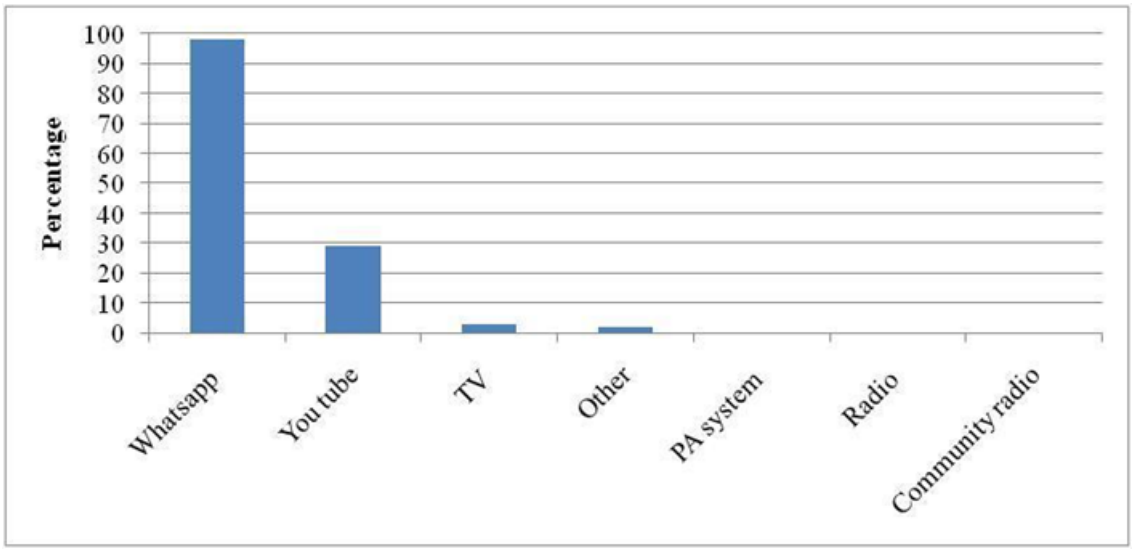

Figure 2: Platforms used for conducting asynchronous classes

Analysis of the 609 in-progress online class observations showed that 73% of the classes were conducted asynchronously, wherein students could not interact with the teachers in real time, and assignments and homework were given to the students through asynchronous platforms. Lack of high speed and stable internet connection appears to be the most prominent reason for this since synchronous platforms rely upon a much higher bandwidth than asynchronous ones. As seen in Figure 2, WhatsApp was seen to be the most widely used platform for conducting asynchronous classes (98%), followed by YouTube (29%) and finally TV (3%). It is necessary to note here that these platforms were used in combination and not in isolation.

A disparity between rural and urban regions was observed in terms of platform usage, with teachers in the urban area using YouTube more often (11% more) as compared to schools in rural areas. This disparity could be attributed to reasons such as connectivity issues, unavailability of faster internet connections, quality of available devices, and also the technical know-how of using YouTube as a platform to teach. While 100% of the private schools used WhatsApp for all teaching, learning, and communication purposes, government schools reported a slightly lower usage at 97%.

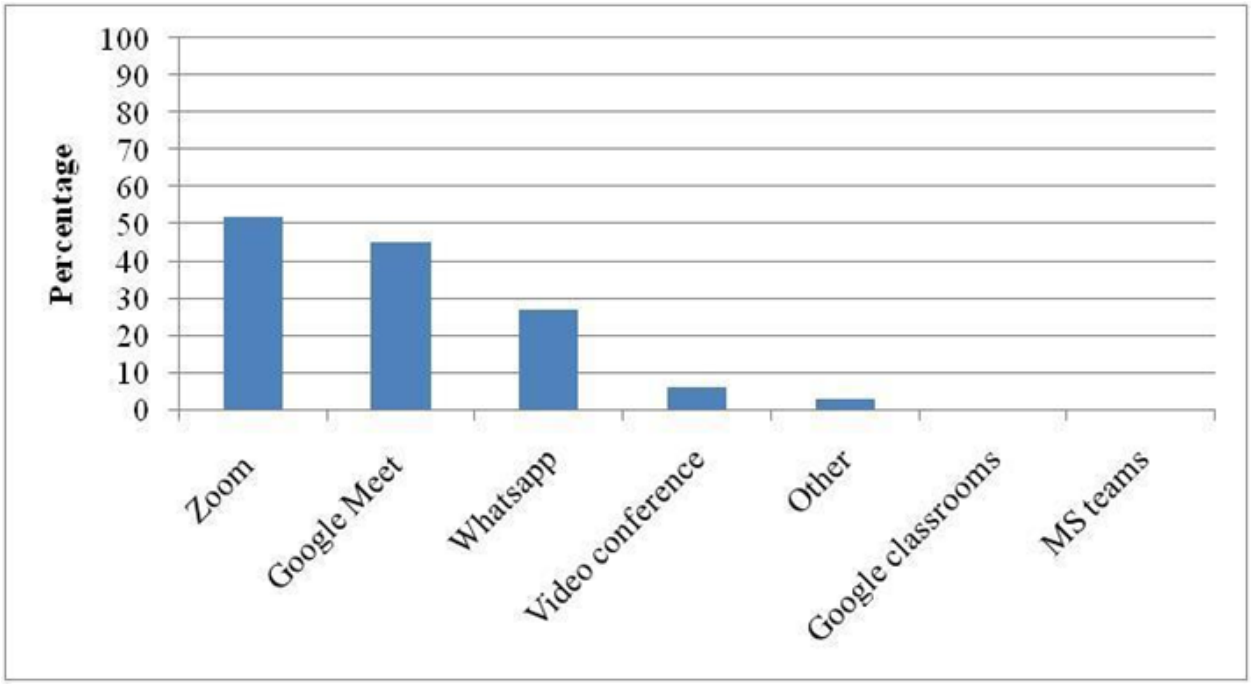

Figure 3: Platforms used for conducting synchronous classes

Out of the 165 synchronously conducted classes observed, Zoom and Google Meet were used most widely for synchronous learning with 52% and 45% observations respectively. Curiously, WhatsApp was found to be used even in synchronously conducted classes with 27% of teachers opting for the platform.

Differences based on the type of school were observed for synchronously conducted classes, with the usage of Zoom in private schools (26%) being more than double as compared to its usage in government schools (12%). Similar differences were observed even for the usage of Google Meet. Zoom and Google Meet are known to require more data and bandwidth as compared to WhatsApp. Private schools usually have students who are more likely to be better connected to the internet when compared with government school students owing either to their location or their socioeconomic status. These factors can explain the findings regarding the platform used for synchronous learning.

4.3 Accessibility to Online Learning

Evaluating online learning is incomplete if the availability of resources and mode of delivery is measured without assessing actual accessibility issues. Our next research question addresses this reality and tries to deep dive into the reasons for these circumstances. Accessibility with reference to the skill levels of parents and students, using the devices used for online learning was thus explored in the present study.

4.3.1 Skill level of parents

Parental support during online learning can be extremely crucial in helping students participate and effectively engage in online learning; especially in the case of students in primary school. Thus, it was essential to also assess the device usage skill level of the parents and not just the students.

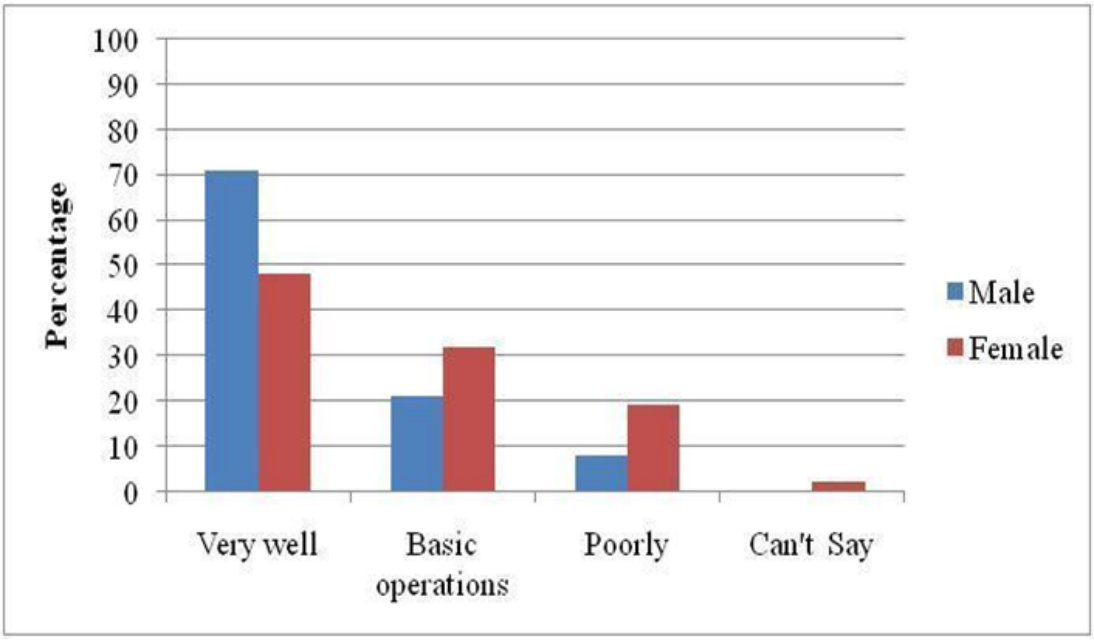

Figure 4: Skill level of parents for using devices

When enquired about how well they can use the devices, only 60% of the parents said they could use the devices 'Very Well', 26% said they could do 'Basic Operations' and 13% said that they had no expertise in handling these devices. As seen in Figure 4, gender differences too were revealed in the ability to use the devices. This gap in skill levels was also seen when the parents of students enrolled in private schools were compared with those enrolled in government schools (73% and 55% of parents reported using the devices very well respectively). The rural-urban divide too demonstrated a 12% difference with the urban areas faring better. As in the study by the Centre for Communication and Development Studies Design (CCDS) (Srivastava et al., 2015), family income and the skill level of parents to use devices seem to have a link. When the skill to use these devices was compared with the education level of the parents, the results showed that none of the illiterate parents could use the devices well, while only 17% of the 'just literate' parents could use these devices well. 37% of parents who attended up to grade eight of school, 55% of the parents who attended

the tenth grade, and 69% of the parents who received education higher than grade ten could use these devices well.

The level of education of parents is proportional to their ability to use the devices well. These results are pointing toward how certain areas and certain groups of people might be better equipped to use technology than others and brings out the glaring disparity in accessibility. It is important here that we see the level of expertise of parents in using these devices since that will directly translate into their ability to guide their children well in their online classes. While 74% of the fathers and 56% of the mothers responded that they can guide their children very well in their online classes, there is a possibility that it's mostly the mothers who support their children at home to study. This skill gap becomes even more detrimental to the student's education in this way.

4.3.2 Skill level of students

Data from student interviews showed that 46% of girls and 42% of boys could perform only the basic functions on the available devices. A higher percentage of private school-going students (57%) could use the devices very well, compared to their government school counterparts (38%), most likely owing to their better socio-economic conditions as well as better exposure to devices at an early age.

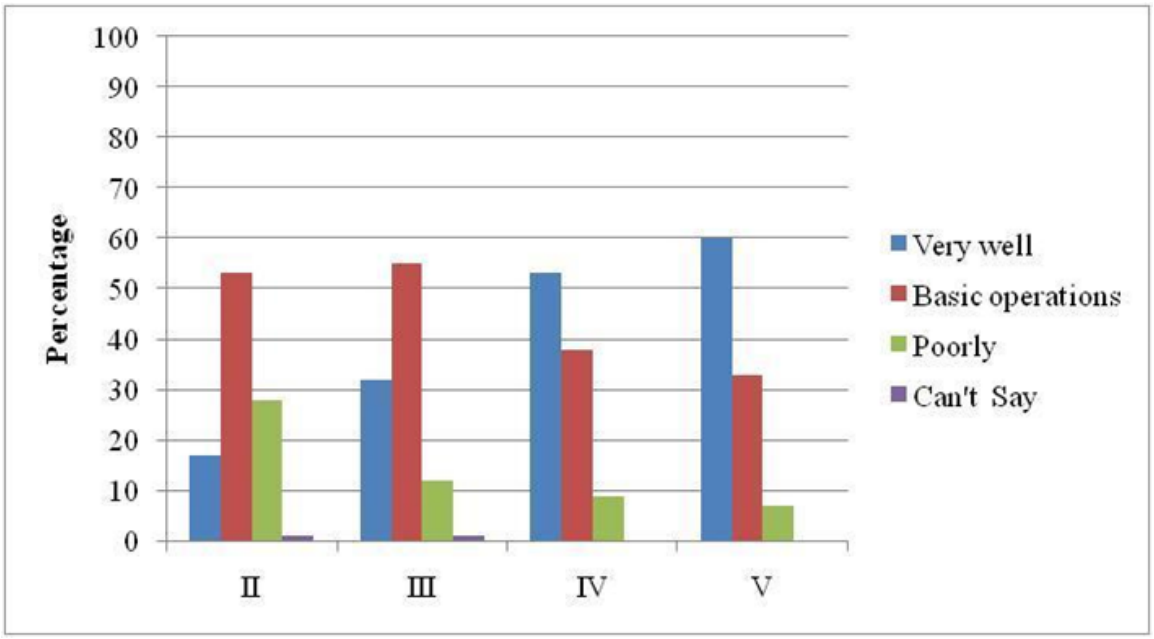

Figure 5: Grade-wise skill level of students for using devices

Overall, when grade-wise skill levels were analyzed, a link between age and skill level emerged. As seen in Figure 5, 17% of grade two students, 32% of grade three students, 53% of grade four students, and 60% of grade five students reported that they could use devices very well. To further analyze the impact of this link between grade and skill level, student attendance across grades for the classes conducted synchronously (165 observations) was also looked into. Since synchronous classes were delivered primarily using Zoom (39%) and Google Meet (34%) which are fairly complicated to use, the attendance of younger students can be expected to be lower. Attendance in these classes was divided into four ranges, namely 1-25% attendance, 26-50% attendance, 51-75% attendance, and 76-100%. In the 76-100% attendance category, attendance was merely 19% for grade two students, 25% attendance for grade three, 33% attendance for grade four, and 40% for grade five students. While overall attendance is poor in general, the lower grades are being left out of online learning the most. The findings discussed in this section have direct implications for executing online learning more effectively by taking into consideration the accessibility issues elicited here.

4.4 Platforms for teaching, learning, monitoring of the implementation of online learning, and sharing of good practices in online learning

The fourth research question examined the most used platform throughout the implementation of online teaching-learning processes for primary school students. While earlier sections have elicited the usage of platforms in Maharashtra, this section compares platforms to identify the platform(s) with leverage over others.

Student interviews demonstrated that WhatsApp was the most widely used platform for online learning, YouTube was used by less than 50% of the students and other platforms like Zoom, Google Meet, educational programs on TV, radio programs, Emails, and Google Classrooms were not comparatively popular. The findings of the teacher interviews were consistent with this, with 92% of teachers reportedly using WhatsApp to conduct classes. It is crucial to note here that the type of school (private vs. government) or the location of the school (rural vs. urban) did not impact the usage of this platform. Teachers across different schools and regions used WhatsApp for conducting classes in the range of 90%-93%. YouTube was the second most popular platform, used by 42% of teachers. Teachers also reported using WhatsApp to share homework with students and to provide feedback for the same. 94% of the students submitted homework via this platform. 96% of teachers gave students feedback through WhatsApp, and only 23% used phone calls for this. When the platforms used by the teachers to share good practices with peers were analyzed, a staggering 97% of teachers reported that they shared this information through WhatsApp. Government authorities frequently checked the status of the implementation of online learning through

regular communication within their offices. As per the data received through the interviews of these officials, Zoom was used most frequently, immediately followed by WhatsApp, with 84% of officials stating that they use WhatsApp in an official capacity to keep a tab on all online learning-related activities.

The reasons for the popularity of WhatsApp compared to the other learning platforms, especially in this sample of primary education stakeholders from government and budget private schools, can again be linked to the availability and accessibility aspects of this platform. WhatsApp as a social media platform is ranked third in India, with 74.6% of social media account holders using this platform in the country (Kemp, 2021). This large user base in general allows it to be a more frequently used platform by not only the students and parents but also teachers and higher authorities and officials, for most of the online learning-related needs. The ease of use of WhatsApp when compared to other platforms used for online learning would be another factor contributing to its popularity, especially among the sample considered for this study, whose device usage-related skills are modest. The third facet explaining this pattern can be the internet resources available to the stakeholders discussed earlier. With over 96% of the stakeholders using their personal cellular network for online learning, a platform like WhatsApp, that utilizes much lower bandwidths would be a more viable choice. Such benefits of using WhatsApp in the educational setup have been highlighted in a few earlier studies as well (Bouhnik & Deshen, 2014; Cetinkaya, 2017). A study by Suardika and colleagues (2020) pointed out that students using WhatsApp for course-related formal groups had the added benefit of developing a stronger sense of community, and overall, the benefits of using WhatsApp outweighed the drawbacks associated with it. WhatsApp offers not only texting facilities but also file sharing and audio group calling capabilities without requiring a high-speed Wi-Fi network to connect. Moreover, other platforms like Zoom, Google Meet, Microsoft Teams, etc., that were popularized as tools for online learning, especially during the pandemic, all require a valid internet account and additional learning to get accustomed to the user interface. WhatsApp on the other hand already existed as a social media platform that offers a simple interface, and thus leveraging it as a platform for online learning did not require additional training for stakeholders who were familiar with it.

While advanced video conferencing platforms like Zoom, Google Meet, Microsoft Teams, and live as well as recorded video sharing platforms like YouTube are extremely effective online learning platforms, it is imperative to understand that this study targeted low-income groups who are the most vulnerable when it comes to inequity in education. Financial status has been identified as a strong determinant of learning disparities, even from the beginning of primary education, especially in rural India (Alcott & Rose, 2017). Coupled with the woes of bad connectivity, the students in this area can be the most vulnerable to missing out on online learning opportunities not just during the pandemic but even in the

future when blended learning or distance learning is expected to become more widespread. WhatsApp and similar free user-friendly platforms that can be used for continued online learning may emerge as a ray of hope for those who cannot afford the luxury of more advanced platforms.

5 Conclusions

The findings of the study revealed that smartphones were the most commonly used device by all stakeholders across all regions. With reference to an internet connection, private cellular networks were most widely used by students and teachers alike for online teaching and learning, especially since interventions by the schools, community, or government were reported, for providing high-speed Wi-Fi connections or any other form of internet to the stakeholders for online learning.

A majority of classes (73%) conducted for primary school children in Maharashtra were asynchronous, primarily owing to the low accessibility of students to devices as well as the poor availability of stable and high-speed internet. 98% of the interviewed teachers used WhatsApp for teaching, making it the most widely used platform. The platform was found to be relevant in the conduction of synchronous classes as well since 27% of the observed classes were using WhatsApp Audio/video calls.

The western part of Maharashtra showed a higher proportion of synchronous classes and ownership of devices for online learning. The cities of Mumbai and Pune which fall under this part of the state, are among the wealthiest cities of the state, and also among the best equipped in terms of online learning. This further strengthens the link between the socio-economic conditions of a region and the availability of as well as accessibility to devices for online learning.

A majority of the data supported the notion that the mere availability of online learning infrastructure in the form of devices for online learning does not guarantee accessibility to these resources and their utilization for online learning. Low levels of skill in using technology in both students and parents emerged as a prominent factor determining accessibility. As the shift to online education was sudden and a fairly novel experience for most stakeholders, the existing skill levels were insufficient.

Due to issues in connectivity and the speed of internet connection, and factors like accessibility, WhatsApp emerged as the most favoured platform by teachers to conduct classes, assign homework, and give feedback to students. A vast majority of education department officials (84%) used WhatsApp to communicate with other officials and to monitor the implementation of online classes.

6 Recommendations

Based on careful consideration of the results and taking into consideration the current status of online learning in the country, a few recommendations are being proposed in this section. These recommendations are not assumed to be a generalized solution for online learning woes for all regions/countries, and their significance would have to be evaluated in light of the prevalent conditions and particular context. Countries facing similar issues technological infrastructure gaps or the digital divide in education may consider these as probable options to be explored. While these recommendations are structured around WhatsApp due to its emergence as the most widely used platform in the present study, similar platforms may be leveraged by educationists and policymakers, per the available data on popular platforms in that particular region/country.

A robust strategy and an adaptable implementation framework can be designed with the help of all the stakeholders, for achieving efficient utilization of WhatsApp, for encouraging higher participation of students, content sharing by teachers with students and with peers, creating and sharing class schedules, and effortless communication within the stakeholders of the primary school education system.

The use of WhatsApp should be facilitated and promoted more effectively among primary school children, for their online learning. The technology-intensive platforms and synchronous teaching modes appear to be more suitable for students of higher grades, skilled students, and students with better and faster internet connections. A grade-wise and region-wise implementation of online learning practices is therefore pivotal for successfully implementing online teaching/ learning programs. Providing context-specific solutions, rather than a blanket implementation of interventions will be more sustainable.

Awareness and training workshops for students and their parents through local government and community intervention can be initiated for the usage of WhatsApp. Since the results of this study pointed out to higher availability of smartphones and higher usage of WhatsApp, efforts should primarily be concentrated on available and accessible technology rather than on introducing new technology. This would help guarantee the efficient utilization of available resources along with the maximum reach of online learning.

Training programs can be conducted for skill-building related to maximum utilization of WhatsApp by educators, in partnership with civil society organizations and local organizations working in the same domain. The subject expertise of these organizations can be used for quick and effective implementation. Utilizing all the functionalities of WhatsApp to their full potential can aid pedagogical practices and will be beneficial for the teachers as well as the learners.

Keeping preparedness in mind, training programs can be initiated for stakeholders to increase their awareness and to build their skills regarding other digital platforms like Zoom, Google Meet, Google Classrooms, etc. that can be used over and above WhatsApp, for enriched online learning in the near future. These training programs can be imparted using WhatsApp by leveraging its popularity and reach. With more literature accumulating on the benefits of synchronous learning, the shift from asynchronous to blended learning and synchronous classes in primary education may be explored with more enthusiasm. WhatsApp could be the platform that assists all stakeholders to make this transition smoother and could eventually help to weave a more inclusive fabric of learning.

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Conflicts of Interest

The authors have no conflicts of interest to declare.

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